z/OS
2.4

MVS System Management Facilities (SMF)

SA38-0667-40

Note

Before using this information and the product it supports, read the information in “Notices” on page 1119.

This edition applies to Version 2 Release 4 of z/OS (5650-ZOS) and to all subsequent releases and modifications until otherwise indicated in new editions.

Last updated: 2021-06-21

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About this document

This information supports z/OS® (5650-ZOS) and describes the system management facilities (SMF) component of a z/OS system. This document can be used to aid in planning, installing, and using SMF in a z/OS environment.

Who should use this document

This document is primarily intended for system programmers who support accounting and billing services for an installation. It can be used by installation managers and system programmers who are responsible for problem resolution, system tuning, and capacity planning for a z/OS system. This document assumes that the reader has extensive experience with z/OS, is familiar with its basic concepts, and can code JCL statements to run programs or cataloged procedures, can code in assembler language, and can read assembler, loader, and linkage editor output.

How this document is organized

This document is organized as follows:

- Chapter 1, "Introduction to SMF," on page 1 introduces SMF and describes how installations use SMF.
- Chapter 2, "Setting up and managing SMF," on page 15 describes what must be done to run SMF on your system.
- Chapter 3, "Using the SMF dump programs," on page 29 describes the SMF dump program, how to switch and dump the SMF data sets.
- Chapter 4, "Customizing SMF," on page 57 describes methods of tailoring SMF to meet the specific needs of the installation.
- Chapter 5, "Using SMF macros," on page 77 includes SMF macros and how to use them.
- Chapter 6, "User-written report programs," on page 93 describes how to design and produce SMF reports.
- Chapter 7, "APPC/MVS accounting," on page 101 describes recording information for APPC/MVS work.
- Chapter 8, "z/OS UNIX System Services accounting," on page 107 describes z/OS UNIX information in various SMF records.
- Chapter 9, "System Logger accounting," on page 115 describes recording information for system logger.
- Chapter 10, "EXCP count," on page 119 includes information on how EXCP counts are included in SMF records.
- Chapter 11, "CPU time," on page 121 describes CPU time under TCBs and SRBs and possible variations.
- Chapter 12, "IFAUSAGE — Collecting usage data," on page 125 describes the IFAUSAGE macro that MVS™ provides for collecting data related to CPU time usage and other resource usage.
- Chapter 13, "Signing and validating SMF records," on page 147 describes how you can use digital signatures to detect a change, addition, or removal of an SMF record from a group of records.
- Chapter 14, "SMF real-time interface," on page 153 describes the application programming interface (API) that offers real-time access to SMF in-memory resources.
- Chapter 16, "SMF record general information and best practices," on page 161 discusses general information, standard and extended record headers, and best practices for designing SMF records.
- Chapter 17, "SMF records ," on page 167 includes the formats of SMF records and describes SMF header standards.

Highlighting

This document uses different type styles to identify certain kinds of information. General information is printed in the standard type style (the type style used for this sentence). The following type styles indicate special information:

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: Each time a new term is introduced, its first occurrence is printed in bold italic type (for example, "***racfbname*** specifies the name of a RACF® data base").

SYSTEM PARTS
: The names for commands, subcommands, keywords, utilities, and other parts of the system are printed in uppercase type (for example, "the ALTER command").

Variable information
: The names for information that you must provide are printed in italic type (for example, "type *yourname*").

  Variable information that appears in system messages is also printed in this type style, for example, "LOCATE *entryname*". In this case, the italicized word (*entryname*) that is used in this document is replaced by the actual entry name when the system displays the message.

  When numerical variables appear in the system messages, this document uses the following convention: *nnn*. In this case, what the system supplies on the screen is an actual number that you can use to determine the cause of the problem. Similarly, in the case of alphabetic variables, this document uses the characters *xxx*, *yyy*, or *zzz*.

`Information that you are to type or that appears on your screen`
: Information that you should type (in response to a message) is printed in monospace type (for example, "type `yes` and press Enter"). Also, when this document refers directly to a message that appears on the screen, this type style is used. An example of such a message is "`Enter password`."

z/OS information

This information explains how z/OS references information in other documents and on the web.

When possible, this information uses cross document links that go directly to the topic in reference using shortened versions of the document title. For complete titles and order numbers of the documents for all products that are part of z/OS, see *z/OS Information Roadmap*.

To find the complete z/OS library, go to IBM Documentation (www.ibm.com/docs/en/zos).

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  - Your name, company/university/institution name, and email address
  - The following deliverable title and order number: z/OS MVS System Management Facilities (SMF), SA38-0667-50
  - The section title of the specific information to which your comment relates
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Summary of changes

This information includes terminology, maintenance, and editorial changes. Technical changes or additions to the text and illustrations for the current edition are indicated by a vertical line to the left of the change.

Summary of changes for z/OS Version 2 Release 4

The following changes are made for z/OS Version 2 Release 4 (V2R4).

New

The following information is added in this publication:

May 2021 refresh

- For record type 89, APAR OA60198 adds the SMF89SolutionID field at offset 206 in “System ID section” on page 831.

April 2021 refresh

- For record type 92, APAR OA60306 updated record type 92 subtype 12 and 13 to allow for memory maps that are larger than 2 gigabytes in length. See “Subtype 12” on page 877 and “Subtype 13” on page 877.
- HWIREST API information added to Record type 106 via APAR OA60351. See “Record type 106 (X'6A') — BCPii activity” on page 1073.

March 2021 refresh

- For record type 26, APAR OA57466 adds new triplet fields to locate the Encryption/compression section in “Triplet Section” on page 284, and adds the Encryption/compression section in “Encryption/compression section” on page 285.

December 2020 refresh

- For record type 42 subtype 6, new fields, S42SNTWH, S42SNTDR, S42SNTDX, S42DS2FL, and S42DS2DL are added. See “Synchronous I/O Section 2” on page 396 and “Data set header section” on page 391.

October 2020 refresh

- For record type 30, bit 5 of field SMF30SFL is defined, and fields SMF30NumberOfDataSpacesHWM and SMF30UserDataSpaceCreateReqCount are added via APAR OA59126. See “Storage and Paging Section” on page 317.
- For record type 70 subtype 2, FFX measurement fields are added via APAR OA59330. See “ICSF Services Data Section” on page 565.

September 2020 refresh

- For record type 14, byte 2 (SMF14DSENCNP) of the SMF14DEF field and the SMF14FLGS/ SMF14FLG1 field are added via APAR OA56622. See “DASD Data Set Encryption Information (Type 9)” on page 238.
- For record type 90 subtype 40, the SMF90T40_RP_Start_Requestor_ID and SMF90T40_RP_Duration fields are added via APAR OA59813. See “Subtype 40 — Boost information” on page 865.
- For record type 99 subtype 1, the SMF99_BOOSTINFO field is added via APAR OA59366. See “System State Information Section” on page 981.

July 2020 refresh

- For record type 74 subtype 4, new fields are added in the Request Data Section via APARs OA58729 and OA58724. See “Request Data Section” on page 653.
- For record type 42 subtype 6, new fields are added via APAR OA57718. See “Synchronous I/O Section 2” on page 396 and “Synchronous I/O Section 3” on page 397.

Prior to July 2020 refresh

- In support of IBM z/OS Workload Interaction Correlator (APAR OA57165):
  - A brief description of IBM z/OS Workload Interaction Correlator is added in “Profiling system resource use” on page 12.
  - The WIC parameter is added in “WIC — Specifying the generation of type 98 records for IBM z/OS Workload Interaction Correlator” on page 70.
  - A new chapter has been added in Chapter 15, “IBM z/OS Workload Interaction Correlator,” on page 157.
  - New fields are added to the data section in SMF record type 98 subtype starting at decimal offset 128. For details, see “Data section” on page 953.
  - New triplet information has been added in “Suspend lock summary section” on page 962 and “Suspend lock detail section” on page 964.
  - New record type 98 subtype sections are added in “Subtypes for IBM z/OS Workload Interaction Correlator” on page 972.
- Record type 124 subtypes 2 - 5 have been added in “Record type 124 (X'7C') — I/O Supervisor (IOS) information” on page 1101 (APAR OA56924).
- For APAR OA57371, the ASIGVALIDATE parameter has been added in “Specifying parameters for the SMF data set dump program” on page 42. For record type 2, Dump header, subtype 1, a self-defining section and an ARECSIGN section are added. For subtype 2, a self-defining section is added. See “Record type 2 (X'02') — Dump header” on page 169.
- The C header file, `ifacsmfr.h`, is described in “IFACSMFR — Addressing SMF record fields” on page 81.
- In the standard and extended SMF record header descriptions, Table 11 on page 164 is updated for SMFHDR_STP and SMFHDR1 _STP.
- For record type 30, new TIOT high-water mark fields have been added in “Storage and Paging Section” on page 317.
- For record type 30, SMF30_BoostInfo description is added in “Processor Accounting Section” on page 307.
- The REPORTOPTS parameter has been added in “Specifying parameters for the SMF log stream dump program” on page 30 and “Specifying parameters for the SMF data set dump program” on page 42.
- For APAR OA57152, new fields to contain the job ID and sysplex name have been added in record type 62 at offsets 78 and 86 in “Statistics Section” on page 517 and in record type 64 at offsets 304 and 312 in “Statistics Section at OPEN Time” on page 525.
- New fields (SMF70OS_PRTCT, SMF70CPC_TYPE, SMF70_IPL_TIME, SMF70_TRG_M_CNT and SMF70CRW) are added to the CPU Control Section of record type 70 subtype 1.
- A new field, SMF70_TRG_MEM, is added to the Tenant Resource Group (TRG) Data Section of record type 70 subtype 1.
- For record type 70, SMF70FLA description is added in “RMF Product Section” on page 542 and SMF70_BoostInfo description is added in “PR/SM Partition Data Section” on page 557.
- For record type 71, several field descriptions are updated to reflect that reporting is at shared page level and not at shared page group level. In addition, new type 71 fields that report at 64-bit shared page group level are added for “Paging Data Section” on page 572.

- For record type 74 subtype 2, the Path Usage Statistics block is added in “Path Data Section” on page 643.
- A new field, R749LKID, is added to the PCIE Function Data Section of record type 74 subtype 9.
- New fields have been added for RMF reporting of extended asynchronous data mover (EADM) information:
  - For record type 74 subtype 10, in “Subtype 10 — Extended asynchronous data mover (EADM) statistics” on page 695 and “Extended asynchronous data mover (EADM) device (subchannel) information section” on page 696.
  - For record type 78 subtype 3, in “I/O queuing global section” on page 723 and “IOP Initiative Queue and Utilization Data Section” on page 725.
- Record type 78 subtype 2 has five new RUCSA-related fields in “Virtual Storage Common Storage Data Section” on page 718.
- For record type 89:
  - Fields SMF89CountAsTrad and SMF89CountAsTrg are added in “Subtype 1 — Usage data section” on page 834.
  - Fields SMF89TRGData and SMF89TRGDataType are added in “Subtype 1 — Tenant resource group section” on page 838.
- For record type 89, SMF89BoostInfo description is added in “Subtype 1 — Usage data section” on page 834.
- For record type 89, SMF89T2BoostInfo description is added in “Subtype 2 — State data section” on page 840.
- For record type 99, the SMF99E_VCM_CURRTOPO_TOD field has been added in “Header data section” on page 1038.
- Added new group profile and LPAR Capacity group connection types to SMF6ACTP for record type 106. See “Execution environment section” on page 1075.
- A new SMF type 90 subtype 40 record is added for System Recovery Boost. See “Subtype 40 — Boost information” on page 865.

Changed

The following information is changed in this publication:

June 2021 refresh

- For record type 23, SMF now reports a maximum of 100 logstream statistics sections in each record (APAR OA61083). See “Logstream statistics section” on page 268.
- For record type 70 subtype 1, the description of the SMF70OS_PRTCT field is updated in “CPU Control Section” on page 544.
- For record type 72 subtype 3, the word "normalized" is added to the descriptions of the R723TSUSP, R723MSUSP, R723ASUSP, and R723BSUSP fields in “Service/Report Class Period Data Section” on page 594.

April 2021 refresh

- Clarification is provided about collecting SMF type 98 subtype 1 records, as discussed in the following topics:
  - “HFTSINTVL — Specifying the high-frequency throughput statistics interval” on page 69
  - “WIC — Specifying the generation of type 98 records for IBM z/OS Workload Interaction Correlator” on page 70
  - “Record type 98 (X'62') — Workload interaction correlator and high-frequency throughput statistics” on page 947
  - “Subtype 1” on page 952

March 2021 refresh

- For the IFAUSAGE macro, clarification is provided under the Environment and Parameters topics regarding invoking the macro in AMODE 31 and AMODE 64. See "IFAUSAGE macro " on page 127.
- The name of the field at offset 24 (X'18') has been corrected in Table 11 on page 164.
- The introductory paragraph in "Standard and Extended SMF record headers" on page 162 has been updated for better clarity.
- For record type 42 subtype 6, the descriptions of the S42AMZRB and S42AMZWB fields have been updated, and the explanation prior to offset 48 has been updated in "Data access method statistics section" on page 395.
- Clarification about subtypes in type 90 records is provided in:
  - "Record type 90 (X'5A') — System status" on page 843
  - "Specifying parameters for the SMF log stream dump program" on page 30
  - "Specifying parameters for the SMF data set dump program" on page 42
- For record type 99, the name of the field at offset 67 has been corrected. See "Remote Queue Server Data Entry Section" on page 1004.

January 2021 refresh

- Updates have been made in support of sysplex analysis via APAR OA60372 in "Configuring HIS to write workload interaction correlator records to a z/OS UNIX file" on page 159.
- For record type 42 subtype 27, the SMF42RACT field is updated to include new activity types in "VTOC update header section" on page 478.

December 2020 refresh

- The length of the SMF89SER field has been corrected in "System ID section" on page 831.
- Information about how to access *IBM BatchPipes OS/390 V2R1 User's Guide and Reference* has been updated in "Record type 91 (X'5B') — BatchPipes statistics" on page 867.

October 2020 refresh

- The descriptions of the USER4 and USER5 parameters have been updated in "Specifying parameters for the SMF log stream dump program" on page 30 and "Specifying parameters for the SMF data set dump program" on page 42.
- For record type 30, the description of the SMF30SCC field is clarified via APAR OA59998. See "Completion Section" on page 304.
- For record type 42, the description of the SMF42PSV field has been updated. See "Product section" on page 375.
- For record type 42, the descriptions of fields SMF42274 - SMF42276 have been updated, and fields SMF42277 - SMF32279 have been added in "Header/Self-defining section" on page 368.

September 2020 refresh

- The following fields (in multiple record types, as indicated by the field names) are updated via APAR OA59321 to support the recovery process boost class: SMF30_BoostInfo, SMF70FLA, SMF72FLA, SMF79FLA, SMF89_BoostInfo, and SMF89T2BoostInfo.
- For record type 90 subtype 40, the SMF90T40_Event, SMF90T40_Flags0, and SMF90T40_Flags1 fields are updated via APAR OA59813 to support recovery process boosts. See "Subtype 40 — Boost information" on page 865.
- For record type 99 subtype 2, the SMF99FLAGS2 field in the Period Data section has been updated via APAR OA59366. See "Period Data Section" on page 992.

July 2020 refresh

- For record type 30, the description for byte 0 of the SMF30CAS_OA54589 field has been updated. See "Processor Accounting Section" on page 307.

- The descriptions of the RECTYPE and SUBTYPE parameters for the SMFRTEST macro are updated. See "SMFRTEST — Testing record recording" on page 88.
- For APAR OA59541, the SMF42RDS1 and SMF42RCMDS fields are updated in "VTOC update header section" on page 478.

Prior to July 2020 refresh

- For record type 78 subtype 3, bit 2 is defined in the R783GFLX field. See "I/O queuing global section" on page 723.
- In support of IBM z/OS Workload Interaction Correlator (APAR OA57165), the description of the HFTSINTVL is updated in "HFTSINTVL — Specifying the high-frequency throughput statistics interval" on page 69.
- For zHyperLink Write Statistics, the following section was updated:
  - "Data set header section" on page 391

  These sections were added:
  - "Synchronous I/O Section 2" on page 396
  - "Synchronous I/O Section 3" on page 397
- IEFU86 is added with IEFU83, IEFU84 and IEFU85 exits in Chapter 14, "SMF real-time interface," on page 153.
- The sample summary activity report output has been updated in "Summary activity report" on page 51.
- "IFAUSAGE macro " on page 127 is updated to support AMODE 64 and allowing unauthorized callers to access authorized functions.
- The record type 30 "zEDC usage statistics section" on page 335 is updated to support APAR OA56143.
- The record mapping for RMF Product sections in record types 70 through 79 have been updated.
- SMF70HHF description for bit 5 is changed in the CPU Control Section of SMF 70 subtype 1 records.
- The following are added to Cryptographic Hardware Activity of SMF type 70 subtype 2 records:
  - R7023CT, R7023SCOPE, and R7023DID fields have been added in the "Cryptographic CCA Coprocessor Data Section" on page 562,
  - R7024CT, R7024SCOPE, and R7024DID fields have been added in the "Cryptographic Accelerator Data Section" on page 563,
  - R7025CT, R7025SCOPE, and R7025DID fields have been added in the "Cryptographic PKCS11 Coprocessor Data Section" on page 567.
- For record types 71, 78, and 79, several field descriptions are updated to support restricted use common service area (RUCSA):
  - "Paging Data Section" on page 572
  - "Virtual Storage Common Storage Data Section" on page 718
  - "SRCS Data Section" on page 745
- For record type 99, several field descriptions are updated:
  - For subtype 1,
    - "Header/Self-defining Section" on page 979
    - "System State Information Section" on page 981
    - "Resource Group Entry Section" on page 986
    - "Software licensing information" on page 989
  - For subtype 2,
    - "Period Data Section" on page 992

        - “Address space expanded storage access policy section” on page 1005
    - For subtype 10,
        - “CPU Data Section” on page 1026
        - “Processor Speed Change Section (old or new)” on page 1027
    - For subtype 12,
        - “Header data section” on page 1028
        - “Capacity data section” on page 1031
    - For subtype 14, “Header data section” on page 1038

Deleted

The following information is deleted in this publication:

Prior to July 2020 refresh

- The topic, "VTOC update volume section," has been removed as it contained duplicate information already found in “VTOC update header section” on page 478. (APAR OA59541)

Summary of changes for z/OS Version 2 Release 3

The following changes are made for z/OS Version 2 Release 3 (V2R3).

New

The following new information is added in this publication:

- SMF record type 98 has new fields in “Identification section” on page 950, “Context summary section” on page 950, and “Environmental section” on page 955.
- For APAR OA57046, additional examples and clarification have been added in “Using IFASMFDL to carry signatures to data sets” on page 149 and “Using IFASMFDP to validate records” on page 150.
- A link to information about SMF record type 123 has been added in “Record type 123 (X'7B') — IBM z/OS Connect EE” on page 1101.
- For APAR OA52828, information about the SMFTBUFF buffer option has been added in:
    - “BUFSIZMAX, BUFUSEWARN, DSPSIZMAX, PERMFIX, NOBUFFS, and SMFTBUFF — Specifying SMF buffer options” on page 67
    - Field SMF0TBUFF in “Header/self-defining section” on page 167
    - Field SMF7TBLS in “Header/Self-defining Section” on page 215
    - Field SMF23MBU in “SMF statistics section” on page 265
- The following new sections have been added to SMF record type 42 subtype 5 (APAR OA55711):
    - “Volume metrics section” on page 388
    - “System I/O section” on page 389
    - “System I/O statistics section” on page 389
    - “System I/O high response time section” on page 390
    - “Volume background activity” on page 390
    - “Volume cloud activity section” on page 390

  Also, subtype 5 has new fields in “Volume header section” on page 384.

  In addition, subtype 6 has new fields in “Data set I/O statistics section” on page 394.
- For SMF record type 30, in the “Processor Accounting Section” on page 307, the SMF30CAS_OA54589 field has been added at offset 188 (X'BC'). (APAR OA54807)
- For SMF record type 42, subtype 27, new activity type DCPY has been added to the SMF42RACT field.

- For SMF record type 42, subtypes 5 and 6, a new S42SNCONC field has been added in "Synchronous I/O Section 1" on page 387. (APAR OA54112)
- SMF record type 42 subtype 6 "Data set I/O statistics section" on page 394 at offsets 132 and 136, previously reserved, has new application resume delay statistics. Offset 140 is now reserved. (APAR OA54822)
- SMF record type 70 subtype 1 "CPU Control Section" on page 544 at offset 288, previously reserved, has new section SMF70MaxPU offsets. Offset 290 is now reserved.
- For SMF record type 99 subtype 1"Resource Group Entry Section" on page 986 has new resource group flags for SMF99_RG_FLAGS and new offsets. For subtype 2 "Address space expanded storage access policy section" on page 1005 there are new offsets.
- New "Subtype 1 — Tenant resource group section" on page 838 and "Subtype 1 — Intersection data for tenant resource groups" on page 839 have been added to SMF record 89 subtype 1. For subtype 2 "Subtype 2 — State tenant resource group data section" on page 842 has been added.
- A new "Tenant Resource Group data section" on page 561 has been added to SMF record type 70, subtype 1.
- New fields have been added to SMF Record type 99 subtype 1, "CPU Control Section" on page 544.
- For SMF record type 14 (and 15), new fields have been added in "DASD Data Set Encryption Information (Type 9)" on page 238.
- SMF record type 42 has new fields in "VTOC update header section" on page 478 and "DSCB change section" on page 480.
- SMF record type 62 has new fields in "Header/Self-defining Section" on page 516.
- The "Paging Data Section" on page 572 of Record Type 71 has been updated with several new fields.
- The description for R723IFCT in "Service/Report Class Period Data Section" on page 594 has been changed to reserved.
- SMF macro IFAHDR for the Chapter 5, "Using SMF macros," on page 77 section.
- SMF macro IFASMFH for the Chapter 5, "Using SMF macros," on page 77 section.
- SMF macro IFAEXITP for the Chapter 5, "Using SMF macros," on page 77 section.
- SMF record type 30 has new offset of 178, 186, and 187, see the "Header/self-defining section" on page 297.
- New SMF "Record type 125 (X'7D') — Generic Tracker data persistence" on page 1111.
- New offset 88 and 92 for Record type 23 (17) in the "Logstream statistics section" on page 268.
- New offset 148 for record type 124 in the "Subtype 1" on page 1105 section.
- New offset 180 and 181 for record type 30 (1E) in the "Triplet information" on page 307 section.
- New subtype 21 for record type 84 called the "Subtype 21 — JES2 Resource Usage Section" on page 810 and "Subtype Header Section" on page 811 under the "Record type 84 (X'54') — JES monitoring facility data" on page 771 section.
- New offsets 40, 48, 52, 56, and 60 for record type 41 in the "VLF Statistics Section" on page 365.
- SMF record type 72 has new fields in "Workload Manager Control Section" on page 591 .
- "Request Data Section" on page 653 has been updated.
- "PCIE function data section" on page 689 has been updated.
- New subtopics, "Synchronous I/O link data section" on page 694 and "Synchronous I/O response time distribution data section" on page 694 have been added to "PCIE function data section" on page 689.
- SMF record type 92 has new subtypes to support the collecting and recording of file system events, performance data, and per-file system statistics for zFS. See "Record type 92 (X'5C') — File system activity" on page 867.
- SMF record type 92 has a new subtype that is produced when the target file system is mounted during file system migration. See "Subtype 8" on page 874.

- SMF record type 99 has new fields in Subtype 1, “Software licensing information” on page 989 and “Resource Group Entry Section” on page 986, in Subtype 2, “Period Data Section” on page 992 and “Address space expanded storage access policy section” on page 1005, in Subtype 6, “Period Data Section” on page 1016, and in “Subtype 12” on page 1028 .
- SMF record type 122 has been added in “Record type 122 (X'7A') — IBM Explorer for z/OS and dependent products” on page 1101.

Changed

The following information is changed in this publication:

- The meaning of the bits in the SMF30_RAXFLAGS field have been updated. (APAR OA56180)
- The following have been added to Cryptographic Hardware Activity of SMF 70 subtype 2 records.:
  - R7023SCOPE and R7023DID entries have been added to the “Cryptographic CCA Coprocessor Data Section” on page 562,
  - R7024SCOPE and R7024DID have been added to the “Cryptographic Accelerator Data Section” on page 563,
  - R7025SCOPE and R7025DID have been added to the “Cryptographic PKCS11 Coprocessor Data Section” on page 567.
- The description of R7491BPC in “Hardware accelerator compresssion data section” on page 694 of record type 74 (4A) - RMF Activity of Several Resources has been updated.
- The following RMF-related topics and sub-topics have been modified: “CPU Control Section” on page 544, “Tenant Resource Group data section” on page 561, “Workload Manager Control Section” on page 591, and “Service/Report Class Period Data Section” on page 594.
- The “PCIE function data section” on page 689 has been updated.
- New “Triplet Information” on page 305 for SMF30SCC was updated for clarity.
- SMF record type 89 has updated fields in the following sections:
  - The description of SMF89UF2 in “Subtype 1 — Usage data section” on page 834.
  - In “Record product section” on page 830 the “Triplet information” on page 830 has been updated.
  - In “Subtype 2 — State data section” on page 840 the “Triplet information” on page 840 has been updated.
- SMF record type 99 has been updated in “Subtype 14” on page 1037 the “Header data section” on page 1038 has been updated.
- SMF record type 14 has updated fields in the following sections:
  - “RAS Section (Type 8)” on page 237
  - “DASD Data Set Encryption Information (Type 9)” on page 238
- The record mapping for RMF Product sections in Record Types 70 through 79 have been updated.
- SMF record type 70, subtype 1 has updates in the following sections “Header/Self-defining Section” on page 731 and “CPU Control Section” on page 544.
- SMF record type 70, subtype 2 has updates in the following data section: “Cryptographic PKCS11 Coprocessor Data Section” on page 567.
- The “Paging Data Section” on page 572 of Record Type 71 has been updated.
- SMF record type 72, subtype 3 has updates in the following sections: “Service/Report Class Period Data Section” on page 594,“Workload Manager Control Section” on page 591, “Resource Group Data Section” on page 593,
- SMF record type 72, subtype 4 has updates in “Swap Reason Data Section” on page 607.
- SMF record type 72, subtype 4 has updates in “Service Class Period Data Section” on page 606.
- “Storage class memory (SCM) configuration measurement section” on page 695 of SMF record type 74 has been updated.

- “PCIE function data section” on page 689, “PCIE Function Type data section” on page 692, “Record type 74 (X'4A') — RMF Activity of several resources” on page 624 and “Header/Self-defining Section” on page 628
- SMF record type 74 “Device Control Data Section” on page 635, “Control Data Section” on page 682, “Cache device data section” on page 665, “Cache device data section extension” on page 670 and “RAID Rank/Extent Pool Data Section” on page 674 have been updated.
- SMF record type 75 “Page Data Set Data Section” on page 700 has been updated.
- Two new entries were made to the “Virtual Storage Private Area Data Section” on page 720 table of SMF record type 78.
- SMF record type 79 “Monitor II Control Section” on page 735, “SENQR Data Section” on page 749, “Device Data Section” on page 637, and “PGSP Control Section” on page 753 have been updated.
- SMF record type 79, subtype 1 has been updated in “ASD and ASDJ data section” on page 736.
- SMF record type 79, subtype 2 has been updated in “ARD and ARDJ data section” on page 741.
- SMF record type 79, subtype 5 has been updated in “ASRM and ASRMJ Data Section” on page 748.
- SMF record type 99, subtype 12, has been updated in “Capacity data section” on page 1031 to reflect changes.
- Changed title for “Record type 117 — WebSphere Message Broker and IBM Integration Bus” on page 1097 to reflect new information.
- Changed Offset 22, 24, and 140 for record type 124 under the “Subtype 1” on page 1105 section.
- Changed length for record types 14 and 74 under sections “DCB/DEB Section (tape and DASD)” on page 227 and “Header/Self-defining Section” on page 522.
- Values for R783DSTX field in SMF record 78, subtype 3, offset 3 were moved from IOP Initiative Queue and Utilization Data Section to I/O Queuing Data Section. OP Initiative Queue and Utilization Data Section offset 3 was changed to "Reserved".
- The record mapping for RMF Product sections in Record Types 70 through 79 have been updated.
- SMF record type 70, subtype 2 has updates in the following data section: “Cryptographic PKCS11 Coprocessor Data Section” on page 567.
- The “Paging Data Section” on page 572 of Record Type 71 has been updated.
- SMF record type 72, subtype 3 has updates in “Service/Report Class Period Data Section” on page 594.
- SMF record type 72, subtype 3 has updates in “Workload Manager Control Section” on page 591.
- SMF record type 72, subtype 3 has updates in “Resource Group Data Section” on page 593.
- SMF record type 72, subtype 4 has updates in “Swap Reason Data Section” on page 607.
- SMF record type 72, subtype 4 has updates in “Service Class Period Data Section” on page 606.
- “Storage class memory (SCM) configuration measurement section” on page 695of SMF record type 74 has been updated.
- “PCIE function data section” on page 689, “PCIE Function Type data section” on page 692, “Record type 74 (X'4A') — RMF Activity of several resources” on page 624 and “Header/Self-defining Section” on page 628
- SMF record type 74 “Device Control Data Section” on page 635, “Control Data Section” on page 682, “Cache device data section” on page 665, “Cache device data section extension” on page 670 and “RAID Rank/Extent Pool Data Section” on page 674 have been updated.
- Changed title for “Record type 117 — WebSphere Message Broker and IBM Integration Bus” on page 1097 to reflect new information.
- Changed Offset 22, 24, and 140 for record type 124 under the “Subtype 1” on page 1105 section.
- Changed length for record types 14 and 74 under sections “DCB/DEB Section (tape and DASD)” on page 227 and “Header/Self-defining Section” on page 522.

Summary of changes for z/OS Version 2 Release 2, as updated March, 2017

The following changes are made for z/OS Version 2 Release 2 (V2R2), as updated March, 2017.

New

- For SMF record type 99, Resource Group Entry section:
  - Added a new maximum memory limit statistic. See "Resource Group Entry Section" on page 986.

Changed

- For SMF record type 99, period data section, the description of SMF99_FLAGS2 was changed to reflect Honor Priority, in "Period Data Section" on page 992.
- For SMF record type 99, address space expanded storage access policy section, the description of SMF99_AS_ESP_FLAGS was changed to reflect Honor Priority, in "Address space expanded storage access policy section" on page 1005.
- For SMF record type 99, subtype 6, period data section, the description of SMF996_FLAGS was changed to reflect Honor Priority, in "Period Data Section" on page 1016.

Summary of changes for z/OS Version 2 Release 2, as updated December, 2016

The following changes are made for z/OS Version 2 Release 2 (V2R2), as updated December, 2016.

New

- Chapter 14, "SMF real-time interface," on page 153 has been added.
- For SMF record type 42, subtype 19:
  - Added new LRU statistics for above the bar - SMF2AJU (C through G) for "System local buffer manager LRU statistics summary for above the bar" on page 471
  - Added new LRU statistics for below the bar - SMF42JU (C through G) for "System local buffer manager LRU statistics summary for below the bar" on page 465

Changed

- For SMF record type 42 description in "Record type 42 (X'2A') — DFSMS statistics and configuration" on page 366:
  - For the Subtype 2 description, replaced cache for DASD storage and deleted Model 3990-3.
  - Updated the Subtype 14 description for IFASMFR.
- For SMF record type 42, Subtype 6:
  - Corrected the description sentence for "Data access method statistics section" on page 395.
- For SMF record type 70, Subtype 1:
  - SMF70HHF is updated in "CPU Control Section" on page 544 to change bit 4 to indicate Absolute MSU capping is active for this partition.
  - SMF70HWGr_Name is added to "PR/SM Partition Data Section" on page 557 to specify the name of the hardware group to which the partition belongs.
  - SMF70VPF is updated in "PR/SM Logical Processor Data Section" on page 559 to change bit 7 to indicate SMF70HWGr_Cap_Limit has changed during the interval.

- SMF70HWGr_Cap_Limit is added to "PR/SM Logical Processor Data Section" on page 559 to specify absolute limit on partition usage of all CPUs of the type indicated in SMF70CIX that are members of the same hardware group.
- For SMF record type 74, Subtype 1:
  - The "Device Data Section" on page 637 is updated to define a new bit in SMF74CN2 and add new fields SMF74AGC and SMF74AGS.
- For SMF record type 74, Subtype 4:
  - In "Record type 74 (X'4A') — RMF Activity of several resources" on page 624:
    - The **Channel Path data section** is updated to add information about sender and receiver Channel Path data sections for remote coupling facilities.
    - A new **Asynchronous CF Duplexing data section** is added.
  - **Individual header extension for subtype 4** in "Header/Self-defining Section" on page 628 is updated with new fields SMF744AO, SMF744AL, and SMF744AN.
  - "Structure Data Section" on page 652 is updated with new R744QFL1 field.
  - "Asynchronous CF Duplexing Data Section" on page 663 is new.
  - For SMF record type 74, Subtype 9 for the physical-network identifier: The decimal offset of 130 has been corrected to 136.
- For SMF record type 78, Subtype 3:
  - The "I/O queuing global section" on page 723 is updated to add a new R783GFLX field.
  - The "I/O Queuing Configuration Control Section" on page 725 is updated to add new R783AMGC and R783AMGS fields.
  - The "HyperPAV/SuperPAV Data Section" on page 728 is updated to add new fields.
- For the IFAUSAGE macro:
  - The PTOKEN variable was corrected to PRTOKEN.
  - A note was added under the FUNCTIONBEGIN parameter.

Summary of changes for z/OS Version 2 Release 2, as updated September, 2016

The following changes are made for z/OS Version 2 Release 2 (V2R2), as updated September, 2016.

New

- The HFTSINTVL has been added in "HFTSINTVL — Specifying the high-frequency throughput statistics interval" on page 69.
- SMF record type 98 has been added in "Record type 98 (X'62') — Workload interaction correlator and high-frequency throughput statistics" on page 947.

Summary of changes for z/OS Version 2 Release 2, as updated June, 2016

The following changes are made for z/OS Version 2 Release 2 (V2R2), as updated June, 2016.

New

- The NSI parameter has been added to the IFASEXIT interface in "Obtaining records from SMF log streams" on page 20.
- Chapter 14, "SMF real-time interface," on page 153 has been added.
- SMF record type 99 has new fields in "Software licensing information" on page 989.

- “Record type 124 (X'7C') — I/O Supervisor (IOS) information” on page 1101 has been added.

Changed

- For SMF record type 14:
  - The meaning of the bits in the SMF14DSVER field have been updated in “Additional data set characteristics section (Type 5)” on page 235.

Summary of changes for z/OS Version 2 Release 2, as updated December, 2015

The following changes are made for z/OS Version 2 Release 2 (V2R2), as updated December, 2015.

New

- For SMF record type 30, the SMF30SLM field has been added in “Storage and Paging Section” on page 317.
- For SMF record type 90, the following subtypes have been added:
  - “Subtype 38 — SET IEFOPZ” on page 863
  - “Subtype 39 — SET SMFLIM” on page 865
- For SMF record type 99, subtype 12, the SMF99C_VCM_DiagCapDecr_Cont field was added in “Capacity data section” on page 1031.

Changed

- For SMF record type 30, the description of the SMF30SCC field has been updated in “Completion Section” on page 304.
- For SMF record type 99, subtype 2, these sections have been enhanced: “Period Data Section” on page 992 and “Address space expanded storage access policy section” on page 1005.

Summary of changes for z/OS Version 2 Release 2

The following changes are made for z/OS Version 2 Release 2 (V2R2).

New

The following new information is added in this publication:

- Information about SMF support for the JES2 EVENTLOG data set has been added in “SMF data in the JES2 EVENTLOG data set” on page 4 and “Record type 30 (X'1E') — Common address space work” on page 292.
- Support has been added for digitally signed SMF records:
  - The IFASMFDL utility has new parameters described in “Specifying parameters for the SMF log stream dump program” on page 30.
  - The IFASMFDP utility has new parameters described in “Specifying parameters for the SMF data set dump program” on page 42.
  - The RECSIGN parameter is introduced in “RECSIGN — Digitally signing SMF records” on page 69.
  - Information about setting up and using digitally signed SMF records has been added in Chapter 13, “Signing and validating SMF records,” on page 147.
  - For SMF record type 2, new subtypes 1 and 2 have been added in “Subtype 1” on page 170 and “Subtype 2” on page 172.
- For SMF record type 14 (and 15), new fields have been added in “Step Information Section (Type 3)” on page 234.

- For SMF record type 42, new fields have been added to report local true and false contention in:
  - “Subtype 15 — VSAM RLS Storage Class Response Time Summary” on page 401
  - “Subtype 16 — VSAM RLS Data Set Response Time Summary” on page 428
  - “Subtype 17 — VSAM RLS Coupling Facility Lock Structure Usage” on page 456
- For SMF record type 42, a new subtype 27 record has been added in “Subtype 27 — VTOC audit log” on page 478.
- SMF record types 70-72, 74, and 77-79 have several new fields.
- For SMF record type 74, a new subtype 10 was added in “Subtype 10 — Extended asynchronous data mover (EADM) statistics” on page 695.
- For SMF record type 90, a new subtype 37 has been added in “Subtype 37 — Dynamic APF” on page 862.
- For SMF record type 92, information about subtype 16 was added in “Subtype 16” on page 879.
- For SMF record type 99 — System resource manager decisions, new fields have been added to the records in:
  - “Subtype 1” on page 979
  - “Subtype 12” on page 1028
  - “Subtype 14” on page 1037
- Information about SMF record type 105 has been added in “Record type 105 (X'69') — GDPS/Global Mirror” on page 1073.
- SMF record type 106 has been added in “Record type 106 (X'6A') — BCPii activity” on page 1073.
- SMF record type 117 has been added in “Record type 117 — WebSphere Message Broker and IBM Integration Bus” on page 1097.
- SMF record type 121 has been added in “Record type 121 (X'79') — Java runtime performance statistics” on page 1098.

Changed

The following information is changed in this publication:

- For SMF record type 30:
  - The overview has been updated in “Record type 30 (X'1E') — Common address space work” on page 292.
  - The description of the SMF30STI field has been updated in “Completion Section” on page 304.
- For SMF record type 42, subtype 17 — VSAM RLS coupling facility lock structure usage, changes have been made to some record descriptions in:
  - “Lock structure summary section” on page 457
  - “MVS system CF lock structure activity totals section” on page 456
- SMF record types 75 and 79 have updated fields.
- For SMF record type 99 — System resource manager decisions, changes have been made to some record descriptions in:
  - “Subtype 12” on page 1028
  - “Subtype 14” on page 1037
- For SMF record type 104 — RMF Distributed Platform Performance Data, changes have been made to some record descriptions in “RMF XP product section” on page 1047.

Chapter 1. Introduction to SMF

System management facilities (SMF) collects and records system and job-related information that your installation can use in:

- Billing users
- Reporting reliability
- Analyzing the configuration
- Scheduling jobs
- Summarizing direct access volume activity
- Evaluating data set activity
- Profiling system resource use
- Maintaining system security

These examples show the types of reports that can be created by using the information that SMF collects. "Using SMF data" on page 4 describes each of these in more detail.

SMF formats the information that it gathers into system-related records (or job-related records). System-related SMF records include information about the configuration, paging activity, and workload. Job-related records include information on the CPU time, SYSOUT activity, and data set activity of each job step, job, APPC/MVS transaction program, and TSO/E session. (Chapter 17, "SMF records ," on page 167 includes the formats of the SMF records.)

Chapter 3, "Using the SMF dump programs," on page 29 describes the dump program and how to dump SMF data sets and explains how to code and use them.

An installation can provide its own routines as part of SMF. These routines will receive control either at a particular point as a job moves through the system, or when a specific event occurs. For example, an installation written routine can receive control when the CPU time limit for a job expires or when an initiator selects the job for processing. The routine can collect additional information, or enforce installation standards. Chapter 4, "Customizing SMF," on page 57, summarizes the available installation-written exits. *z/OS MVS Installation Exits* describes each SMF installation exit. Chapter 3, "Using the SMF dump programs," on page 29 describes the SMF dump program exits.

Because SMF data-collection and exit routines are independent of each other, the installation can use them separately or in combination. After analyzing the information that the SMF data-collection routines obtained, for example, the installation might choose to set a time limit for all jobs running on the system and then terminate any job that exceeds this limit. However, to allow certain jobs to bypass this restriction, the installation could add a routine at the SMF time limit exit (IEFUTL) to extend the time limit for those selected jobs.

Figure 1 on page 2 illustrates the functional overview of SMF; it also contains references to Table 1 on page 3 , which explains where you can find more information.

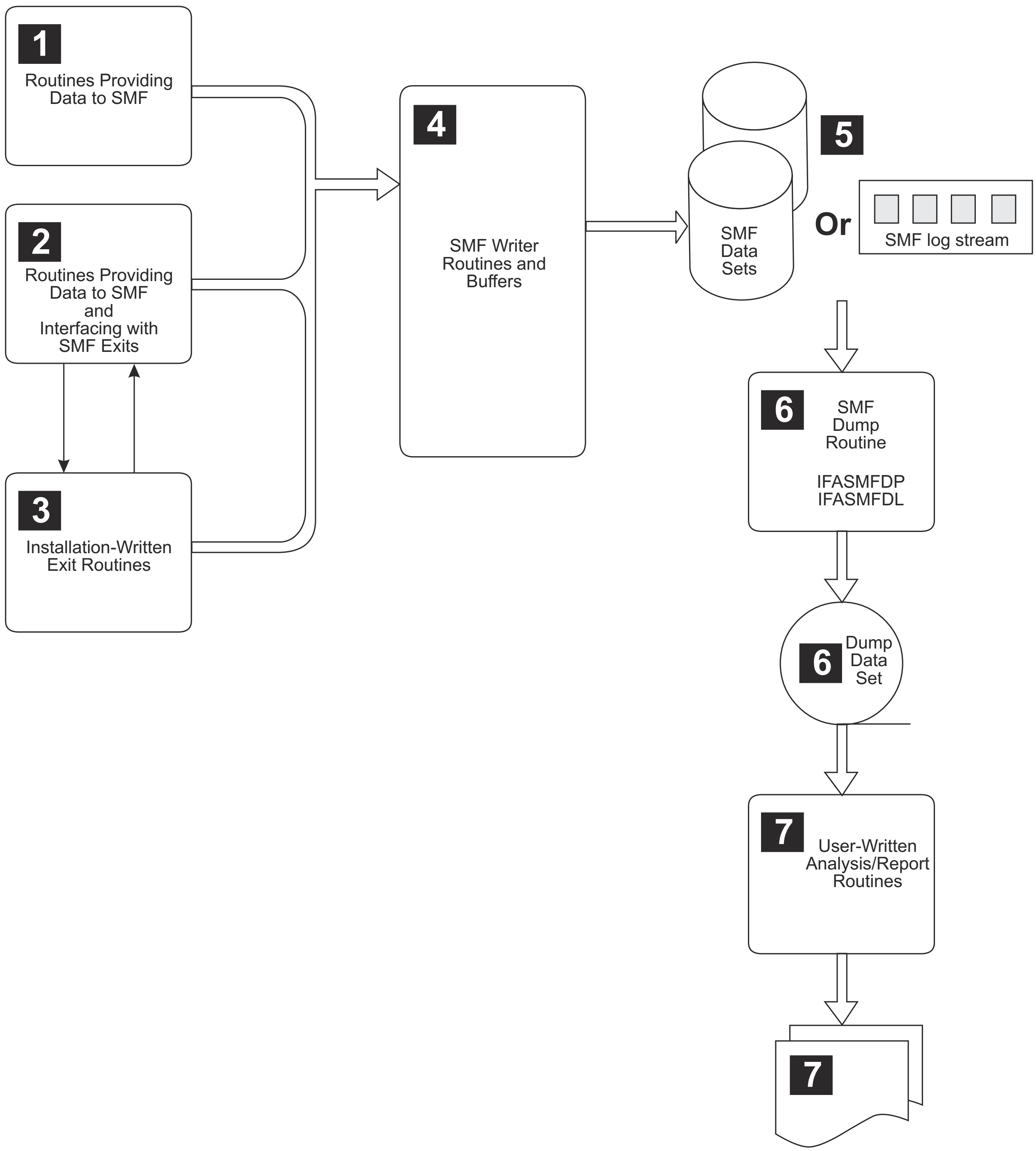


Figure 1. SMF overview

Table 1. SMF process descriptions with references	
Description of process	**Reference**
1 — Routines (SMF, system, program-product, installation-written) collect and format data into records and then pass the records to the SMF writer.	Chapter 4, "Customizing SMF," on page 57 lists the macros used to interface with the SMF writer. *z/OS MVS Programming: Authorized Assembler Services Reference EDT-IXG* and *z/OS MVS Programming: Authorized Assembler Services Reference SET-WTO* contain the detailed description of the macros. Chapter 17, "SMF records ," on page 167 provides information about the records that includes: • The specific events that cause SMF to write records. • The contents of each record.
2 — In addition to collecting data for SMF, some routines interface with the SMF exits, passing control to them at several points during job (and job step) processing.	Chapter 4, "Customizing SMF," on page 57 describes how SMF exits are controlled and how these routines interact with the SMF exits.
3 — The SMF exits get control when specific events occur, such as when a data set exceeds the output limit or at designated points during job processing.	Chapter 4, "Customizing SMF," on page 57 describes the installation exits that are available. The *z/OS MVS Installation Exits* book describes each SMF installation exit and explains how to code them. Chapter 3, "Using the SMF dump programs," on page 29 describes the dump program exits.
4 — SMF routines copy records to SMF buffers and then transfer records from the SMF buffers to either: • SMF data sets • SMF log streams SMF routines then issue messages to the operator indicating the successful or unsuccessful completion of specific SMF-related events.	Chapter 2, "Setting up and managing SMF," on page 15 describes the requirements for running SMF and several SMF performance considerations. Chapter 4, "Customizing SMF," on page 57 describes how an installation can use SMF parameters to vary the amount of information SMF routines collect and record. The information referenced includes the formats, uses, and default values of these parameters.
5 • If you write your SMF data to SMF data sets, the data sets are filled one at a time; while SMF writes records on one data set, other SMF data sets can be dumped or cleared. • If you write your SMF data to a log stream, you can keep writing data to your log stream. The log stream will offload to DASD data sets when the log stream coupling facility structure (or the local storage buffers for a DASD only log stream) fills. You define the thresholds in the log stream definition for how much data is held before offload.	• "Setting Up and Managing SMF Recording to Data Sets" on page 23 describes creating and switching of SMF data sets. • "Setting up and managing SMF recording to logstreams" on page 16 describes setting up and using SMF log streams.
6 — The SMF dump programs copy data from either SMF data sets or log streams to tape or direct access data sets for permanent storage. You can also use the SMF log stream dump program may to dump to a temporary data set for immediate use	Chapter 3, "Using the SMF dump programs," on page 29 describes the dump program for SMF data sets and log streams.
7 — Analysis and report routines, either user-written or those such as the Tivoli® Decision Support for z/OS program product, process information records. Analysis routines read the SMF data set, list the dumped SMF data set, use a sort/merge program to order the SMF-recorded information, or perform a detailed investigation of one particular SMF data item, such as job CPU time under TCBs. Report routines usually format and print the statistics and/or results of the analysis routines.	Chapter 6, "User-written report programs," on page 93 describes sort/merge routines and includes a sample report program.

SMF data in the JES2 EVENTLOG data set

While a job is executing, SMF writes the type 30, subtype 1, 4, and 5 records associated with each job step to the job's EVENTLOG data set. You can use the Job Step panel of the Spool Display and Search Facility (SDSF) to view these records. To control access to this information, the EVENTLOG is protected with two SAF resources in the JESSPOOL class: *nodeid.userid.jobname.jobid*.EVENTLOG.SMFSTEP and *nodeid.userid.jobname.jobid*.EVENTLOG.STEPDATA. See Jobs, job groups, output groups, and SYSIN/SYSOUT data sets in *z/OS SDSF Operation and Customization* for more information.

Using SMF data

SMF data examples:

Most of the examples in this topic were taken from the *GUIDE 35 Proceedings*, "What To Do With SMF Data," published by GUIDE International Corporation. These examples are based on the experience of the speakers at that session, Mr. Brian Currah and Mr. Mario Morino. As such, they have not been submitted to any formal IBM test; SMF users should evaluate the applicability of these examples in their environment before implementing them.

The volume and variety of information in the SMF records enables installations to produce many types of analysis reports and summary reports. For example, by keeping historical SMF data and studying its trends, an installation can evaluate changes in the configuration, workload, or job scheduling procedures. Similarly, an installation can use SMF data to determine system resources wasted because of problems, such as inefficient operational procedures or programming conventions.

The following examples show the types of reports that can be created from SMF data. The examples should be viewed primarily as suggestions to assist you in beginning to plan SMF reports.

Billing users

SMF reports data that installations can use as a basis for billing algorithms and reports. The following sample procedure briefly summarizes one approach installations might follow in creating algorithms and reports from SMF data:

1. Establish the primary goal(s) that the installation wants to achieve from billing its users for computer services.
2. Break down these goals into specific billing objectives.
3. Review the SMF-recorded data items to determine the data items that best satisfy the installation's billing objectives.
4. Create billing algorithms using the appropriate SMF-recorded data items.
5. Generate billing reports for the installation's users (or for management review).

The following scenarios show ways that an installation might implement this procedure.

Scenario 1

An installation whose primary goal is to recover its total cost, including such items as personnel, equipment, and supplies, might set the following billing objectives:

- The billing algorithms and reports must not require expensive programming to control.
- The users must easily understand the charges.
- The charges must be repeatable; that is, the charge for a job must be the same each time the user runs the job.

Given these objectives, the installation might want to create a billing algorithm that is based on one specific SMF-recorded data item such as the, "number of cards read/punched," or "number of lines/pages printed".

Scenario 2

An installation that has a limited variety of computer applications might have the following billing objectives:

- The charges must accurately represent the amount of time required for each application.
- The charges must be consistent for the same types of applications. (For example, all payroll applications must have the same base cost.)

To fulfill these objectives, the installation might take the following steps to create its billing algorithms:

1. Using SMF, establish an average-run time (through actual running or simulation) for each type of computer application.
2. Estimate the average-run-time cost for each type of application.
3. Set a cost-per-hour rate (using steps 1 and 2).
4. Multiply this rate times the “job elapsed time” recorded by SMF for each application.

Scenario 3

An installation that is operating at or near full system capacity might want to encourage better use of its limited resources through billing. The major billing objectives of such an installation might include:

- The users must pay only for the system resources they use.
- The rates for abundant resources must be lower than the rates for scarce ones.
- The charges for each system resource must fluctuate with the demand for that resource.

Assuming that it has cost-conscious users, the installation might use degradation and/or efficiency billing, as described in other topics, to satisfy these objectives.

Scenario 4

An installation that uses TSO/E heavily might set these specific objectives:

- TSO/E billing must be understandable to its users in the terms of the work they do.
- The billing must be predictable; TSO/E users should be able to estimate the charge for a given terminal session.
- The billing must recover TSO/E costs.

The installation can use transaction billing, described in other topics, to satisfy these objectives.

Degradation billing

Installations can use degradation billing to enforce standards created to balance system resource use. Degradation billing allows a job to run even though it has violated a specified resource-use standard. However, because of the violation, the installation will charge the user an additional “punitive” cost for the job.

For example, one installation standard might state that a single job step should not allocate more than six tape units out of the system's available ten. For each of the first six tape units allocated, the installation charges a base cost; for each unit allocated over the allowed six, however, it might charge a progressively higher rate.

Another installation standard might state that programs using the ADDRSPC=REAL facility should not allocate more than 100K bytes, and that any program allocating more than 300K bytes is not only violating the standard but is totally degrading the system. This installation might charge its users for ADDRSPC=REAL storage by establishing a price per K-storage hour used as follows (shown in Figure 2 on page 6):

- For an allocation of 100K bytes or less, the charge is a minimum base rate per K-storage hour.

- For an allocation greater than 100K bytes but less than the critical level of 300K bytes, the charge is a higher base rate per K-storage hour plus a small "punitive" rate based on hour of tie-up.
- For an allocation of 300K bytes or more, the charge is a very large "punitive" rate based on hour of tie-up.

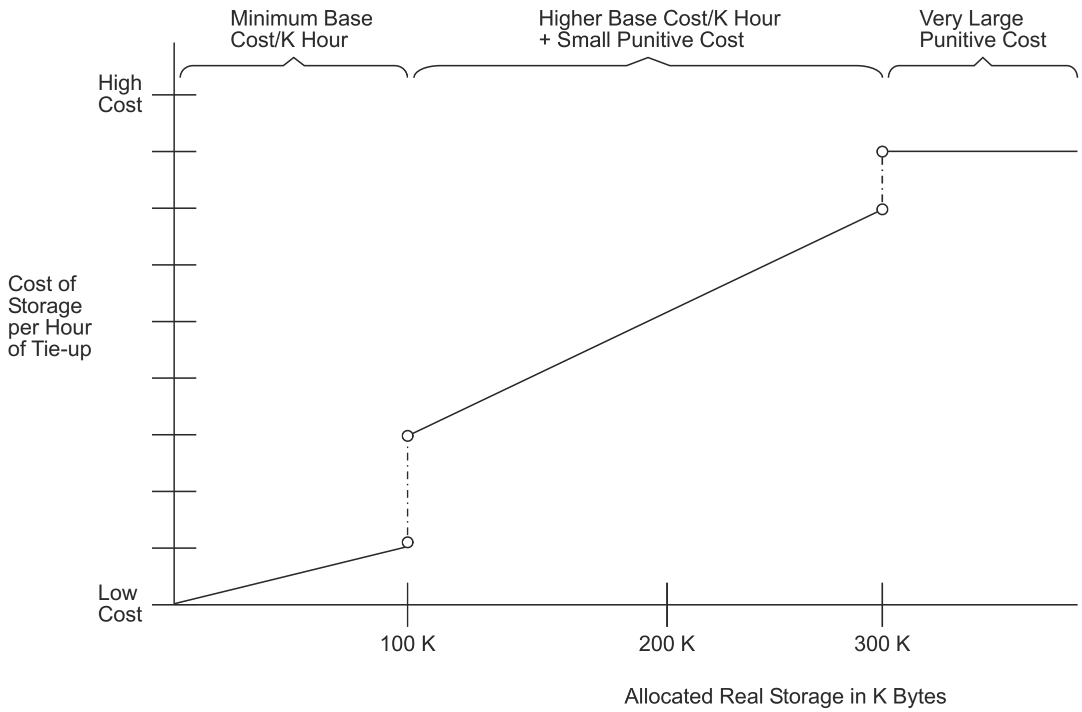


Figure 2. Sample degradation billing for ADDRSPC=REAL storage

Efficiency Billing

Efficiency billing is very similar to degradation billing in that it encourages the conservative use of system resources. Efficiency billing, however, *reduces* the charge for those who use the system efficiently. For example, by evaluating the "date" information in each SMF job initiation record, an installation might charge less for those jobs submitted for Sunday or holiday processing. Likewise, an installation might use the SMF-recorded "time" information to charge less for jobs started during the second or third shifts. Another example of efficiency billing is to give special reduced rates for jobs that represent low-priority background work.

Transaction billing

Transaction billing charges for work in units that are meaningful to the user. Transaction units can include runs of a particular program, online invocations of a defined function, or records read or printed by a standard application. Bills based on transaction units show a clear relationship between the service requested and the payment due, a relationship that, for TSO/E and IMS, is not apparent from a list of resources actually consumed.

Techniques of specifying storage allocation, for instance, are not visible to many terminal users, who therefore have trouble relating their actions to a charge for storage hours. However, charging in terms of commands used is clear to the terminal user.

Transaction billing helps users to see the correlation between what they do and what they pay. With this information, they can develop cost-effective operating standards. If transaction prices incorporate the average cost of resources consumed, the users can evaluate alternatives and make decisions based on their own operations.

Transaction billing might include billing for the use of some TSO/E commands. To be suitable as a billing unit, a transaction should involve processing costs that are consistent enough over time for the average to be meaningful. The transactional billing data collected for TSO/E is how many times each TSO/E command is issued. Note that a TSO/E command does not relate to the system resources manager (SRM) definition of a TSO/E transaction as described in *z/OS MVS Initialization and Tuning Guide*.

The following steps can be used to develop a method of transaction billing for the use of TSO/E commands:

1. Determine the TSO/E costs you want to recover. To determine the TSO/E cost, summarize the total installation cost and then allocate part of it to TSO/E. You can obtain a gross allocation ratio from the data in type 30 records by comparing the resource consumption for TSO/E with the overall resource consumption.
2. For each type of TSO/E command, measure the average resource consumption and the number of times the command is used over a representative time period. You can obtain this data from SMF record type 32 (with the DETAIL option). For further discrimination, you can break down the calculations to the specific user ID.
3. Based on the number of commands issued (obtained during step 2) and any other relevant information, predict the command use by type (for a billing period).
4. Set rates for the resources measured in SMF record type 32, so that the use predicted in step 3 recovers the TSO/E costs from step one. That is, the resources used multiplied by the rates set for the resources should equal the cost you recover.
5. Set prices for each type of TSO/E command, based on the use of the command as determined in step 2, at the rates established in step 4. That is, divide the cost of the resources by the number of times the command was issued to determine the price for each command type.
6. For the duration of each billing period, you can use the date in SMF record type 32 to count the commands being issued by type and user ID. Use the prices determined in step 5 to bill each user ID for the commands used.
7. Repeat step 6 for each billing period until you recalculate the prices. (Deciding how often to recalculate the prices represents a trade off between accuracy and stability.) If costs have changed, start with step 1, otherwise start with step 2.

Reporting reliability

The following examples describe a few ways of using SMF to report the reliability of the system.

Approximate system availability

SMF produces records at IPL time and when the operator enters a HALT EOD command preceding the scheduled shutdown of the system. By examining these records and the last SMF record recorded before shutdown of the system, an installation can establish the following information for a given time period:

- Reporting interval
- Number of IPLs
- System up time and system down time
- Number of scheduled stoppages and the approximate amount of scheduled down time
- Number of unscheduled stoppages and the approximate amount of unscheduled down time
- Reasons for system failure
- Operator name

In addition, JES2 and JES3 produce the SMF subsystem start (type 43) and subsystem stop (type 45) records. From these records, an installation can further analyze the system's availability by checking the start time, stop times, and circumstances under which JES2 or JES3 was started (for example, a cold start versus a warm start).

Abend code summary

SMF reports a system or user abend (abnormal end of task) code for each job (and job step) that abends. By tracking those codes issued by operational procedures (such as codes 122 and 222 for operator cancels), an installation can account for any loss of CPU time due to job reruns. More generally, a summary of the abend codes by program name or code allows an installation to determine which programs are abending frequently and which codes are occurring most often. This information might show the need for software error corrections, JCL revisions, or better operating instructions.

Direct access VTOC errors

The SMF record type 19 has a VTOC indicator bit that the system sets if there is a failure while updating a VTOC (volume table of contents). By checking the setting of this bit, operations personnel can identify any VTOCs that might have missing tracks or overlapping data sets.

Tape error statistics

SMF record type 21 provides tape error statistics such as the number of temporary read and write errors, permanent read and write errors, noise blocks, erase gaps, and cleaner actions. By sorting and summarizing these error statistics by tape volume (or tape unit), operations personnel can identify volumes that might need reconditioning or replacement, or point out tape drives that might require cleaning or maintenance.

Analyzing the configuration

SMF generates records that describe changes in the system configuration:

- At IPL for online devices (types 0, 8, 19, and 22)
- When a device is added to the configuration (types 9 and 10)
- When a device is removed from the configuration (type 11)
- When a processor, channel path, storage device moves online or offline (type 22)

In addition to these records, operations management can use specific information in other SMF records to report configuration statistics. The examples that follow show this use of SMF.

Device and channel loading

From SMF records, an installation can obtain the total problem program EXCP counts by device and by channel over a given reporting period. (See Chapter 10, “EXCP count,” on page 119 for a detailed explanation of EXCP counts and their use in SMF records.) While this summary does not provide a true picture of the I/O load distribution, it might be helpful in identifying a gross loading imbalance among various devices or channels.

Concurrent device use

An installation can combine the data in the SMF step termination records to report the number of devices per device type that problem programs used during specified intervals. By using this report with the RMF device activity records (type 74), an installation can identify periods of the day when the percentage of problem program device use was exceptionally high or low. Further evaluation might show the cause of concurrent device use. If, for example, no more than 12 of the available 16 tape drives are ever in use at the same time, one of the following situations might be responsible:

- Job classes are conflicting.
- Too few initiators are started.

Note: You would find it very difficult to perform tape-allocation analysis for long-running started tasks that dynamically allocate and deallocate tape drives. SMF does not record such information. HSM and DB2® are examples of such started tasks.

Scheduling jobs

Using SMF collected data, it is possible to identify specific intervals when the problem program use of system resources is at an extremely high or low level. By studying the trends in this SMF data, and the relationships among the trends, operations management can establish and enforce its job scheduling procedures. The following examples describe a few potentially useful SMF data-trend analyses for scheduling jobs.

Concurrent job activity

The SMF job initiation and termination records contain the start and stop times of each batch job, job step, TSO/E session, APPC/MVS transaction program, and started task. Using these times, an installation can determine the jobs that are running during the same interval. From a scheduling point of view, a low number of concurrent jobs might indicate the need for establishing more job classes or using more initiators.

Job wait time in initiation and SYSIN/SYSOUT queues

The SMF step termination records have the following three time stamps: step initiation time, device allocation start time, and problem program start time. By calculating the differences in these three times, an installation can identify any abnormally long job step initiation.

In addition, an installation can use the SMF output writer and job purge records to track job wait times in both the SYSIN and SYSOUT queues over a given period of time. If the resulting pattern of wait times shows any significant variances, the installation might want to further investigate the problem areas and perhaps alleviate them by rescheduling manpower or changing hardware.

Job throughput and turnaround time

By examining the SMF-recorded job accounting fields (such as department number, project number, and user ID), and the SMF-recorded job initiation time and date fields, an installation can create a fairly accurate picture of its job throughput and turnaround time. For instance, one installation might analyze its throughput by calculating the total number of jobs initiated within each 15-minute interval and categorizing its jobs into test and production jobs.

Such an installation could use SMF to determine the time of day when the largest number of production jobs were going through the system. Then, by limiting the number of test jobs during that time, the installation might improve its production turnaround time.

Workload characteristics

SMF provides job and job step information, such as:

- Job/step name
- CPU time
- Elapsed (turnaround) time
- Address space dispatching priority
- JES2/JES3 job selection priority
- JES3 deadline type
- Service units
- Workload name
- Service class name and goal
- Resource group name.

By summarizing this type of SMF information for all jobs and job steps over a given period of time, an installation can establish its workload characteristics and set specific standards for each job class and priority. An installation can use this information to determine whether it is meeting its service goals.

Summarizing direct access volume activity

SMF reports information about problem-program use of direct access volumes. The examples that follow show how operations personnel can use this SMF information to examine problem-program use of direct access storage.

Allocated but unused direct access storage

There are many times when users make allocation requests for direct access storage that exceed the actual requirement. This misuse can be a significant drain on the direct access resource pool. To determine the number of tracks allocated for sequential data sets but not used, an installation can compare the following two fields in the SMF type 15 records:

- The relative track of the last record written in the DASD extension of the DCB/DEB section
- The total number of tracks allocated in the DASD extension of the UCB section

Volume mounting

SMF writes a type 19 record whenever a volume that is defined by a DD statement is demounted. Summarizing these records by volume can give an installation some indication of its direct access volume mounting activity for problem programs.

In addition, an installation can use the SMF type 25 records to summarize the JES3 volume mounting for problem programs. JES3 produces a type 25 record for each job that main device scheduling (MDS) processes. These records show both the number of tape volumes and the number of disk volumes mounted for a job.

Fragmented volumes

Periodic analysis of the SMF type 19 records can be useful in identifying direct access volumes whose unallocated space is fragmented. An installation can identify the volumes that might need reorganization by examining the relationship of the following SMF fields:

- The number of unallocated cylinders and tracks
- The number of cylinders and tracks in the largest unallocated extent
- The number of unallocated extents

An installation can further analyze the unallocated space on direct access volumes by comparing the number of unallocated tracks with the number of available data set control blocks (DSCB). For example, such a comparison might show that even though a given volume still has 50 free tracks, its amount of additional space is limited because there is only one available DSCB.

Evaluating data set activity

SMF produces several records that contain information on data set activity. These records, which include types 4, 14, 15, 17, 18, 30, and 34 can help the installation to answer the following questions:

- What is the average data set size for both tape and direct access devices?
- Is the number of multi-volume data sets significantly large?
- What percentage of all data sets are permanent? What percentage are temporary?
- What percentage of all temporary data sets does VIO (virtual input output) control?
- Which data sets do applications use most frequently?
- How often do applications re-use permanent data sets?
- What is the average block size, block count, and EXCP count for each tape data set?
- How are problem programs using chained scheduling?

The following examples show different ways of evaluating problem-program data set activity from SMF records.

Multiple extents

By checking the “number of extents” field in the UCB section of SMF type 14 and 15 records, an installation can identify direct access data sets that have exceeded their primary allocation and have used secondary allocation. Although useful, secondary allocation might affect system performance and fragment the space on direct access volumes.

One reason to check for data sets that are going into multiple extents is to avoid an X37 abend in a production job the next time it runs. While the job may get the space it needs this time, the next allocation may be on a volume that only has enough space for the primary allocation. The attempt at secondary allocation will fail and waste resources in reruns.

Data set modifications

SMF generates a record each time a user:

- Scratches a non-VSAM data set (type 17).
- Renames a non-VSAM data set (type 18).
- Updates a VSAM data set (type 60).
- Defines a catalog entry for the integrated catalog facility (type 61).
- Alters or renames a catalog entry for the integrated catalog facility (type 66).
- Defines or alters a VSAM catalog entry (type 63).
- Deletes a catalog entry for the integrated catalog facility (type 65).
- Deletes a VSAM catalog entry (type 67).
- Renames a VSAM catalog entry (type 68).

By sorting these records by job name or user ID, an installation can produce a report of the data sets that were defined, modified, or deleted by problem programs during a specified interval. Such a report might be useful in a backup situation, especially when critical data sets have been unintentionally altered or destroyed.

Open/close activity

SMF writes a type 14 or 15 record whenever a data set is closed or processed by EOV. The installation can determine how many times EOV closed or processed a given data set by counting the number of type 14 and 15 records. (For this kind of report, an installation might want to exclude any SMF records for programs such as sorts, where it is known in advance that the open/close activity is significant.)

Blocking factors

By examining the “block size” and “logical record length” fields recorded in the SMF type 14 and 15 records, an installation can identify those data sets that the system is processing with ineffective blocking factors. For instance, assume a data set having 10,000 records is processed unblocked with a logical record length of 80 using a 3380 device. An installation discovering such a data set through SMF might increase its block size to 6160 (77 records) to minimize I/O processing overhead and reduce direct access storage requirements.

Optional services

Although useful, some optional services might hinder system performance if not used appropriately. For example, the write validity check (OPTCD=W) service requires an additional disk rotation to reread the data written for each output block. Similarly, a data set that over uses the chained scheduling (OPTCD=C) service might monopolize the available time on a channel. An installation can use the SMF type 14 and 15 records to ensure that each application that uses an optional service is authorized or justified in using it.

Profiling system resource use

Most SMF records contain general identification fields such as the job name, step name, programmer name, reader start time, and reader start date. By sorting and summarizing SMF data according to these types of fields, an installation can create reports or profiles that show each batch job, job step, and TSO/E session's use of system resources such as:

- CPU time
- Storage
- Paging facilities
- I/O devices
- Service units
- Programming languages

CPU time use

SMF accumulates the job/step CPU time in two separate fields of each job/step termination record: processing time under TCBs and processing time under SRBs. (Chapter 11, "CPU time," on page 121 includes a list of the different times that are included and those that are excluded for these CPU time fields). An installation might want to summarize these time fields by program name over a given interval to compare each program's SRB time with its total CPU time. This summary might identify programs that have excessive interrupt processing.

In addition to CPU time, SMF reports many different times relating to job, job step, APPC/MVS transaction program, and TSO/E session processing including:

- Job/step/TSO/E session/ APPC/MVS work start and stop times
- Job/step/TSO/E session elapsed (turnaround) time
- Device allocation start time
- Problem program start time
- Initiator selection time
- TSO/E logon enqueue time
- Reader start and stop times
- Converter start and stop times
- Run processor start and stop times
- Output processor start and stop times

By examining these time fields, an installation can profile each job's flow through the system. Such a profile might identify jobs that have abnormally long wait times. These jobs are usually good candidates for further detailed examination. An installation might want to use these time fields to determine which jobs are running on the system at the same time.

Storage use and paging activity

The RMF paging activity record (type 71) is written for specified measurement intervals. It contains information about the demands made on the system paging facilities and the use of real and auxiliary storage including. For example: the number of:

- Non-VIO page-ins and page-outs
- Swap-ins and swap-outs
- Address space swap sequences
- VIO page-ins and page-outs

An installation can calculate the system paging rate for each specified interval by dividing the number of page-ins and page-outs by the interval's CPU time. By plotting several paging rates over time, an installation can correlate its workload with its real storage capacity.

SMF reports the following information on storage use and paging activity for each job step and TSO/E session:

- Amount of contiguous real storage reserved for a program specifying ADDRSPC=REAL
- Storage used from the top of the private area (includes the LSQA and the SWA)
- Storage used from the bottom of the private area (includes subpools 0-127, 129-132, 244, 251, and 252)
- Number of non-VIO page-ins and page-outs
- Number of swap-ins and swap-outs
- Number of address space swap sequences
- Number of VIO page-ins and page-outs

An installation can use the SMF field “storage used from the bottom of the private area”, along with the paging statistics for the address space, to estimate a job's use of real storage.

I/O activity

Several SMF records contain useful information about a job, job step, or TSO/E session's I/O activity. For example, the step termination records contain device entries that include the device class, unit type, channel/unit address, and EXCP count. An installation might want to use these SMF fields to isolate those job steps whose I/O activity exceeded certain limits, for example:

- More than a given percentage of the I/O activity was on a certain unit
- More than a given percentage of the I/O activity was on a certain channel path
- More than a given number of data sets on the same direct access volume each had a significantly large number of EXCPs

Service activity

An installation can use the SMF termination records to report the number of service units, transaction active time, and performance group number for each job step and TSO/E session. By comparing this information with the information reported in the RMF workload records (type 72), an installation can calculate the percentage of the total system services that it gives to particular performance groups. Such a comparison might be helpful in determining whether service is being distributed according to the goals of the installation. (See *z/OS MVS Initialization and Tuning Guide* for more information on service, transaction active time, and performance group numbers.)

Programming language use

SMF type 4, 30, and 34 records contain the name of the program used (taken from the PGM= parameter on the EXEC statement). By sorting these records by program name, an installation can determine to what extent users are compiling in various programming languages, such as PL/1, COBOL, and FORTRAN.

Similarly, an installation can produce reports for specific job categories or installation departments by using key program names such as SORTJOBS, PAYROLL, and STANDRDS. By assigning unique step names and evaluating the SMF step termination records (which report those names), an installation can produce reports for each step in a cataloged procedure.

IBM z/OS Workload Interaction Correlator

You can configure SMF to collect IBM z/OS Workload Interaction Correlator data. IBM z/OS Workload Interaction Correlator enables a product, such as a z/OS component, middleware, or application, that executes in multiple instances distributed across multiple address spaces to generate high-frequency, summarized, system-wide and compartmental data. Products can use the IBM z/OS Workload Interaction

Correlator services to generate an SMF type 98 record for a product's subtype every 5 seconds containing data about the product's activities in a standardized, synchronized, contextualized format.

Records from the workload interaction correlator produce a summary view of the component's activities across address spaces of similar priority and CPU usage and highlight data from exceptional address spaces. These records are generated on a synchronized, high-frequency 5-second interval across multiple products.

Analytics tools, such as IBM z/OS Workload Interaction Navigator, can analyze these records across z/OS components, middleware, and applications to detect and correlate anomalies. Presenting an organized progression of interacting anomalies reduces the time and expertise needed to diagnose a performance problem. When an action is taken to solve or mitigate the performance problem, the system programmer can verify that the fix is behaving as expected by comparing the results before and after the implementation of the action.

For information about configuring SMF to collect these records, see Chapter 15, “IBM z/OS Workload Interaction Correlator,” on page 157.

Maintaining system security

An installation can use Resource Access Control Facility (RACF) SMF record types (80, 81 and 83) to:

- Track the total use of a resource.
- Identify the resources that are repeated targets of detected unauthorized attempts to access them.
- Identify the users who make detected unauthorized requests.
- Track the activity of a particular user.
- Perform operator command auditing.

z/OS Security Server RACF Auditor's Guide describes how the installation can request that records be written, and how to use the RACF report writer to look at the results.

RACF provides options that allow your installation to control access to resources and, through SMF records, audit your security controls. Note that many of these options significantly increase the number of SMF records your system generates.

Chapter 2. Setting up and managing SMF

Setting up SMF requires your installation to decide what kind of records it wants SMF to produce or what information it wants SMF to gather. Then you can make decisions about how to set SMF up to meet these requirements. You'll also want to consider the following points in planning your SMF configuration:

1. What records must SMF produce to give you the information your installation wants?
2. What is the environment SMF will run in and how many jobs run through the system? (The number of records generated by SMF depends on the number of jobs.)
3. Are you running program products (such as RMF or DB2) that might require special considerations for SMF? (See "Special considerations for DB2, JES3, and RMF" on page 28.)
4. What is the impact of the system configuration, particularly the type and degree of multiprogramming?
5. How much contention is there for the resources that SMF needs?

Once you've considered some of the basics about what you want SMF to do in your installation, your next decision is whether you want to write your SMF records to log streams or to SMF data sets.

- When you use *SMF data set recording*, SMF writes records to the SMF data sets you allocate. The size of the data that the system can write to SMF data sets is constrained by the VSAM control interval size—SMF can only write one control interval at a time. See "Setting Up and Managing SMF Recording to Data Sets" on page 23.
- When you use *SMF logging*, SMF writes records to the system logger managed log streams that you set up. SMF can write much larger chunks of data to the log stream than it can to SMF data sets. This has the potential to make writing SMF records faster, which could mean collecting more data.

  SMF logging also allows you to group different SMF record types into different log streams defined for different purposes. For example, you might want a log stream for job-related SMF data and one for performance SMF data. SMF can also write a single record to multiple log streams. Record 30, the common address space work record, for example, might well fit into both the job-related log stream and the performance log stream.

  You can set up either of the following types of log streams:

  – Coupling facility log streams, where data is stored in a coupling facility structure and then offloaded to DASD.

  – DASD-only log streams, where data is stored in local storage buffers and then offloaded to DASD.

  See "Setting up and managing SMF recording to logstreams" on page 16

Now that you've made some basic decisions, use the following topics to set up SMF to meet your installation's requirements:

- "Switching between SMF logging and SMF data set recording" on page 15
- "Setting up and managing SMF recording to logstreams" on page 16
- "Setting Up and Managing SMF Recording to Data Sets" on page 23
- Chapter 3, "Using the SMF dump programs," on page 29
- Chapter 4, "Customizing SMF," on page 57 for information on how to customize your SMF configuration using the parameters of the SMFPRM*xx* parmlib member.
- Chapter 4, "Customizing SMF," on page 57, if you need additional processing from installation-written routines you provide to the SMF installation exits.

Switching between SMF logging and SMF data set recording

It is easy to dynamically switch between SMF data set recording and SMF logging:

- First, set up your SMF configuration in an SMFPRMxx member of parmlib for both SMF data set recording and SMF logging by defining both SMF data sets (DSNAME parameter) and SMF log streams (LSNAME and DEFAULTLSNAME parameters).
- You can then toggle between the two methods using the RECORDING(DATASET | LOGSTREAM) parameter in the SMFPRMxx member. There are two ways to do this:
  - Change the RECORDING parameter in a new SMFPRMxx member, and then issue the SET SMF=*xx* command to switch the system to using that SMFPRMxx member.
  - Issue the SETSMF RECORDING(DATASET | LOGSTREAM) command to switch to the method you wish. Note that this method requires that PROMPT(LIST) or PROMPT(ALL) be specified in the active SMFPRMxx parmlib member to allow use of the SETSMF command.

Setting up and managing SMF recording to logstreams

If you choose to record your SMF records in log streams, you must define log streams, coupling facility structure space (for coupling facility log streams) and DASD space for offloading the log stream data. You will also need to define authorization for your log streams. The following topics guide you through the set-up process:

- "Requirements for using SMF logging" on page 16
- "Planning your SMF logging configuration" on page 16
- "Define authorization to SMF logging resources" on page 18
- "Define SMF logging resources in the LOGR and CFRM policy couple data sets" on page 18
- "Managing log streams and SMF log stream data" on page 19
- "Sharing an SMFPRMxx parmlib member in an SMF logging environment" on page 19
- "Using SMF log streams" on page 20
- "Dumping SMF data from log streams" on page 22

Tip: Wait—don't delete those SYSx.MANx data sets!

If you intend to switch from SMF data sets to SMF logging, *do not delete* any of your SMF data sets. You should retain these as a fallback option. You can add SMF logging to your SMF data set configuration in an SMFPRMxx member and dynamically switch between recording to data sets and log streams. See "Switching between SMF logging and SMF data set recording" on page 15.

Requirements for using SMF logging

- Using SMF logging requires a sysplex in monoplex or multisystem mode. This is true for either coupling facility or DASD-only log streams.
- Coupling facility log streams require a coupling facility running coupling facility control code at one of the following levels:
  - CFLEVEL 1 with service level 4.03 or higher.
  - CFLEVEL 2 or higher.
- For either a coupling facility or a DASD-only log stream, system logger requires that you have SMS installed and active at your installation. This is true even if you do not use SMS to manage the DASD log data sets and staging data sets, because system logger uses SMS to allocate data sets, such as the DASD log stream and staging data sets.

For complete information, see Understand the requirements for system logger in *z/OS MVS Setting Up a Sysplex*.

Planning your SMF logging configuration

The basic decisions for an SMF logging configuration include:

- “Coupling facility or DASD-only log streams?” on page 17
- “How many log streams?” on page 17
- “Which log streams map to which structures?” on page 17
- “Determine a naming convention for SMF logging resources” on page 18
- “Planning the structure and DASD space you need for SMF logging” on page 18

Coupling facility or DASD-only log streams?

There are two types of log streams, and SMF logging supports both of them:

- Coupling facility log streams, where data is stored in a coupling facility structure and then offloaded to DASD. A coupling facility log stream is ideal for merging SMF data from multiple systems. Note that a systems' SMF id, or "SID", should be unique within the sysplex.
- DASD-only log streams, where data is stored in local storage buffers and then offloaded to DASD. Note the following about DASD-only log streams:
  - DASD-only log streams can only be single-system in scope and only one system can write data to any given DASD-only log stream.
  - DASD-only log streams may experience delays in connecting at IPL because system logger's recovery processing involves offloading data from its interim storage to the offload data sets. These delays do not affect coupling facility log streams.

For complete information, see Determine the right kind of log stream for each application in *z/OS MVS Setting Up a Sysplex*.

How many log streams?

The number of log streams you'll need to define for SMF logging is primarily a matter of how you want to log data at your installation. For example:

- Do you want one log stream per system? You can define either coupling facility or DASD-only log streams for this purpose.
- Do you want to create different log streams that merge specific SMF record types from different systems? For example, you could create a coupling facility log stream for job related data and collect record type 30 data from all the systems in your sysplex.

Basically, this particular decision is up to your installation, but you can also see Plan the system logger configuration in *z/OS MVS Setting Up a Sysplex*.

Which log streams map to which structures?

For coupling facility log streams, you can assign which log streams write to which coupling facility structures in a variety of ways. For example, you can have multiple log streams sharing one structure, one structure for each log stream, related log streams using a structure, and so forth. Just make sure that you use an approach consistent with other system logger applications and one that makes it easier to recover data in the event of a system, sysplex, or coupling facility failure. For complete information, see Determine which log streams map to which coupling facility structures in *z/OS MVS Setting Up a Sysplex*.

Planning for log data recovery: When you are deciding which coupling facility structures to associate with each coupling facility log stream, you can plan it so that system logger can easily recover coupling facility data in the case of a system failure, by making sure that each log stream structure has a peer connector, which is a system in the sysplex that can connect to the same structure as the failing system. This step applies to coupling facility log streams only. See Plan your configuration for log data recovery in *z/OS MVS Setting Up a Sysplex*.

Determine a naming convention for SMF logging resources

- **Log stream names:** A log stream name should be a unique descriptive identifier, made up of one or more qualifiers (each 1 to 8 characters in length) separated by periods, up to the maximum length of 26 characters. For an SMF log stream, the first 7 characters must be 'IFASMF**.**'.

  Use the following rules in naming a log stream:

  – Each qualifier can contain up to eight numeric, alphabetic, or national ($, #, or @) characters.

  – The first character of each qualifier must be an alphabetic or national character.

  – Each qualifier must be separated by periods, which you must count as characters.

  If there is an error in the log stream name (for example, if the first 6 characters are not 'IFASMF), the system issues an error message.

  For more guidance on log stream naming conventions, see Naming conventions for the log stream and DASD data sets in *z/OS MVS Setting Up a Sysplex*.

- **DASD data sets, staging data sets, and coupling facility names:** See Develop a naming convention for system logger resources in *z/OS MVS Setting Up a Sysplex*.

Planning the structure and DASD space you need for SMF logging

For coupling facility structure sizing:, See Determine the size of each coupling facility structure in *z/OS MVS Setting Up a Sysplex*.

For DASD resources: Both coupling facility log streams and DASD-only log streams require DASD space for:

- DASD data sets, where data is offloaded from either the coupling facility or the local storage buffers (for DASD-only log streams).
- Staging data sets, which hold a duplicate of the data from either the coupling facility or local storage buffers in case of data loss or system failures.

To plan DASD resources for both coupling facility and DASD-only log streams, see Plan DASD space for system logger in *z/OS MVS Setting Up a Sysplex*.

Define authorization to SMF logging resources

IBM suggests that installations use System Authorization Facility (SAF) to control access to system logger resources, such as log streams or coupling facility structures associated with log streams. See Define authorization to system logger resources in *z/OS MVS Setting Up a Sysplex*.

Define SMF logging resources in the LOGR and CFRM policy couple data sets

When you define log streams to system logger, you must put information into the LOGR and CFRM couple data sets. Do the following:

- Ensure that you have a formatted LOGR couple data set available. If you use other system logger applications, such as OPERLOG or Logrec, the LOGR couple data set will already be available. See Format the LOGR couple data set and make it available to the sysplex in *z/OS MVS Setting Up a Sysplex*.
- Define the log streams and coupling facility structures (for coupling facility log streams) in the LOGR policy couple data set using the administrative data utility (IXCMIAPU) utility. See Add information about log streams and coupling facility structures to the LOGR policy and LOGR keywords and parameters for the administrative data utility in *z/OS MVS Setting Up a Sysplex*.

  – For a DASD-only SMF log stream, you must specify the LOGR policy MAXBUFSIZE parameter to define the maximum log block size, in bytes, that the system can write to the DASD-only log stream. IBM suggests a MAXBUFSIZE for a DASD-only log stream of 65532. You are required to define a MAXBUFSIZE of at least 33024.

  – For a coupling facility log stream, you must specify the LOGR policy MAXBUFSIZE parameter to define the maximum log block size, in bytes, that the system can write to the log stream assigned to the structure you are defining. IBM suggests that you define a MAXBUFSIZE value between 33024 and 65532. SMF will issue an error message if the MAXBUFSIZE value specified is too small.

- Define the coupling facility structures in the CFRM policy couple data set using the IXCMIAPU utility. See Define the coupling facility structures attributes in the CFRM function couple data set and CFRM parameters for administrative data utility in *z/OS MVS Setting Up a Sysplex*.

Managing log streams and SMF log stream data

Once you've set up your SMF log streams, there are a few things you need to know about managing them:

- **How much data and for how long?** System logger can help you manage data retention and archiving of your SMF data in log streams, so that you might not need to dump SMF data from log streams for archiving. Use the RETPD and AUTODELETE parameters in a LOGR couple data set to manage:
  - How much SMF data you keep in a log stream
  - How long you keep SMF data in the log stream
  - How you archive log data

  See Managing log data: How much? For how long? in *z/OS MVS Setting Up a Sysplex*.
- **Deleting log streams:** Do you want to remove a log stream from use for SMF logging, or do you want to actually delete the log stream itself?
  - To remove a log stream from use in your SMF logging configuration, create a new SMFPRMxx parmlib member and remove the log stream you no longer wish to use. Then issue the SET SMF=*xx* command to switch to using that SMFPRMxx parmlib member.
  - To delete a log stream from your installation, you must delete it from the LOGR policy. To accomplish this you can use either:
    - The IXCMIAPU utility for system logger, with DELETE LOGSTREAM NAME(*log_stream_name*) parameters
    - The IXGINVNT service, with the REQUEST=DELETE TYPE=LOGSTREAM parameters
    - The SETLOGR FORCE,DELETE command with the LSN=*name* parameter

    See Deleting log streams from the LOGR policy in *z/OS MVS Setting Up a Sysplex*.
- **Update a log stream:** You can update certain attributes of a DASD-only or structure-based log stream using either the IXGINVNT macro with REQUEST=UPDATE or the IXCMIAPU utility. See Updating a log stream's attributes in *z/OS MVS Setting Up a Sysplex*.

  To add or delete log streams and record types from use in your SMF logging configuration, see "Changing the log streams or record types used for SMF logging" on page 20.

Sharing an SMFPRMxx parmlib member in an SMF logging environment

When you set up SMF logging in a multisystem environment, you specify a log stream for each system. If two or more systems share an SMFPRMxx parmlib member, you can specify symbols in the log stream name (LSNAME parameter) in SMFPRMxx to allow the systems to specify unique values based on the system IDs. For example, suppose two systems share an SMFPRMxx parmlib member that specifies the following:

```
LSNAME(IFASMF&SID..PERF,IFASMF.&SID..JOB,)
```

Suppose the substitution text for the &SID symbol is SYSA on one system and SYSB on the other. When you IPL system SYSA, the log stream names are:

- IFASMF.SYSA.PERF
- IFASMF.SYSA.JOB

When you IPL system SYSB, the log stream names are:

- IFASMF.SYSB.PERF

- IFASMF.SYSB.JOB

For more information about symbols and how to specify them in SMFPRMxx, see the topic on sharing parmlib members and the description of SMFPRMxx in *z/OS MVS Initialization and Tuning Reference*.

Using SMF log streams

During initialization, SMF searches the SMFPRMxx parmlib member to see whether the system is using log streams or SMF data sets to record SMF data. If the member specifies RECORDING(LOGSTREAM), SMF will write the SMF data to the log streams specified on the DEFAULTLSNAME and LSNAME parameters of the SMFPRMxx member. You can define a default log stream name on DEFAULTLSNAME, and request particular record types go to particular log streams using the TYPE subparameter on the LSNAME parameter.

To use SMF logging, you must specify the following parameters in SMFPRMxx:

- RECORDING(LOGSTREAM) to specify that you wish to write SMF data to log streams rather than SMF data sets.
- LSNAME, to specify a log stream in which you want to write particular SMF record types, specified on the TYPE subparameter, as follows:

  ```
  LSNAME(logstreamname,TYPE({aa,bb}|{aa,bb:zz}|{aa,bb:zz,...}),NOBUFFS(MSG|HALT),
  BUFUSEWARN(nn),DSPSIZMAX(nnnnM|nG),COMPRESS(PERMFIX(nnnnM)))
  ```

- DEFAULTLSNAME, to specify a default log stream to which all SMF data not otherwise specified on LSNAME parameters will be written.

  ```
  DEFAULTLSNAME(logstreamname,NOBUFFS(MSG|HALT),BUFUSEWARN(nn),DSPSIZMAX(nnnnM|nG),
  COMPRESS(PERMFIX(nnnnM)))
  ```

Note that you do not have to specify both DEFAULTLSNAME and LSNAME, but you must specify log streams on one or the other for SMF logging to take place.

If you specify duplicate record types to different log streams, the system will record and dump the duplicate records.

Removing an SMF log stream from use

To stop recording to a particular SMF log stream, create a new SMFPRMxx parmlib member and remove the log stream you no longer wish to use. Then issue the SET SMF=*xx* command to switch to using that SMFPRMxx parmlib member.

Changing the log streams or record types used for SMF logging

You can dynamically change, add, or remove the log streams you want to use or the record types that you want for your SMF logging configuration by doing one of the following:

- Use the SETSMF LSNAME or SETSMF DEFAULTLSNAME to temporarily add, delete, or edit log streams or record types. Because the change is not in the SMFPRMxx parmlib member, the next IPL will not reflect this change.

  Note that this method requires that PROMPT(LIST) or PROMPT(ALL) be specified in the active SMFPRMxx parmlib member to allow use of the SETSMF command.
- Create a new SMFPRMxx member with the changes to the log streams or record types you want. Then use the SET SMF=*xx* command to begin using that parmlib member. This change will remain in effect across IPLs.

Obtaining records from SMF log streams

You can use either of the following interfaces to extract data from the SMF log stream:

- IFASMFDL, which is the SMF dump utility

- IFASEXIT, which is the SMF Logstream Subsystem Exit

With IFASMFDL, you can dump the data from one or more specified log streams into one or more data sets. For detailed information, see "Using IFASMFDL — the SMF log stream dump program" on page 29.

Using IFASEXIT, you can obtain records from one SMF logstream at a time. IFASEXIT is executed as a logstream exit routine that is invoked in JCL using the SUBSYS DD statement parameter. Figure 3 on page 21 shows the syntax of this statement.

Notes:

- IBM does not support using IFASEXIT to retrieve records from a logstream under multiple tasks in the same address space.
- If obtaining records from a logstream that contains zEDC compressed data, ensure that the system is properly configured to use zlib. For more information on using zlib, see the "Invoking Unauthorized Interfaces for zEnterprise Data Compression" topic in *z/OS MVS Programming: Callable Services for High-Level Languages*.

```
//ddname   DD  DSNAME=log.stream.name,
//  SUBSYS=(LOGR,IFASEXIT[,'SUBSYS-options1']
//     [,'SUBSYS-options2'])
```

Figure 3. Syntax of SUBSYS JCL for IFASEXIT

log.stream.name
Specifies the name of the log stream to read. The name can be 1 to 26 characters in a data-set-name format.

SUBSYS-options1
Specifies options that are meaningful to all exit routines. For detailed information, see JCL for the LOGR Subsystem in *z/OS MVS Programming: Assembler Services Guide*.

SUBSYS-options2
Specifies unique exit routine options. For IFASEXIT, the following parameters are accepted:

SID(*xxxx*)
This is an optional parameter used to indicate that only records written by the operating system with the specified system identifier are to be written to the output data set. The *xxxx* value indicates the system identifier and can be 1 to 4 alphanumeric characters. There is no default value. Only one SID parameter can be specified for each invocation of IFASEXIT. If SID is not specified, records pertaining to all SIDs found in the logstream are written.

SMEP(*hhmm*)
This is an optional parameter used to designate a "smart end point" value. The smart end point value, specified as *hhmm*, results in a calculated time that designates when to discontinue browsing the SMF logstream. By default, if this parameter is not specified, IFASEXIT reads records all the way to the end of the logstream before completing. However, by specifying a Smart End Point value, you can choose to stop reading logstream data at a designated point before the actual end of the logstream. This can shorten the IFASEXIT processing time.

The *hhmm* value describes the number of hours and minutes to use to calculate the smart end point. The total value cannot exceed 2 hours (designated as 0200).

hh
A number between 00–02

mm
When *hh* is less than 2, this is a number between 00–59; when *hh* is 2, the *mm* value must be 00.

The smart end point value is calculated by adding the value specified by *hhmm* to the time specified in the TO=`ending-time` value of the *SUBSYS-options1* parameter. The smart end point is satisfied when it has been determined that records for all known SIDs, or records for only the

SID specified with the SID(*xxxx*) parameter, contain a date and time that is past the calculated smart end point.

Note: It is possible that data is buffered on a z/OS image, and writes to this logstream are delayed. In this case, IFASEXIT may not dynamically detect the image that was buffering data, and may assign a smart end point that is actually prior to when some of these records were actually written ("hardened") to the logstream. These records would remain unselected for output, and would be candidates for selection on the subsequent run of the job that invokes the IFASEXIT exit.

If the following *SUBSYS-options1* parameters are specified, the SMEP parameter is not allowed

- TO=YOUNGEST
- DURATION

NSI

This is an optional parameter used to indicate that SMF records that are compressed with zEDC cannot be decompressed using software decompression. This option results in an error when SMF records compressed with zEDC are found and the zEDC Express feature is unavailable.

Example of using the IFASEXIT LOGR interface exit

Figure 4 on page 22 shows sample JCL for invoking the IFASEXIT LOGR interface exit. In this example, the IFASEXIT exit is invoked by the IEBGENER utility to extract SMF records from the logstream named IFASMF.MULTSYS.DEFAULT. SMF records selected for output must have been written to the logstream between 1:00 AM on July 19, 2010 to 10:00 PM on October 25, 2010. Only records that were generated on the system with the ID SY1 are selected for output. Browsing of the logstream is discontinued when a record that was generated on the SY1 system is found to have a date and time that is past 11:00 PM on October 25, 2010.

```
//STEP1    EXEC PGM=IEBGENER
//SYSUT1   DD DSNAME=IFASMF.MULTSYS.DEFAULT,
//            LRECL=32756,RECFM=VB,
//            BLKSIZE=32760,
// SUBSYS=(LOGR,IFASEXIT,'FROM=(2010/200,01:00),TO=(2010/298,22:00)',
//        'SID(SY1),SMEP(0100)')
//SYSUT2   DD DSN=BORDONE.SMF.DATA,
//            UNIT=SYSALLDA,
//            DISP=(NEW,CATLG,DELETE),
//            LRECL=32756,RECFM=VB,
//            BLKSIZE=32760,
//            SPACE=(CYL,(90,1),RLSE)
//SYSIN    DD DUMMY
//SYSPRINT DD SYSOUT=*
```

Figure 4. Sample JCL to invoke the IFASEXIT LOGR interface

Dumping SMF data from log streams

See "Using IFASMFDL — the SMF log stream dump program" on page 29 for a discussion about the SMF dump program, and how to dump SMF data sets.

Flushing the logstream buffer

SMF data is maintained in a buffer area before it's written to the logstream. SMF will be triggered to flush the buffer and "harden" the data to the logstream if any of the following scenarios occur:

- At least a single buffer block is full.
- The time that is coded on the MAXDORM parameter expires.
- In response to a SWITCH SMF, command (see *z/OS MVS System Commands* for more information on the SWITCH command).
- During halt processing (following a Z EOD).

Setting Up and Managing SMF Recording to Data Sets

To record SMF records in SMF data sets, an installation must allocate direct access space and catalog the SMF data sets. **IBM recommends** that you catalog the SMF data sets in the master catalog.

SMF should have a minimum of two data sets for its use, and **IBM recommends** that you run with a minimum of three SMF data sets to ensure availability.

Select DASDs that can handle the volume of data that SMF generates at your installation. If the I/O rate for a device is too slow, SMF places the data it generates in buffers. The buffers will eventually fill, which could result in lost data. Several factors, such as the specific system configuration, the amount of SMF data to be written, the size of SMF buffers (the control interval size), and your installation's report program requirements, determine which device type is most efficient for a particular installation.

Creating SMF Data Sets

You should create at least two SMF data sets to store the system and job-related information that SMF collects. SMF data sets should be RACF-protected. Each one is identified by a 1-44 character data set name.

SMF data-gathering routines fill the data sets one at a time. While the gathering routines write records on one data set, SMF can write out or clear the others. SMF continues to write records while it can find an empty inactive data set when the active data set becomes full (see “Using SMFPRMxx parameters” on page 57).

You can use the DEFINE command of the access methods services utility to create the data sets after system installation (see “Using DEFINE to Create SMF Data Sets” on page 24). Allocate each SMF data set as a single-extent VSAM cluster on a single volume and catalog it in the master catalog. Do not specify secondary space for any of the cluster's components. Specify the same control interval size for all SMF data sets that a particular system will use.

You can specify the data sets to be used for SMF recording on the DSNAME parameter in the SMFPRMxx parmlib member. In a multisystem environment, you can use system symbols to allow each system to generate unique SMF data set names from a single definition, as explained in the other topics.

Sharing an SMFPRMxx parmlib member in a SMF data sets environment

When you set up SMF in a multisystem environment, you might need to specify a recording data set for each system. If two or more systems share an SMFPRMxx parmlib member, you can specify symbols in the recording data set name in SMFPRMxx to allow the systems to specify unique values. For example, suppose two systems share an SMFPRMxx parmlib member that specifies the following:

```
DSNAME(&SID..MAN1,&SID..MAN2,&SID..MAN3)
```

Suppose the substitution text for the &SID symbol is SYSA on one system and SYSB on the other. When you IPL system SYSA, the recording data sets are:

- SYSA.MAN1
- SYSA.MAN2
- SYSA.MAN3

When you IPL system SYSB, the recording data sets are:

- SYSB.MAN1
- SYSB.MAN2
- SYSB.MAN3

If system A and system B are sharing the same catalog, you can easily identify the systems to which the SMF data sets are associated.

For more information about symbols and how to specify them in SMFPRMxx, see the topic on sharing parmlib members and the description of SMFPRMxx in *z/OS MVS Initialization and Tuning Reference*.

Using DEFINE to Create SMF Data Sets

Before you can use an SMF data set, you must both define the data set and pre-format the data set. To define the data set, use the DEFINE access methods services utility. To preformat the data set with dummy records, use the IFASMFDP program. If you do not pre-format an SMF data set, SMF pre-formats it during initialization, which increases the time needed to IPL the system or to switch to a new, previously unused, SMF data set.

Defining an SMF data set: When you define an SMF data set, specify the following options for DEFINE:

- REUSE indicates that the data set can be cleared by the dump program.
- CONTROLINTERVALSIZE indicates the size of the SMF buffer. For the SMF data sets, you can specify ANY value between 0.5 (512 bytes) and 26K (26624 bytes), with certain restrictions. See "Selecting the SMF Data Set Control Interval" on page 25 for more details.
- SHAREOPTIONS has two sub-options (values) that define the level of sharing. The cross-region value must be 2. This indicates that sharing occurs with reading and serialization occurs with writing. The cross-system value is allowed to default.
- NONINDEXED indicates that the entries are entry-sequenced.
- SPANNED indicates that the records can span control intervals.
- SPEED indicates that the data set will not be preformatted by VSAM while IFASMFDP is preformatting. (If SPEED is not selected, VSAM and SMF preformat concurrently.)

Note: SMF does not support extended-addressability VSAM data sets. Thus, the largest SMF data set cannot be larger than 4 gigabytes. For example, you must limit the number of cylinders you request to a maximum of 5800 for a data set on a 3390 device type.

If DATABASE 2 (DB2) performance, serviceability, or audit data is sent to SMF, see "Special considerations for DB2, JES3, and RMF" on page 28.

Figure 5 on page 24 shows the JCL statements needed to use the DEFINE utility to allocate one SMF data set on a direct access device and catalog it in the system catalog. This figure assumes that an IPL with the NOACTIVE SMF parameter was performed. Each SMF data set must be created according to this example before the first IPL that starts SMF recording.

```
//CREATE EXEC PGM=IDCAMS
//SYSPRINT DD SYSOUT=A
//SYSIN DD *
   DEFINE CLUSTER  (NAME(SYS1.MANX)            +
                   VOLUME(xxxxxx)              +
                   NONINDEXED                  +
                   CYLINDERS(nn)               +
                   REUSE                       +
                   RECORDSIZE(4086,32767)      +
                   SPANNED                     +
                   SPEED                       +
                   CONTROLINTERVALSIZE(nnnn)   +
                   SHAREOPTIONS(2))
/*
```

Figure 5. Sample JCL Statements for Allocating the SMF Data Sets

Preformatting an SMF data set: When you use the IFASMFDP SMF dump program to preformat an SMF data set, use the BUFFERSPACE(81920) AMP=BUFND=nn option parameter on the DD statement specified in the INDD(ddname,OPTIONS(CLEAR)) parameter to improve the performance of the preformatting processing. (The number of data buffers desired is specified by nn, e.g., 10. Note that 10 buffers with a CISIZE of 26K will require 260K of memory.)

The step in Figure 6 on page 25 preformats the data set. Using IFASMFDP to preformat the data set during the definition process avoids increasing the time required to IPL the system.

```
//FORMAT EXEC PGM=IFASMFDP
//SYSPRINT DD SYSOUT=A
//NEWDS DD DSN=SYS1.MANX,DISP=SHR
//SYSIN DD *
   INDD(NEWDS,OPTIONS(CLEAR))
/*
```

Figure 6. Sample JCL Statements for Preformatting the SMF Data Sets

Regardless of how the SMF data sets are created, the amount of DASD space they require depends on the amount of data generated and how often the data sets are dumped. The amount of data generated depends on the system work load and the record types selected for writing to the SMF data set.

If SMF data is available from a system similar to your own, you can use the report produced by the SMF dump program to estimate the amount of data generated. Otherwise, you might select a trial size for the data sets and adjust it as necessary. For example, you might start with two SMF data sets, each with 25 cylinders of space on a 3390. If the data sets fill up too quickly and data is lost, you can allocate more space for each data set, or create additional data sets.

Selecting the SMF Data Set Control Interval

The control-interval (CI) size of SMF data sets can range from 0.5K (512 bytes) to 26K (26624 bytes) in size, with certain restrictions. The user specifies the CI size of the SMF data set and the device type when the VSAM data set is defined. Then, VSAM chooses the physical record size of the data set based on the specified CI size and the track size of the specified device type. SMF requires the CI size to equal the physical record size; otherwise, SMF cannot open the data set. Instead, SMF issues an error message to the console in addition to displaying the ‘feedback’ code.

The default CI size is 4K. Choose a larger value only if the default is so small that it makes the I/O rate too high.

When you choose a CI size, verify that the physical record size that VSAM selects for the DASD you specify equals that CI size. Table 2 on page 25 shows some examples of valid user CI-size choices and the physical-record sizes that VSAM chooses for specific DASD.

Table 2. Examples of valid user CI-size choices and physical-record sizes VSAM chooses for DASD

Control Interval (CI) Size	Physical Record Size	DASD
16K (16384 bytes)	16K (16384 bytes)	3350
22K (22528 bytes)	22K (22528 bytes)	3380
26K (26624 bytes)	26K (26624 bytes)	3390

Before choosing a CI size, determine the size of your typical SMF record. To avoid wasting DASD storage, select a value that is either an integral multiple or an even divisor of that record size because records that cross a CI boundary when copied to DASD waste DASD storage. For example, if you specify a CI of 26K for a 30K SMF record, the record requires two 26K intervals (or 52K of storage) when copied to DASD, wasting 22K of DASD storage.

The CI size of the first SMF data set that the system opens during an IPL will be the CI size for all SMF data sets for that IPL. If SMF encounters a data set with a different CI size, then the data set is not used, and the system displays a message on the console informing the operator of the problem. A data set that has any error does not go on the list of active data sets. If all data sets fail to be successfully opened and allocated, then 4K (4096 bytes) is chosen as the default CI size for the IPL, and SMF buffers the data.

If you define a new group of SMF data sets with a different CI size, you must re-IPL to use these data sets. When you define an SMF data set, the logical record size must be 10 bytes less than the CI size.

Using SMF data sets

During initialization, SMF searches the SMFPRMxx parmlib member to see whether the system is using log streams or SMF data sets to record SMF data. If the member specifies or defaults to RECORDING(DATASET), SMF searches the list of data sets specified on the DSNAME parameter of the SMFPRMxx member for the first non-full data set. The search proceeds in the order that the data sets were defined. If a data set is found, that one becomes the ACTIVE data set. The remaining data sets are processed such that any non-empty data set will be set to status of DUMP REQUIRED, and any empty data set will be set to status of ALTERNATE.

If no non-full data set is found, SMF stores the records in its buffers until a data set is made available. To make a data set available, or to empty it, you must run the SMF dump program. For more information, see Chapter 3, "Using the SMF dump programs," on page 29.

The first data set specified on the DSNAME parameter of the SMFPRMxx parmlib member is called the primary data set and should be allocated on a high performance device; the rest are secondary data sets.

The following examples show the result of a D SMF command issued under different SMF initialization environments.

Example 1: This example shows the results of initialization when there is 1 non-full and 2 empty data sets.

```
d smf
IEE949I 11.05.21 SMF DATA SETS 728
  NAME        VOLSER SIZE(BLKS) %FULL STATUS
P-SYS1.MANA SMFVL1       15000   15  ACTIVE
S-SYS1.MANB SMFVL2        300    0   ALTERNATE
S-SYS1.MANC SMFVL2        300    0   ALTERNATE
```

Example 2: The following example shows the results of initialization when the first data set is full (contains data left over from the previous system IPL) and the second one is non-full.

```
d smf
IEE949I 11.05.21 SMF DATA SETS 728
  NAME        VOLSER SIZE(BLKS) %FULL STATUS
P-SYS1.MANA SMFVL1       15000  100  DUMP REQUIRED
S-SYS1.MANB SMFVL2        300    1   ACTIVE
S-SYS1.MANC SMFVL2        300    0   ALTERNATE
```

Example 3: The following example shows the result when the first data set is non-full, and the second and third data sets contain data left over from previous system IPL.

```
d smf
IEE949I 11.05.21 SMF DATA SETS 728
  NAME        VOLSER SIZE(BLKS) %FULL STATUS
P-SYS1.MANA SMFVL1       15000   20  ACTIVE
S-SYS1.MANB SMFVL2        300    1   DUMP REQUIRED
S-SYS1.MANC SMFVL2        300   100  DUMP REQUIRED
```

Note that SMF will not switch to a partially used data set. In this example, even though SYS1.MANB is only 1% full, SMF will not be able to switch to and record on it until it is dumped and cleared.

Switching the SMF Data Sets

When the SMF data set that is currently being recording on becomes full, SMF does the following:

- Automatically closes the full data set, making it available for dumping.
- Locates the new data set to open by starting at the **top** of the list of data sets specified on the DSNAME parameter of the SMFPRM*xx* member and looking for the first completely empty data set.

For example, suppose an installation defined three data sets, DS1, DS2, and DS3, in that order on the DSNAME parameter of SMFPRM*xx*. Now, lets say that SMF is writing to DS2, while DS1 and DS3 are empty. When DS2 fills, the installation issues `I SMF` to switch to an empty data set, SMF will use data set DS1 because it is at the top of the list in SMFPRMxx.

If the first available data set is not completely empty, SMF will begin to store the records in its buffers, even though there might be enough room in that data set for the records it is trying to write, and even though others of the SMF data sets might be completely empty.

Full means that the record which SMF is currently preparing to write out will not fit into the space left on the current SMF data set. It is possible that a data set might become "full" when it is less than 100% filled.

To prepare an SMF data set for dumping *before* it becomes full, the operator uses the SWITCH SMF command. When switching the SMF data sets, an inactive data set cannot become active unless it is empty. Therefore, before issuing the SWITCH command, the operator should use the DISPLAY SMF command to verify that there is at least one alternate data set. If the operator does not make this check, data might be lost.

The HALT EOD command causes a switch of SMF data sets but should be used only if the operator intends to quiesce the system in preparation to shut down. The HALT command should never be used if you intend to keep running, because it closes the system log.

When the operator issues either the HALT EOD or the SWITCH SMF command, the following actions occur:

- A type 19 record is created for each online direct access device (if a type 19 record was specified)
- For a SWITCH SMF command, a type 90 record is created to show the old and new data set names
- The SMF buffer is written to the active SMF data set
- The SMF data sets are switched so that the operator can dump the previously active data set.

Dumping SMF Data Sets

See Chapter 3, "Using the SMF dump programs," on page 29 for a discussion about the SMF dump program, and how to dump SMF data sets.

Preserving SMF Data

SMF records may be created by SMF itself or by other components of the operating system or certain application programs (such as CICS® and DB2). These records are then passed to SMF, which copies them to buffers and then asynchronously writes them to the SMF data sets. The control interval size you select for the SMF data sets determines the size of each SMF buffer. To keep real storage use to a minimum, SMF automatically obtains and releases more buffers as SMF activity increases and decreases.

When no output data sets are available for use or when SMF collects data more quickly than it can write records, SMF holds the data in its address space. You must correct the condition causing the problem before SMF uses all of the available storage, or data will be lost.

SMF writes message IEE986E to the console when the percentage of buffers in use in the SMF address space reaches or exceeds the buffer usage warning percentage for all available storage. The buffer usage warning percentage is specified with the BUFUSEWARN parameter (the default value is 25 percent, see "Using SMFPRMxx parameters" on page 57 for more information). The maximum amount of storage available to SMF is set with the BUFSIZMAX parameter (the default is 128M, see "Using SMFPRMxx parameters" on page 57). Until the percentage of buffers in use decreases below the specified BUFUSEWARN value, message IEE986E is redisplayed with updated percentage values as each additional SMF buffer is made ready for use or becomes available. When the percentage of buffers in use decreases below the specified BUFUSEWARN value, the message is deleted. If the percentage of use does not decrease the following possible operator actions can be taken:

1. Use the DISPLAY SMF command to check on the status of the SMF data sets. If no data sets are active or available, use the SMF dump program (IFASMFDP) to clear one and make it available for use."
2. The DISPLAY SMF, O command can be used to determine the maximum amount of buffer space available for SMF to use. If the percentage of buffer space in use is approaching or has reached the 100 percent level of all available storage for SMF buffering, then consider increasing the BUFSIZMAX value to allow for additional SMF record buffering. This action can aid in reducing the loss of SMF record data when there is a spike in SMF recording activity or there is a temporary inhibitor to making

the SMF data set available for use. Since the BUFSIZMAX value can also be reduced from its current setting, if an increase is put into effect to handle a temporary constraint condition, then the BUFSIZMAX value can be reduced when the constraint clears.

3. In addition, use the DISPLAY SMF,O command to check the record types that are being collected. Reducing the number of records being collected will slow the allocation and use of the buffers.

After taking the possible actions, if the percentage of use does not decrease SMF will eventually run out of storage for its buffers and stop recording data resulting in lost SMF records. Use the SMF NOBUFFS parameter (see "Using SMFPRMxx parameters" on page 57), to specify what the system is to do in this situation. The possible system actions are:

1. continue processing with the loss of SMF data or
2. enter a restartable wait state.

In the same way, you can control system action when the last available SMF data set is filled using the SMF LASTDS parameter.

Use the MAXDORM parameter to minimize the amount of data lost because of system failure. By specifying MAXDORM, your installation specifies the period of real time that data is permitted to remain in the SMF buffer before it is written. (See "Using SMFPRMxx parameters" on page 57.)

When there is a system failure, data in the SMF address space is lost, because it has not yet been written to a data set. If the events recorded in SMF records are very important to your installation, you should take a system dump that includes the SMF address space. You can then use the Interactive Problem Control System (IPCS) subcommand SMFDATA to read the dump, extract the data in the SMF buffers, and write it to an SMF data set. For more information on SMFDATA, see *z/OS MVS IPCS Commands*.

SMF Halt Processing

Use the HALT command to record statistics before stopping the operating system. After you have stopped all subsystem processing (through the use of the appropriate subsystem command) and the system notifies you that all system activity has completed, you can issue the HALT EOD command to ensure that important job and system statistics and data records in storage are recorded. For more information on the Halt command, see *z/OS MVS System Commands*.

When the operator issues the HALT EOD command, the following actions occur:

- Data in the SMF buffer is written to the active SMF data set or logstream.
- For SMF data set recording, a type 19 record is created for each online direct access device (if a type 19 record was selected to be recorded in the SMFPRMxx parmlib member).
- For SMF data set recording, the SMF data sets are switched so that the operator can dump the previously active data set.

Special considerations for DB2, JES3, and RMF

If your environment includes programs like RMF, JES3, or DB2, you may have to take their requirements into consideration when setting up SMF.

If SMF is processing records for DB2, the volume of data can be quite large. You must ensure an adequate number of VSAM buffers at initialization and sufficiently large SMF data sets.

If you are running a JES3 complex or using RMF, you might need to allocate larger data sets. If DASD space is severely limited in your installation, you might have to dump the data sets more frequently. The same considerations apply if you are using RACF and auditing many security-related events.

For more information, see Systems Programmer's Guide to: z/OS System Logger (www.redbooks.ibm.com/abstracts/sg246898.html).

Chapter 3. Using the SMF dump programs

The way you dump SMF data depends on whether you use log stream recording or SMF data set recording. See:

- "Using IFASMFDL — the SMF log stream dump program" on page 29
- "Using IFASMFDP — the SMF data set dump program" on page 42

Note that both the dump program for SMF log streams (IFASMFDL) and for SMF data sets (IFASMFDP) support the same exits. See "Parameters for the SMF log stream dump program (IFASMFDL)" on page 30 for IFASMFDL and "Parameters for the SMF data set dump program (IFASMFDP)" on page 42 for IFASMFDP.

See also:

- "Summary activity report" on page 51
- "Reading SMF data sets directly without using the dump programs" on page 55
- "SMFDLEXIT and SMFDPEXIT — Specifying the dump program exit" on page 68

Using IFASMFDL — the SMF log stream dump program

When you wish to dump an SMF log stream to archive the data to a permanent medium such as tape, or so that existing user written analysis routines can run against the dump data sets, you can dump SMF log stream data by issuing the SWITCH SMF command, which first dumps the SMF data in the buffers out to the log streams, and then passes control to the IEFU29L SMF log stream dump exit. The operator can use the SMF log stream dump program, IFASMFDL, to dump the specified log stream data to dump data sets. For more information about the IEFU29L — SMF log stream dump exit, see *z/OS MVS Installation Exits*.

Unlike the SMF data set dump program, there is no CLEAR option on the log stream dump program to delete data. When you use log streams to record SMF data, you can use the ARCHIVE and DELETE options to delete data from the log stream. System logger also allows you to manage log data retention using options on the log stream definition in the LOGR couple data set (specified using the administrative data utility, IXCMIAPU). See "Managing log streams and SMF log stream data" on page 19.

The SMF log stream dump program dumps the contents of one or more log streams to sequential data sets on either tape or direct access devices. The SMF log stream dump program allows the installation to route different records to separate files and produce a summary activity report. This report is described in "Summary activity report" on page 51. The job control language (JCL) to execute the SMF log stream dump program is described in "Running the SMF log stream dump program" on page 38.

During the dump process, the SMF log stream dump program creates two SMF records and writes them to every output data set: a dump header (record type 2) at the beginning of the data set and a dump trailer (record type 3) at the end of the data set.

If problems are encountered, the SMF log stream dump program writes messages, as required, to the SYSPRINT data set. The messages describe the following problems:

- If the SMF log stream dump program is unable to read a log stream, it writes an error message indicating which log stream it could not read.
- If the SMF log stream dump program is unable to open an output data set, it writes an error message indicating which data set it could not open.
- If the SMF buffers become full or the log stream is full or not available, SMF will be in a data lost condition and will be unable to record data. All data created after this condition is encountered will be lost. When this condition occurs, SMF tracks the number of lost records in record type 7 and the operator receives a message stating that data is being lost.

  You can use the SET SMF or SETSMF command to have new records issued to an available log stream.

When you use SMF logging, you can write individual record types to multiple log streams if you wish to, producing duplicate records. If you are dumping several log streams that contain the same record types, the dump may contain duplicate records. In addition, if you dump a log stream that contains data from multiple systems, you should coordinate the timezone of the recording system(s) and the dumping system.

The SMF log stream dump program writes a message to the SYSPRINT data set for all input log streams and output data sets and includes the names of the data sets in the message.

When reading SMF records from a log stream that has been compressed with zEDC, IBM recommends that you run the IFASMFDL utility on a system running with z/OS V2R1 or higher that has access to a zEDC Express® feature. If the IFASMFDL utility is run with the default NOSOFTINFLATE option and the system does not currently have access to a zEDC Express feature, IFASMFDL halts processing log streams containing zEDC compressed SMF records and generates a return code of 4. When SOFTINFLATE is specified, the IFASMFDL utility uses software decompression to read the records when hardware is unavailable. Note that the SOFTINFLATE option may cause the IFASMFDL utility to use additional time and CPU resources.

Specifying parameters for the SMF log stream dump program

"Parameters for the SMF log stream dump program (IFASMFDL)" on page 30 lists the parameters that control the processing of the SMF log stream dump program. When you specify the parameters as input to the program, the following syntax rules apply:

- Specify data in columns 1 to 71 of the input statement.
- Blanks are allowed anywhere in the statement except within a keyword or value.
- You can specify comments by enclosing them with `/* */` delimiters, but you should start comments at least in column 2. However, the comments do not appear in the SYSPRINT listing.

Parameters for the SMF log stream dump program (IFASMFDL)

LSNAME(*lsname*[,OPTIONS(*data*)])

Specifies the log stream, where *lsname* is the name of the log stream. You can specify the following to specify that you want a log stream to be dumped:

```
LSNAME(lsname)
```

The OPTIONS subparameter is optional; the *data* value can be:

ARCHIVE
IFASMFDL dumps the data to a data set and then deletes the data from the log stream.

DELETE
IFASMFDL only deletes the data from the log stream without dumping the data.

DUMP
Indicates that the log stream is to be dumped, as does no OPTIONS specification at all. The OPTIONS statement is allowed for easier migration from the data set dump utility.

You can specify any number of LSNAME parameters. If you do not specify the LSNAME parameter, the default is:

```
LSNAME(IFASMF.DEFAULT)
```

The system generates a summary activity report if at least one record was read and written. For more information, see "Summary activity report" on page 51.

OUTDD(*ddname*,*filters*)

Describes the output data set, where *ddname* is the data definition name (DDNAME) of the output data set. If a syntax error occurs in the OUTDD parameter, the job is terminated.

You can specify *filters* to filter the records written to the output data set by record type or subtype, date, start time, or end time. The *filters* value can be any of the following:

TYPE(*list*)
NOTYPE(*list*)

Required parameter that indicates the record types and subtypes to be selected for (TYPE) or excluded from (NOTYPE) dumping. If you specify both TYPE and NOTYPE for the same data set, the first valid specification is used.

Note: IFASMFDL does not support subtype selection for type 90 records. See “Record type 90 (X'5A') — System status” on page 843 for more information.

The *list* value specifies any record type and subtype or combination of records and subtypes. The record types and subtypes can be specified individually or as a range.

Examples:

- TYPE(2,4:7,9,30(2,4:6)) indicates that record types 2, 4, 5, 6, 7, 9, and subtypes 2, 4, 5, and 6 of record type 30 are to be included in the output data set.
- NOTYPE(30(1,3:5)) indicates that subtypes 1, 3, 4, and 5 of record type 30 are to be excluded from the output data set.

DATE({*yyddd*|*yyyyddd*},{*yyddd*|*yyyyddd*})

Specifies a date range by which to filter the records written to the output data set. The values for the OUTDD DATE subparameter must equate to a matching set or subset of the corresponding IFASMFDL DATE parameters. The OUTDD start date must be greater than or equal to the global start date, and the OUTDD end date must be less than or equal to the global end date.

Examples: Given that data for the date of 2008342 exists in the logstream:

- The following combination of DATE parameters results in an error because the dates specified in the OUTDD DATE parameter are outside the range of the global dates:

```
LSNAME (IFASMF.MULTSYS.STREAM1)
OUTDD (OUTDD2,...,DATE(2008342,2008342))
DATE(2008340,2008341)
```

- The following combination of DATE parameters results in records for 2008342 being selected for OUTDD2:

```
LSNAME (IFASMF.MULTSYS.STREAM1)
OUTDD (OUTDD2,...,DATE(2008342,2008342))
DATE(2008340,2008342)
```

START(*hhmm*)

Specifies the start time by which to filter the records written to the output data set, where *hh* is the hours and *mm* is the minutes (based on a 24-hour clock). The START value must fall within the range of the IFASMFDL (global) START and END values.

END(*hhmm*)

Specifies the end time by which to filter the records written to the output data set, where *hh* is the hours and *mm* is the minutes (based on a 24-hour clock). The END value must fall within the range of the IFASMFDL (global) START and END values.

You may specify any number of OUTDD parameters.

See “Running the SMF log stream dump program” on page 38 for examples of specifying various subparameters on the OUTDD statement.

DATE({*yyddd*|*yyyyddd*},{*yyddd*|*yyyyddd*})

Specifies the start and end date for the period for which records are to be written, where *yy* is the last two digits of the year, *yyyy* is all four digits of the year, and *ddd* is the Julian date. If only the last two digits of the year is specified, the first two digits defaults to 19. For example, DATE(92001,92366) indicates only records from January 1, 1992 to December 31, 1992 are to be written. The value for *ddd* cannot exceed 366. If DATE is specified, values for both the start date and the end date must be included.

If DATE is not specified, the default is: `DATE(1900000,2099366)`

You can specify DATE in the following ways:

- On a separate input line, as an IFASMFDL global parameter affecting all of the OUTDD statements
- As a subparameter on the OUTDD parameter to customize a specific output data set

Note that dates and times specified are based on the local time on the system running the IFASMFDL program. Use caution when dumping data from a system in a different timezone to ensure the proper data is dumped.

START(*hhmm*)
Specifies that only those records that were recorded at and after the START time and before the END time are to be written, where *hh* is the hours and *mm* is the minutes (based on a 24-hour clock).

If START is not specified, the default is: `START(0000)`

You can specify START in the following ways:

- On a separate input line, as an IFASMFDL global parameter affecting all the OUTDD statements.
- As a subparameter on the OUTDD parameter to customize a specific output data set. Specifying START on the OUTDD statements allows you to filter the records read and write different sets to different OUTDDs. In other words, you can create several data sets with different contents from one read of the log stream.

END(*hhmm*)
Specifies that only those records that were recorded after the START time and before the END time are to be written, where *hh* is the hours and *mm* is the minutes (based on a 24-hour clock).

If END is not specified, the default is: `END(2400)`

You can specify END in the following ways:

- On a separate input line, as an IFASMFDL global parameter affecting all the OUTDD statements.
- As a subparameter on the OUTDD parameter to customize a specific output data set. Specifying END on the OUTDD statements allows you to filter the records read and write different sets to different OUTDDs. In other words, you can create several data sets with different contents from one read of the log stream.

RELATIVEDATE(*unit*,*n*,*x*)
Specifies a date range based on the current day to be selected by the IFASMFDL program. The start date of the date range is calculated by going backward *n* time units measured by day, week, or month from the current day, week, or month. The end date of the date range is calculated by moving *x* time units forward from the start date. You can use the RELATIVEDATE option instead of the DATE option. The RELATIVEDATE parameter is not compatible with the DATE parameter.

unit
Indicates the unit used to calculate the start date and end date of the range. The value of *unit* can be BYDAY, BYWEEK, or BYMONTH.

BYDAY
Indicates that the unit is a day.

BYWEEK
Indicates that the unit is a week.

WEEKSTART is an optional parameter that specifies whether the first day of a week in the calculation is Sunday or Monday. If WEEKSTART is not specified, the default is Sunday.

BYMONTH
Indicates that the unit is a month.

n
A required parameter that specifies the number of the unit to go backward to calculate the beginning of the range.

Value range:

- When BYDAY is specified: 0-31
- When BYWEEK is specified: 0-26
- When BYMONTH is specified: 0-12

x

A required parameter that specifies the number of unit to go forward from the calculated beginning of the range to calculate the ending month of the range.

Value range:

- When BYDAY is specified: 1-31
- When BYWEEK is specified: 1-26
- When BYMONTH is specified: 1-12

WEEKSTART(*y*)

When the *unit* is specified as BYWEEK, you can use **WEEKSTART(*y*)** to specify if the first day of the week is Sunday or Monday, where:

y

A required parameter that specifies the first day of the week. The value can be either of the following:

SUN

A week is defined as the days Sunday through Saturday.

MON

A week is defined as the days Monday through Sunday.

This parameter is meaningless in either of the following situations:

- The RELATIVEDATE parameter is not used.
- The *unit* option on the RELATIVEDATE parameter is not BYWEEK.

SID(*xxxx*)

Specifies that only records written by the operating system with the specified system identifier are written to the output data set, where *xxxx*, which indicates the system identifier, can be any one to four alphameric characters. A separate SID parameter can be specified for each system the SMF dump program is expected to handle. If SID is not specified, records pertaining to any operating system are written.

You can only specify SID on a separate input line as a IFASMFDL global parameter affecting all the OUTDD statements. You cannot use it as a subparameter on the OUTDD parameter.

ABEND(RETRY|NORETRY)

Specifies whether the SMF log stream dump program attempts to recover from an abend (abnormal end of task). When specified, this option overrides the SMF parmlib option (DUMPABND).

If you specify RETRY, then the SMF log stream dump program attempts to recover from the abend.

If you specify the NORETRY, then the SMF log stream dump program terminates after the abend has occurred.

You can only specify ABEND on a separate input line as a IFASMFDL global parameter affecting all the OUTDD statements.

USER1(*name*)

Specifies the *name* of an installation-written exit routine that is given control after each record is read and the counters incremented. This exit does not receive control for records that contain an extended header. See “Standard and Extended SMF record headers” on page 162 for more information about the types of SMF headers. The parameter list pointed to by register 1 contains the address of the 3-word user work area in word 1, the address of the SMF record in word 2, and the address of the log stream name in word 3. See Figure 29 on page 56.

You can only specify USER1 on a separate input line as an IFASMFDL global parameter.

The exit routine must set a return code in register 15 before passing control back to the SMF log stream dump program. The return codes are as follows:

Code
Meaning

00
Normal processing should continue

04
The record should not be written to the output data set.

Any other return code indicates that a problem was encountered and that the SMF log stream dump program is not to invoke the exit again.

USER2(*name*)
Specifies the *name* of the installation-written exit routine that is given control when the SMF log stream dump program selects a record to be written. This exit does not receive control for records that contain an extended header. See "Standard and Extended SMF record headers" on page 162 for more information on the types of SMF headers. The parameter list pointed to by register 1 contains the address of the 3-word user work area in word 1, the address of the SMF record in word 2, and the address of the OUTDD *ddname* in word 3. See Figure 29 on page 56.

You can only specify USER2 on a separate input line as a IFASMFDL global parameter.

The return codes are the same as those for USER1.

USER3(*name*)
Specifies the *name* of the installation-written exit routine that is given control after the output data set is closed. This routine is invoked for each output data set. The parameter list pointed to by register 1 contains the address of the 3-word user work area in word 1, the address of the output DCB in word 2, and the address of the OUTDD *ddname* in word 3. See Figure 29 on page 56.

You can only specify USER3 on a separate input line as a IFASMFDL global parameter.

The exit routine must set a return code in register 15 before passing control back to the SMF log stream dump program. The return codes for USER3 are as follows:

Code
Meaning

0
Normal processing should continue

Non-0
A problem was encountered and the SMF log stream dump program is not to invoke the exit again.

User records must include a standard record header; the SMF log stream dump program might not flag an error in a record that does not have a standard header.

USER4(*name*)
Specifies the *name* of an installation-written exit routine that is given control after each record is read and the counters incremented. This exit receives control for records that contain any standard or extended record header. The parameter list pointed to by register 1 contains the address of the 3-word user work area in word 1, the address of the SMF record in word 2, and the address of the log stream name in word 3. See Figure 29 on page 56.

Note: The USER4 exit is called prior to calling the USER1 exit.

You can only specify USER4 on a separate input line as an IFASMFDL global parameter.

The exit routine must set a return code in register 15 before passing control back to the SMF log stream dump program. The return codes are as follows:

Code
Meaning

00
Normal processing should continue

04
The record should not be written to the output data set.

Any other return code indicates that a problem was encountered and that the SMF log stream dump program is not to invoke the exit again.

USER5(*name*)
Specifies the *name* of the installation-written exit routine that is given control when the SMF log stream dump program selects a record to be written. This exit receives control for records that contain any standard or extended record header. The parameter list pointed to by register 1 contains the address of the 3-word user work area in word 1, the address of the SMF record in word 2, and the address of the OUTDD *ddname* in word 3. See Figure 29 on page 56.

Note: The USER5 exit is called prior to calling the USER2 exit.

You can only specify USER5 on a separate input line as a IFASMFDL global parameter.

The return codes are the same as those for USER4.

SMARTENDPOINT
Specifies that processing of input records in the logstream should discontinue after it has been determined that records for all known SIDs contain a date and time that is past the IFASMFDL specified date and time plus the SMARTEPOVER value. The SMARTENDPOINT option will be ignored if no records are found that match the specified search criteria within the logstream.

The default behavior is that IFASMFDL continues to read records all the way to the end of the logstream.

In z/OS V1R9 through z/OS V1R12, this keyword only applies to the DUMP option. Beginning with z/OS V1R13, this keyword applies to all the OPTIONS subparameter (ARCHIVE, DELETE, and DUMP).

SMARTEPOVER(*hhmm*)
This keyword only applies when SMARTENDPOINT is specified; it specifies the amount of time that is added to the end date and time to determine the SMARTENDPOINT time. The value specified in *hhmm* can range from zero (0000) to two hours (0200). The default value is two hours (0200).

To determine which value to specify, take into account the following considerations:

- If no SIDs are specified, you can set this value to double the maximum MAXDORM value of any image recording into the logstream. This allows for the best results from SID auto-detection.
- If all SIDs are specified, this value can be minimized down to zero.
- If only a single SID is recorded into this logstream (for example, in a DASD-only logstream), this value can be minimized down to zero.

For more information about the MAXDORM option, see parmlib member SMFPRMxx in *z/OS MVS Initialization and Tuning Reference*.

FLDSTATS(*xxxx*)
Prints out a table with statistics related to record flooding. The output table includes statistics for the records that matched the output filters. Each line of the report is for a given record type. Statistics are gathered based on the *xxxx* value. This value indicates the number of records that make a single interval for the statistical calculations. See Figure 15 on page 41.

REPORTOPTS(NOSUBTYPE|SUBTYPE)
Specifies whether the summary activity report is to list subtypes.

NOSUBTYPE
The default. Specifies that the summary activity report lists record types but not subtypes.

SUBTYPE
Specifies that the summary activity report lists record types and subtypes.

SOFTINFLATE|NOSOFTINFLATE
Specifies whether the SMF log stream dump program can decompress SMF records that were compressed with zEDC using software decompression.

NOSOFTINFLATE
The default. Specifies that SMF records compressed with zEDC cannot be decompressed using software decompression. This option results in an error when SMF records compressed with zEDC are found and either the zEDC Express feature is unavailable or the system is running a pre-z/OS V2R1 release.

SOFTINFLATE
Specifies that SMF records compressed with zEDC can be decompressed using software decompression. When a zEDC Express feature is unavailable and at pre-z/OS V2R1 releases, software algorithms are used to decompress SMF records. Note that this may result in greater CPU utilization or a longer job time than expected.

SIGSTRIP|NOSIGSTRIP
Specifies whether or not the log stream dump program includes the signature records in the dump data sets. If no signature records are present in the input logstream, there will be no impact on processing. IFASMFDL will output SMF type 2 subtype 1 and 2 records from a logstream when the logstream contains signature data, unless SIGSTRIP is specified. These records will be in the IFASMFDL statistics as SMF type 2 records that bare being written.

SIGSTRIP
The default. Do not include the signature records in the dump data sets.

NOSIGSTRIP
Include the signature records in the dump data sets.

Notes on the IFASMFDL parameters

1. If a syntax error occurs in the processing of a parameter, SMF does not process the parameter and sends a message to the SYSPRINT data set. If a parameter is not specified, the default is used. The valid dump parameters specified or used by default are listed in the SYSPRINT data set on completion of the SMF log stream dump program.
2. **START and END parameters:** If the start time is less than the end time, the records selected for any particular day are those records produced after the start time and before the end time. For example, if you specify `START(0800),END(2000)`, SMF selects records during the period indicated by the shaded area in Figure 7 on page 36.

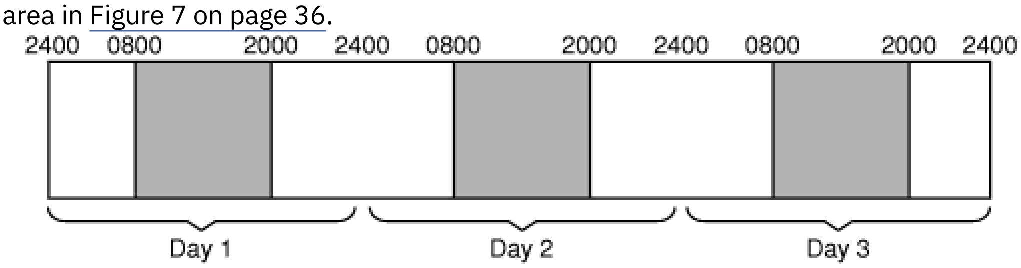


Figure 7. Showing how SMF selects records (START(0800),END(2000))

If the start time is greater than the end time, all records produced between the start time on one day and the end time on the following day are selected. For example, if you specify `START(2000),END(0800)`, SMF selects records during the time period indicated by the shaded area in Figure 8 on page 36.

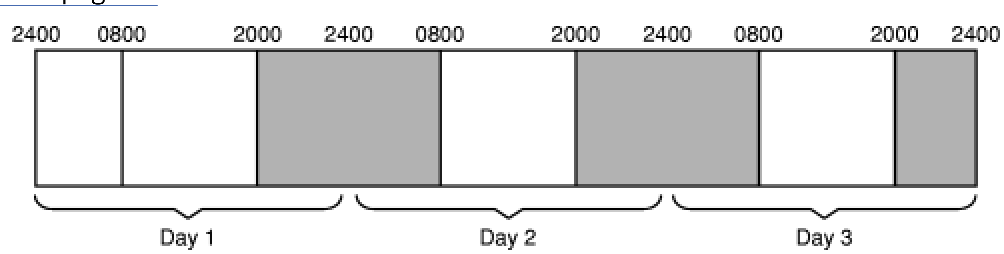


Figure 8. Showing how SMF selects records (START(2000),END(0800))

SMF does not select the records produced between 0800 hours and 2000 hours in any day.

3. **ARCHIVE and DELETE options:** When you specify the ARCHIVE or DELETE option in LSNAME, pay attention to these items:

   - The start date and time of the IFASMFDL is always the start date and time of the log stream. The start time that is specified by the START parameter is ignored. The start date that is specified by DATE or RELATIVEDATE parameter will also be ignored.
   - When using the ARCHIVE option, you can use any combinations of the OUTDD filters except for START and END.
   - For an ARCHIVE request, you must write each record in the log stream up until the end date and time to at least one OUTDD. Ensure that all the types and subtypes and all SIDs are being written to a data set or are specified on the OUTDD parameters. If any record fails to match any specified OUTDD, the request fails.
   - If you specify the DELETE option, everything in the specified log stream is removed, from the start of the log stream up until the end date that is specified by the DATE or RELATIVEDATE parameter and the end time that is specified by the END parameter. The OUTDD statements are not permitted when the DELETE option is used.
   - ARCHIVE and DELETE requests are performed on logger block boundaries. If the logger block timestamp matches the criteria that is specified on the ARCHIVE or DELETE request, all of the records in that block are included in the ARCHIVE or DELETE request. For an ARCHIVE or DELETE request, you might not get data in the time range that is written past the point of your end date and time.

     For example, consider the following series of logger blocks where the time shown for each block is the time the block was written:

Block 1 2008.150 2300	Block 2 2008.151 0100	Block 3 2008.151 0300	Block 4 2008.151 0400

     and each logger block has SMF records at the following times:

     Block 1: 2008.150 2200 to 2008.150 2259
     Block 2: 2008.150 2300 to 2008.151 0059
     Block 3: 2008.151 0100 to 2008.151 0259
     Block 4: 2008.151 0300 to 2008.151 0359

     When you specify an ARCHIVE or DELETE option on this log stream where the end date is 2008.150 and the end time is 2400, only the data from Block 1 is dumped and deleted for an ARCHIVE request, and only the data from Block 1 is deleted for a DELETE request.

     The MAXDORM option in SMFPRMxx can be used to align the logger block boundaries with the date and time selection criteria of the ARCHIVE and DELETE options. For more information about the MAXDORM option, see parmlib member SMFPRMxx in *z/OS MVS Initialization and Tuning Reference*.
   - When using the DELETE and ARCHIVE options, you must ensure that only one instance of the IFASMFDL program is running at a time for a given log stream. Running multiple instances of the dump program against the same log stream leads to unexpected results.
4. **SMARTENDPOINT parameter:** The IFASMFDL SMARTENDPOINT processing can dynamically detect the z/OS images while reading the logstream or use the SID(xxxx) statement to specify the images. If there is the possibility that buffering occurred on an z/OS image that writes to this logstream, IFASMFDL might not dynamically detect the image that was buffering data. To ensure all systems writing to a logstream are accounted for, despite any buffering that has occurred, use the SID(xxxx) option to specify each system of interest.
5. **RELATIVEDATE parameters:**

   - The date range specified through the RELATIVEDATE parameter is calculated starting at the previous full unit. For example, if you use the RELATIVEDATE parameter with the BYMONTH option on May 15th, the calculation of the time range starts at counting backwards from April, because April is the first previous full month.

- To get RELATIVEDATE parameter to resolve to the current date, you can use RELATIVEDATE(*unit*,0,1).
- If the date range calculated by the RELATIVEDATE parameters exceeds the date and time that the job was submitted, the end date and time in use are set to the date and time that the job was submitted. In this case, a return code X'04' is returned and message IFA834I is issued, indicating the end date and time for the dump.
- If the date range calculated through the RELATIVEDATE parameter exceeds the year that the job was submitted, the calculated end date is undefined.

6. **USER*x* parameters:** The name fields in USER1, USER2, USER3, USER4, or USER5 specify the name of a load module that the SMF log stream dump program loads and calls at the indicated times. You can either link-edit each exit into an APF-authorized library in LINKLIST (but do not use the AC=1 attribute) or use a //STEPLIB DD card. You must define all the exits you specify to the system in the SMFPRMxx member with the SMFDLEXIT parameter.

Running the SMF log stream dump program

Use the IEFU29L SMF dump exit to initiate the SMF log stream dump program. See *z/OS MVS Installation Exits* for more information about the IEFU29L dump exit.

Sample JCL to execute the SMF log stream dump program is shown in Figure 9 on page 38. The output is a non-temporary data set on a standard-labeled tape. In this example, the DCB= keyword is not specified, so the SMF log stream dump program assigns the following DCB attributes.

- BLKSIZE=0 (allows the system to determine the optimum block size)
- LRECL=32767
- RECFM=VBS

SMF records created by IBM components never exceed 32,756 bytes. If the data required in a record would cause the record to exceed that length, the component responsible for creating the record would, instead, create multiple (continuation) records, none of which would exceed 32,756 bytes. (See “Record type 30 (X'1E') — Common address space work” on page 292 for an example.) SMF records are written as spanned (VBS) in order to conserve storage space by ensuring that each block of data is as full as possible. If you specify DCB parameters on any of the input or output DD statements for IFASMFDL, you must specify RECFM=VBS. You should not specify LRECL=X for reading or writing SMF dump data, because LRECL=X signifies that a single record may be larger than 32,756 bytes, which is not the case for SMF data.

You can specify LRECL=32760 instead of 32767. You can also specify any block size from 4096 to the maximum allowed for the chosen device.

Specify a region size of `0M` to avoid abend `X'878'` reason code 10 or other related abends.

```
//DUMPX     JOB   MSGLEVEL=1
//STEP1     EXEC  PGM=IFASMFDL,REGION=0M
//OUTDD1 DD DSN=BASCAR.LSDEFLT.RECOR66,DISP=(NEW,CATLG,DELETE),
//          UNIT=3390,
//     SPACE=(CYL,(1,1),RLSE),DCB=(LRECL=32760,RECFM=VBS,BLKSIZE=0)
//SYSPRINT DD  SYSOUT=A
//SYSIN    DD  *
 LSNAME(IFASMF.MULTSYS.STREAM1,OPTIONS(DUMP))
 OUTDD(OUTDD1,TYPE(0:255),START(0000),END(2400))
 DATE(2007011,2007011)
 SID(SY1)
/*
```

Figure 9. Sample JCL for dumping an SMF log stream to a data set

Dumping multiple SMF log streams

Figure 10 on page 39 shows a sample job using the SMF log stream dump program to dump two SMF log streams to three output data sets.

```
//IFASMFDL  JOB   accounting information
//STEP      EXEC  PGM=IFASMFDL,REGION=0M
//OUTDD1    DD    DSN=SMFREC.FEWTYPES,DISP=(NEW,CATLG,DELETE)
//OUTDD2    DD    DSN=SMF.TYPE10.TYPE255,DISP=(NEW,CATLG,DELETE),DCB=BLKSIZE=32000
//OUTDD3    DD    DSN=SMF.TYPE10.TYPE255B,DISP=(NEW,CATLG,DELETE),DCB=LRECL=32760
//SYSPRINT  DD    SYSOUT=A
//SYSIN     DD    *
       LSNAME(IFASMF.ACCNT1)
       LSNAME(IFASMF.ACCNT2)
       OUTDD(OUTDD1,TYPE(0,2,10,15:30,33(1)),START(0730),END(1850))
       OUTDD(OUTDD2,TYPE(10:255),DATE(2006274,2006334))
       OUTDD(OUTDD3,TYPE(10:255))
       DATE(2006001,2006366)
       SID(308A)
       SID(308B)
/*
```

Figure 10. Sample JCL for dumping multiple SMF log streams to multiple output data sets

Figure 10 on page 39 illustrates the following:

- The DCB= keyword has been coded for the output data set defined by OUTDD2. Any block size 4096 or greater may be specified. Choosing a block size suitable for the device type being used will improve storage resource use. For this job, the data set specified by OUTDD1 will have a system determined block size while the data set specified by OUTDD2 will have a block size of 32000.
- The LRECL= keyword has been coded for an output data set defined as OUTDD3. For this job, the data set specified by OUTDD3 will have an LRECL of 32760. For OUTDD1 and OUTDD2, the LRECL will default to 32767.
- The LSNAME parameters contain the names of two log streams to be dumped.
- The OUTDD parameters contain filters selecting the SMF record types to be dumped:
  - OUTDD1 specifies that you want to dump record types 0, 2, 10, 15-30, and subtype 1 of record type 33 starting with those issued at 7:30 am and ending at 6:50 pm.
  - OUTDD2 specifies that you want to dump record types 10 through 255 from dates 1 October 2006 through 30 November 2006.
  - OUTDD3 specifies that you want to dump record types 10 through 255.
- The DATE parameter specifies that for those OUTDD statements that do not include the DATE subparameter, data from 1 January 2006 through 31 December 2006 is to be written.
- The SID parameters specify that data will be dumped for systems 308A and 308B.

There can be any number of input (LSNAME) or output (OUTDD) parameters in the SMF log stream dump program. The log streams are dumped in reverse order. For example, in Figure 10 on page 39, two log streams are specified. After the SMF log stream dump program is processed, the output files contain the records from log stream IFASMF.ACCNT2 first, followed by the records from IFASMF.ACCNT1.

After the SMF log stream dump program job shown in Figure 10 on page 39 runs, information is listed in the SYSPRINT data set, as shown in Figure 11 on page 39.

```
SMF DUMP PARAMETERS
END(2400) -- DEFAULT
START(0000) -- DEFAULT
SID(308B) -- SYSIN
SID(308A) -- SYSIN
DATE(2006001,2006366) -- SYSIN
OUTDD(OUTDD3,TYPE(10:255)) -- SYSIN
OUTDD(OUTDD2,DATE(2006274,2006334),TYPE(10:255)) -- SYSIN
OUTDD(OUTDD1,END(1850),START(0730),TYPE(0,2,10,15:30,33(1))) -- SYSIN
LSNAME(IFASMF.ACCNT2) -- SYSIN
LSNAME(IFASMF.ACCNT1) -- SYSIN
```

Figure 11. Sample information included in SYSPRINT data set

More IFASMFDL examples

Example 1: Figure 12 on page 40 requests records to be selected from the log stream that were recorded starting from three days before the current date, and ending at the third day, counting from that starting day. To illustrate further, if the JCL in Figure 12 on page 40 executes on Monday, 28 July 2008

(Julian date 2008.210), the data in the log stream from Friday, 25 July 2008 (Julian date 2008.207) to Sunday, 27 July (Julian date 2008.209) will be dumped.

```
//DUMPX     JOB   MSGLEVEL=1
//STEP1     EXEC  PGM=IFASMFDL,REGION=0M
//OUTDD1    DD    DSN=BASCAR.LSDEFLT.RECOR66,DISP=(NEW,CATLG,DELETE),
//                UNIT=3390,
//     SPACE=(CYL,(1,1),RLSE),DCB=(LRECL=32760,RECFM=VBS,BLKSIZE=0)
//SYSPRINT  DD    SYSOUT=A
//SYSIN     DD    *
 LSNAME(IFASMF.MULTSYS.STREAM1,OPTIONS(DUMP))
 OUTDD(OUTDD1,TYPE(0:255))
 RELATIVEDATE(BYDAY,3,3)
 SID(SY1)
/*
```

Figure 12. Sample JCL for dumping a SMF log stream with the RELATIVEDATE option

The SMF log stream dump program requires APF-authorization. Running the SMF log stream dump program, as shown in the above JCL examples, preserves the APF-authorization assigned to the SMF log stream dump program. Invoking the SMF log stream dump program in any way other than as shown above (for example, if you invoke the SMF log stream dump program from another program or invoke it as a TSO/E command), might cause it to lose its authorization.

For more information on APF-authorization, see *z/OS MVS Programming: Authorized Assembler Services Guide*. For more information on running authorized programs under TSO/E, see *z/OS TSO/E Customization*.

Example 2: Figure 13 on page 40 illustrates the following:

- The RELATIVEDATE parameter requests records to be selected from the log stream in a date range beginning three weeks before the current week and ending at the second week counting from the starting week.
- The WEEKSTART(MON) parameter specifies that weeks are defined as running from Monday through Sunday, as opposed to Sunday through Saturday (which would be specified as WEEKSTART(SUN)).

```
//DUMPX     JOB   MSGLEVEL=1
//STEP1     EXEC  PGM=IFASMFDL,REGION=0M
//OUTDD1    DD    DSN=BASCAR.LSDEFLT.RECOR66,DISP=(NEW,CATLG,DELETE),
//                UNIT=3390,
//     SPACE=(CYL,(1,1),RLSE),DCB=(LRECL=32760,RECFM=VBS,BLKSIZE=0)
//SYSPRINT  DD    SYSOUT=A
//SYSIN     DD    *
 LSNAME(IFASMF.MULTSYS.STREAM1,OPTIONS(DUMP))
 OUTDD(OUTDD1,TYPE(0:255))
 RELATIVEDATE(BYWEEK,3,2)
 WEEKSTART(MON)
 SID(SY1)
/*
```

Figure 13. Sample JCL for dumping a SMF log stream with the RELATIVEDATE and WEEKSTART options

If we run the job in Figure 13 on page 40 on the following days,

- On Sunday, 27 July 2008 (Julian date 2008.209), the calculated range for the output is Monday, 30 June 2008 (2008.182) to Sunday, 13 July (Julian date 2008.195).
- On Monday, 28 July 2008 (Julian date 2008.210), the calculated range for the output is Monday, 7 July 2008 (2008.189) to Sunday, 20 July (Julian date 2008.202).

Example 3: Figure 14 on page 41 illustrates the following:

- The RELATIVEDATE option requests that yesterday's records be selected.
- The OPTIONS(ARCHIVE) overrides the start date produced by the RELATIVEDATE option, and starts at the beginning of the logstream. All records will then be dumped and deleted until the end of yesterday.
- If such a job is run nightly, the start of the logstream continues to "move" with each subsequent run, because the data that is dumped is also being deleted.

```
//DUMPX     JOB   MSGLEVEL=1
//STEP1     EXEC  PGM=IFASMFDL,REGION=0M
//OUTDD1    DD    DSN=BASCAR.LSDEFLT.RECOR66,DISP=(NEW,CATLG,DELETE),
//                UNIT=3390,
//      SPACE=(CYL,(1,1),RLSE),DCB=(LRECL=32760,RECFM=VBS,BLKSIZE=0)
//SYSPRINT  DD    SYSOUT=A
//SYSIN     DD    *
 LSNAME(IFASMF.MULTSYS.STREAM1,OPTIONS(ARCHIVE))
 OUTDD(OUTDD1,TYPE(0:255))
 RELATIVEDATE(BYDAY,1,1)
 /*
```

Figure 14. Sample JCL for dumping a SMF log stream with the RELATIVEDATE option

Example 4: Figure 15 on page 41 shows an example to get statistics information for type 90 and 101 records with the FLDSTATS parameter. This job will gather statistics individually for type 90 and 101 and also for them combined. Each interval will consist of 1000 records.

```
//RUNSMFDL JOB  MSGLEVEL=(1,1),NOTIFY=&SYSUID
//SMFDMP   EXEC PGM=IFASMFDL,REGION=0M
//DUMP04   DD DUMMY
//SYSPRINT DD SYSOUT=*
//SYSIN    DD *
    LSNAME(IFASMF.SOME.LOGSTREAM,OPTIONS(DUMP))
    OUTDD(DUMP04,TYPE(90,101))
    FLDSTATS(1000)
```

Figure 15. Sample JCL for dumping a SMF log stream with the FLDSTATS option

Example 5: Figure 16 on page 41 shows an example of retaining signature records with the NOSIGSTRIP parameter.

```
//IFASMFDL JOB  MSGLEVEL=(1,1),NOTIFY=&SYSUID
//STEP1     EXEC  PGM=IFASMFDL,REGION=0M
//OUTDD1    DD    DSN=SMFREC.FEWTYPES,DISP=(NEW,CATLG,DELETE),
//SYSPRINT  DD    SYSOUT=A
//SYSIN     DD    *
       LSNAME(IFASMF.ACCNT1)
       OUTDD(OUTDD1,TYPE(10:255))
       DATE(2014001,2014365)
       SID(308A)
       NOSIGSTRIP
/*
```

Figure 16. Sample JCL for dumping a SMF log stream with the NOSIGSTRIP option

Serialization of the SMF logstream dump program

IFASMFDL obtains an enqueue for each logstream that is being processed. The major name is SYSZSMFL; the minor name is the name of the logstream. Table 3 on page 41 describes the mode in which the enqueue is obtained depending on the type of request and the type of logstream.

Table 3. How mode is obtained, depending on request and logstream type

LS type header	Request type		
	DELETE	**ARCHIVE**	**DUMP**
DASD-only	SYSTEM EXCLUSIVE	SYSTEM EXCLUSIVE	SYSTEM SHARED
CF-based	SYSTEMS EXCLUSIVE	SYSTEMS EXCLUSIVE	SYSTEMS SHARED

During initialization, IFASMFDL attempts to obtain all the required enqueue. If any enqueue cannot be obtained, the obtained enqueue up to that point are released and message IFA838I is issued. IFASMFDL retries every 30 seconds to obtain the enqueue and reissues message IFA838I every 5 minutes when it is waiting.

Because IFASMFDL is not waiting on the enqueue, the contention is not shown with a D GRS,C command. Also because IFASMFDL is releasing and attempting to re-obtain the enqueue, the order of execution of two IFASMFDL jobs may change from the order in which they were submitted.

Using IFASMFDP — the SMF data set dump program

When the current recording data set cannot accommodate any more records, the SMF writer routine automatically switches recording from the active SMF data set to an empty SMF data set, and then passes control to the IEFU29 SMF dump exit. The operator is then informed that the data set needs to be dumped. For more information about the IEFU29 exit, see *z/OS MVS Installation Exits*.

SMF data sets cannot be shared across systems. IBM does not recommend that the SMF data set dump program be run from one system in an attempt to clear a SMF data set used by another system.

When notified by the system that a full data set needs to be dumped, the operator uses the SMF data set dump program (IFASMFDP) to transfer the contents of the full SMF data set to another data set, and to reset the status of the dumped data set to empty so that SMF can use it again for recording data.

The SMF data set dump program dumps the contents of multiple VSAM or QSAM data sets to sequential data sets on either tape or direct access devices. The SMF data set dump program allows the installation to route different records to separate files and produce a summary activity report. This report is described in "Summary activity report" on page 51. The job control language (JCL) to execute the SMF data set dump program is described in "Running the SMF data set dump program" on page 48.

The SMF data set dump program copies the input data sets to the output data sets. During the copy process, the SMF data set dump program creates two SMF records and writes them to every output data set: a dump header (record type 2) at the beginning of the data set and a dump trailer (record type 3) at the end of the data set.

If problems are encountered, the SMF data set dump program writes messages, as required, to the SYSOUT data set. The messages describe the following problems:

- The operator must not clear a data set that is being filled. If the operator attempts to clear the active SMF data set, the SMF data set dump program returns a code of X'08' in register 15. The operator can, however, dump the active or alternate data set without clearing it.
- If the SMF data set dump program is unable to open either the input or output data sets, it writes an error message indicating which data set was not successfully opened.
- If all SMF data sets and the SMF buffers become full, SMF will be in a data lost condition (unable to record) until dumping takes place. When this condition occurs, SMF tracks the number of lost records in record type 7 and the operator receives a message stating that data is being lost.

The SMF data set dump program writes a message to the SYSPRINT data set for all input and output data sets and includes the names of the data sets in the message.

Specifying parameters for the SMF data set dump program

Parameters control the processing of the SMF data set dump program. When you specify the parameters as input to the program, the following syntax rules apply:

- Specify data in columns 1 to 71 of the input statement.
- Blanks are allowed anywhere in the statement except within a keyword or value.
- You can specify comments by enclosing them with `/* */` delimiters. However, the comments do not appear in the SYSPRINT listing.

"Parameters for the SMF data set dump program (IFASMFDP)" on page 42 describes the parameters that control IFASMFDP processing.

Parameters for the SMF data set dump program (IFASMFDP)

INDD(*ddname*,OPTIONS(*data*))
Describes the input data set, where *ddname* is the data definition name (DDNAME) of the data set and *data* can be any one of the following:

ddname
Specifies the data definition name (DDNAME) of the input data set.

data
Specifies one of the following processing options:

DUMP
Indicates that the input data set is to be read or copied without being reset.

CLEAR
Indicates that the input data set is to be reset and preformatted. The information on the data set is not copied and therefore lost.

ALL
Indicates both the DUMP and CLEAR options.

If INDD is not specified, the default is: `INDD(DUMPIN,OPTIONS(ALL))`

If DUMP or ALL is specified, a summary activity report is written if at least one record was read or written. For more information, see "Summary activity report" on page 51.

OUTDD(*ddname*,TYPE(*list*))
OUTDD(*ddname*,NOTYPE(*list*))
Describes the output data set, where *ddname* is the data definition name (DDNAME) of the output data set. TYPE indicates that the record types and subtypes specified in *list* are to be included in the output data set. NOTYPE indicates that the record types and subtypes specified in *list* are to be excluded from the output data set. The *list* variable can be any record type and subtype or combination of records; the record types and subtypes can be specified individually or as a range. For example, TYPE(2,4:7,9,30(2,4:6)) indicates that record types 2, 4, 5, 6, 7, 9, and subtypes 2, 4, 5, and 6 of record type 30 record are to be included in the output data set. NOTYPE(30(1,3:5)) indicates that subtypes 1, 3, 4, and 5 of record type 30 are to be excluded from the output data set.

Note: IFASMFDP does not support subtype selection for type 90 records. See "Record type 90 (X'5A') — System status" on page 843 for more information.

If OUTDD is not specified, the default is `OUTDD(DUMPOUT,TYPE(000:255))`, which specifies that all record types and subtypes are to be included in the output data set.

If both TYPE and NOTYPE are specified for the same data set, the first valid specification is used. If a syntax error occurs in the OUTDD option and any INDD option specified ALL, DUMP, or CLEAR, the job is terminated.

DATE({*yyddd*|*yyyyddd*},{*yyddd*|*yyyyddd*})
Specifies the start and end date for the period for which records are to be written, where *yy* is the last two digits of the year, *yyyy* is the year digits of the year, and *ddd* is the Julian date. If only the last two digits of the year are specified, the first two digits defaults to 19. For example, DATE(92001,92366) indicates only records from January 1, 1992 to December 31, 1992 are to be written. The value for *ddd* cannot exceed 366. If DATE is specified, both a start value and an end value must be specified.

If DATE is not specified, the default is: `DATE(1900000,2099366)`

START(*hhmm*)
Specifies that only those records that were recorded at and after the START time and before the END time are to be written, where *hh* is the hours and *mm* is the minutes (based on a 24-hour clock).

If START is not specified, the default is: `START(0000)`

END(*hhmm*)
Specifies that only those records that were recorded after the START time and before the END time are to be written, where *hh* is the hours and *mm* is the minutes (based on a 24-hour clock). If END is not specified, the default is: `END(2400)`

SID(*xxxx*)
Specifies that only records written by the operating system with the specified system identifier can be written to the output data set, where *xxxx*, which indicates the system identifier, can be any one to four alphameric characters. SID can be specified for each system the SMF data set dump program is expected to handle. If SID is not specified, records pertaining to any operating system are written.

ABEND(RETRY|NORETRY)
Specifies whether the SMF data set dump program attempts to recover from an abend (abnormal end of task). When specified, this option overrides the SMF parmlib option (DUMPABND).

If the RETRY parameter is issued, then the SMF data set dump program attempts to recover from the abend.

If the NORETRY parameter is issued, then the SMF data set dump program terminates after the abend has occurred. The SMF data set dump program overrides NORETRY when, while SMF dump is dumping and clearing the input data set, an ABEND occurs after the input data set has been cleared. In this case, the SMF data set dump program tries to recover from the ABEND to prevent the deletion of the output data set and the loss of SMF data when the SMF data set dump program abnormally ends.

USER1(*name*)
Specifies the *name* of a installation-written exit routine that is given control after each record is read and the counters incremented. This exit does not receive control for records that contain an extended header. See the "Standard and Extended SMF record headers" on page 162 section for more information on the types of SMF headers. The parameter list pointed to by register 1 contains the address of the 3-word user work area in word 1, the address of the SMF record in word 2, and the address of the INDD *ddname* in word 3.

The exit routine must set a return code in register 15 before passing control back to the SMF data set dump program. The return codes are as follows:

Code
Meaning

00
Normal processing should continue

04
The record should not be written to the output data set.

Any other return code indicates that a problem was encountered and that the SMF data set dump program is not to invoke the exit again.

USER2(*name*)
Specifies the *name* of the installation-written exit routine that is given control only when the SMF data set dump program selects a record to be written. This exit does not receive control for records that contain an extended header. See "Standard and Extended SMF record headers" on page 162 for more information on the types of SMF headers. The parameter list pointed to by register 1 contains the address of the 3-word user work area in word 1, the address of the SMF record in word 2, and the address of the OUTDD *ddname* in word 3. This exit is always called by the SMF data set dump program before any records are written.

The return codes are the same as those for USER1.

USER3(*name*)
Specifies the *name* of the installation-written exit routine that is given control after the output data set is closed. This routine is invoked for each output data set. The parameter list pointed to by register 1 contains the address of the 3-word user work area in word 1, the address of the output DCB in word 2, and the address of the OUTDD *ddname* in word 3.

The exit routine must set a return code in register 15 before passing control back to the SMF data set dump program. The return codes for USER3 are as follows:

Code
Meaning

0
Normal processing should continue

Non-0
A problem was encountered and the SMF data set dump program is not to invoke the exit again.

USER4(*name*)
Specifies the *name* of an installation-written exit routine that is given control after each record is read and the counters incremented. This exit receives control for records that contain any standard or extended record header. The parameter list pointed to by register 1 contains the address of the 3-word user work area in word 1, the address of the SMF record in word 2, and the address of the INDD *ddname* in word 3. See Figure 29 on page 56.

Note: The USER4 exit is called prior to calling the USER1 exit.

You can only specify USER4 on a separate input line as an IFASMFDP global parameter.

The exit routine must set a return code in register 15 before passing control back to the SMF data set dump program. The return codes are as follows:

Code
Meaning

00
Normal processing should continue

04
The record should not be written to the output data set.

Any other return code indicates that a problem was encountered and that the SMF data set dump program is not to invoke the exit again.

USER5(*name*)
Specifies the *name* of the installation-written exit routine that is given control when the SMF data set dump program selects a record to be written. This exit receives control for records that contain any standard or extended record header. The parameter list pointed to by register 1 contains the address of the 3-word user work area in word 1, the address of the SMF record in word 2, and the address of the OUTDD *ddname* in word 3. See Figure 29 on page 56.

Note: The USER5 exit is called prior to calling the USER2 exit.

You can only specify USER5 on a separate input line as a IFASMFDP global parameter.

The return codes are the same as those for USER4.

FLDSTATS(*xxxx*)
Prints out a table with statistics related to record flooding. The output table includes statistics for the records that matched the output filters. Each line of the report is for a given record type. Statistics are gathered based on the *xxxx* value. This value indicates the number of records that make a single interval for the statistical calculations. See Figure 23 on page 50.

REPORTOPTS(NOSUBTYPE|SUBTYPE)
Specifies whether the summary activity report is to list subtypes.

NOSUBTYPE
The default. Specifies that the summary activity report lists record types but not subtypes.

SUBTYPE
Specifies that the summary activity report lists record types and subtypes.

SIGSTRIP|NOSIGSTRIP
Specifies whether or not the SMF data set dump program includes the signature records in the dump data sets. If no signature records are present in the input data set, there will be no impact on processing.

SIGSTRIP
The default. Do not include the signature records in the dump data sets.

NOSIGSTRIP
Include the signature records in the dump data sets. You must specify NOSIGSTRIP in order to use the SIGVALIDATE parameter.

NOSIGVALIDATE|SIGVALIDATE(HASH(*hashmethod*),TOKENNAME(*tokenname*))
Specifies whether or not to validate the digital signature data in the signature records in the input data sets. If no signature records are present in the input data sets, IFASMFDP will fail with return code 8.

NOSIGVALIDATE
The default. Do not validate the digital signature data.

SIGVALIDATE(HASH(*hashmethod*),TOKENNAME(*tokenname*))
Allow the SMF data set dump program to validate the signature records in the input data sets. You must specify a cryptographic public key token name (*tokenname*) and hash method (*hashmethod*) that match the signature data to be verified.

Restrictions:

- If the INDD specifies a VSAM data set, no validation processing is done, IFASMFDP fails with return code 8, and message IFA745I is issued.
- If the data set being validated contains records from multiple systems and the SID parameter is unspecified or multiple SIDs are specified, IFASMFDP fails with return code 8 and the IFA747I message is issued.

HASH(*hashmethod*)
Specify the same *hashmethod* as was specified on the RECSIGN parameter in the SMFPRM*xx* parmlib member that was in use at the time the records were generated. See *z/OS MVS Initialization and Tuning Reference* for more information about the valid hash values.

TOKENNAME(*tokenname*)
Specify the same token name to be used with the specified hashing technique as was specified on the RECSIGN parameter in the SMFPRM*xx* parmlib member that was in use at the time the records were generated. See *z/OS MVS Initialization and Tuning Reference* for more information about the token name value.

The SIGVALIDATE parameter also causes the SMF data set dump program to generate a record validation report. For more information, see "IFASMFDP record validation report" on page 54.

If the IFASMFDP program is run in a non-authorized environment, the user ID under which the program runs must have access to both the PKCS #11 callable services (CSFSERV class) and the public key (appropriate User.*xxxxxxx* resource in the CRYPTOZ class). Errors related to ICSF authorization will be written to the JOBLOG.

SIGVALIDATE must be specified when ASIGVALIDATE is also specified.

NOASIGVALIDATE|ASIGVALIDATE(HASH(*hashmethod*),TOKENNAME(*tokenname*))
Specifies whether or not to validate the alternate digital signature data in the signature records in the input data sets. If no signature records are present in the input data sets, or signature records are present but do not include alternate signature data, IFASMFDP will fail with return code 8.

NOASIGVALIDATE
The default. Do not validate the alternate digital signature data.

ASIGVALIDATE(HASH(*hashmethod*),TOKENNAME(*tokenname*))
Allow the SMF data set dump program to validate the alternate signature records in the input data sets. You must specify a cryptographic public key token name (*tokenname*) and hash method (*hashmethod*) that match the signature data to be verified.

Restrictions:

- When ASIGVALIDATE is specified, SIGVALIDATE must also be specified. If SIGVALIDATE is not specified with ASIGVALIDATE, IFASMFDP fails with return code 8, and message IFA851I is issued.
- If the INDD specifies a VSAM data set, no validation processing is done, IFASMFDP fails with return code 8, and the IFA745I message is issued.
- If the data set being validated contains records from multiple systems and the SID parameter is unspecified or multiple SIDs are specified, IFASMFDP fails with return code 8 and the IFA747I message is issued.

HASH(*hashmethod*)
Specify the same *hashmethod* as was specified on the ARECSIGN parameter in the SMFPRM*xx* parmlib member that was in use at the time the records were generated. See *z/OS MVS Initialization and Tuning Reference* for more information about the valid hash values.

TOKENNAME(*tokenname*)
Specify the same token name *tokenname* to be used with the specified hashing technique as was specified on the ARECSIGN parameter in the SMFPRM*xx* parmlib member that was in use at the time the records were generated. See *z/OS MVS Initialization and Tuning Reference* for more information about the token name value.

The ASIGVALIDATE parameter also causes the SMF data set dump program to generate a record validation report. For more information, see "IFASMFDP record validation report" on page 54.

If the IFASMFDP program is run in a non-authorized environment, the user ID under which the program runs must have access to both the PKCS #11 callable services (CSFSERV class) and the public key (appropriate User.*xxxxxxx* resource in the CRYPTOZ class). Errors related to ICSF authorization will be written to the JOBLOG.

SIGVALIDATE must be specified when ASIGVALIDATE is also specified.

Notes on the IFASMFDP parameters

1. If a syntax error occurs in the processing of a parameter, SMF does not process the parameter and sends a message to the SYSPRINT data set. If a parameter is not specified, the default is used. The valid dump parameters specified or used by default are listed in the SYSPRINT data set on completion of the SMF data set dump program.
2. **START and END parameters:** If the start time is less than the end time, the records selected for any particular day are those records produced after the start time and before the end time. For example, if you specify `START(0800),END(2000)`, SMF selects records during the period indicated by the shaded area shown in Figure 17 on page 47.

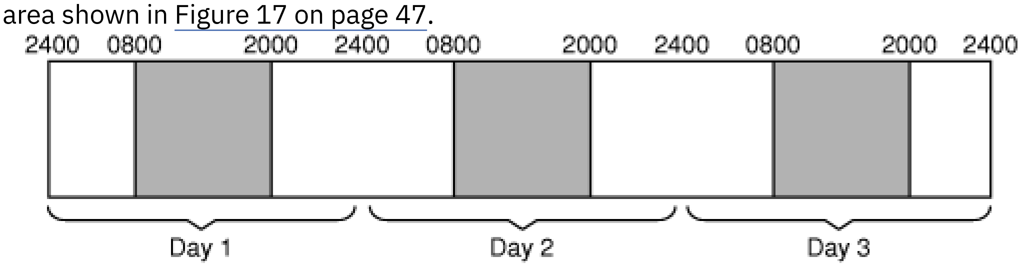
   

   Figure 17. SMF selects records during the period (START(0800),END(2000))

   If the start time is greater than the end time, all records produced between the start time and the end time on the following day are selected. For example, if you specify `START(2000),END(0800)`, SMF selects records during the time period indicated by the shaded area shown in Figure 18 on page 47.

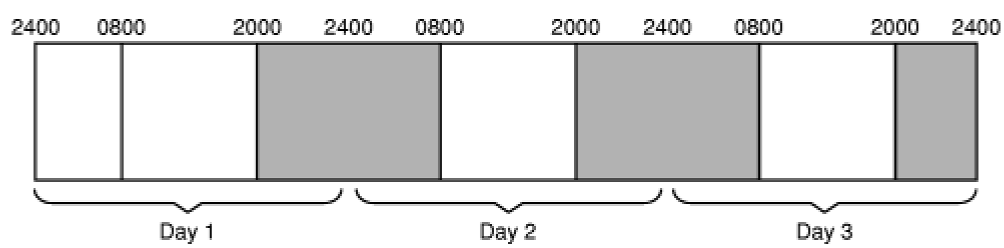
   

   Figure 18. SMF selects records during the period (START(2000),END(0800))

   Note that SMF does not select the records produced between 0800 hours and 2000 hours in any day.
3. User records must include a standard record header; the SMF data set dump program might not flag an error in a record that does not have a standard header.
4. **USER*x* parameters:** The name field in USER1, USER2, USER3, USER4, or USER5 specifies the name of a load module that the SMF data set dump program loads and calls at the indicated times. You can

either link-edit each exit into an APF-authorized library in LINKLIST (but do not use the AC=1 attribute) or use a //STEPLIB DD card. All exits specified must be defined to the system in the SMFPRM*xx* member with the SMFDPEXIT parameter if the program is being executed in an authorized environment. When IFASMFDP is run in an unauthorized environment, the exits specified with USER1, USER2, USER3, USER4, and USER5 are not verified against what is in the SMFPRM*xx* member.

Running the SMF data set dump program

IBM recommends that you use the IEFU29 SMF dump exit to run the SMF data set dump program. When the current recording data set cannot hold any more records, the SMF writer routine automatically switches recording from the active SMF data set to an empty SMF data set, and passes control to the IEFU29 dump exit. This avoids the need for operator intervention. See *z/OS MVS Installation Exits* for more information about the IEFU29 dump exit.

Another method to run the SMF data set dump program is shown (sample JCL) in Figure 19 on page 48. The output is a non-temporary data set on a standard-labeled tape. The operator should record the volume serial number of the output data set so that other jobs can reference it. In this example, the DCB= keyword is not specified, so the SMF data set dump program assigns the following DCB attributes.

- BLKSIZE=0 (allows the system to determine the optimum block size)
- LRECL=32767
- RECFM=VBS

SMF records created by IBM components never exceed 32,756 bytes. If the data required in a record would cause the record to exceed that length, the component responsible for creating the record would, instead, create multiple (continuation) records, none of which would exceed 32,756 bytes. (See “Record type 30 (X'1E') — Common address space work” on page 292 for an example.) SMF records are written as spanned (VBS) in order to conserve storage space by ensuring that each block of data is as full as possible. If you specify DCB parameters on any of the input or output DD statements for IFASMFDP, you must specify RECFM=VBS. You should not specify LRECL=X for reading or writing SMF dump data, because LRECL=X signifies that a single record may be larger than 32,756 bytes, which is not the case for SMF data.

You can specify LRECL=32760 instead of 32767. You can also specify any block size from 4096 to the maximum allowed for the chosen device.

```
//DUMPX     JOB   MSGLEVEL=1
//STEP1     EXEC  PGM=IFASMFDP
//DUMPIN    DD    DSN=data set name, DISP=SHR
//DUMPOUT   DD    DSN=SMFDATA,UNIT=tapeaddr,
//                DISP=(NEW,KEEP),LABEL=(,SL),VOL=SER=serial
//SYSPRINT  DD    SYSOUT=A
```

Figure 19. Sample JCL for running the SMF data set dump program

Authorization requirements

The CLEAR function of the SMF data set dump program requires APF-authorization. Running the SMF data set dump program shown in the JCL samples in “IFASMFDP examples” on page 49 preserves the APF-authorization assigned to the SMF data set dump program. Invoking the SMF data set dump program in any way other than as shown in the JCL samples (for example, invoking the SMF data set dump program from another program or invoking it as a TSO/E command) might cause it to lose its authorization.

The DUMP function is permitted in an unauthorized environment. If the CLEAR function is attempted in an unauthorized environment, a message is written indicating the request was denied.

For more information on APF-authorization, see *z/OS MVS Programming: Authorized Assembler Services Guide*. For more information on running authorized programs under TSO/E, see *z/OS TSO/E Customization*.

IFASMFDP examples

Example 1: Figure 20 on page 49 shows a sample job using the SMF data set dump program to dump and clear an SMF data set (INDD1) and to combine its records with those in an old dumped data set (INDD2) to three data sets.

```
//IFASMFDP  JOB   accounting information
//STEP      EXEC  PGM=IFASMFDP
//INDD1     DD    DSN=SYS1.MANB,DISP=SHR
//INDD2     DD    DSN=SMFDATA,UNIT=TAPE,DISP=SHR,VOL=SER=SMFTAP
//OUTDD1    DD    DSN=ALLSMF.TYPE0.TYPE40,DISP=SHR
//OUTDD2    DD    DSN=ALLSMF.TYPE10.TYPE255,DISP=SHR,DCB=BLKSIZE=32000
//OUTDD3    DD    DSN=ALLSMF.TYPE10.TYPE255B,DISP=SHR,DCB=LRECL=32760
//SYSPRINT  DD    SYSOUT=A
//SYSIN     DD    *
       INDD(INDD1,OPTIONS(ALL))
       INDD(INDD2,OPTIONS(DUMP))
       OUTDD(OUTDD1,TYPE(0,2,10,15:40))
       OUTDD(OUTDD2,TYPE(10:255))
       OUTDD(OUTDD3,TYPE(10:255))
       DATE(92002,92366)
       SID(308A)
       SID(308B)
/*
```

Figure 20. Sample Job for Dumping SMF Data Sets

Figure 20 on page 49 illustrates the following:

- The DCB= keyword has been coded for the output data set defined by OUTDD2. Any block size 4096 or greater may be specified. Choosing a block size suitable for the device type being used will improve storage resource use. For this job, the data set specified by OUTDD1 will have a system determined block size while the data set specified by OUTDD2 will have a block size of 32000.
- The LRECL= keyword has been coded for an output data set defined as OUTDD3. For this job, the data set specified by OUTDD3 will have an LRECL of 32760. For OUTDD2, the LRECL will default to 32767.

There can be any number of input (INDD) or output (OUTDD) files in the SMF data set dump program. The input files are dumped in reverse order unless concatenated under one input file. For example, in Figure 20 on page 49, two input files are specified. After the SMF data set dump program is processed, the output file contains the records from INDD2 first, followed by the records from INDD1.

After the SMF data set dump program job shown in Figure 20 on page 49 runs, the information shown in Figure 21 on page 49 is listed in the SYSPRINT data set.

```
SMF DUMP PARAMETERS
SID(308A) - SYSIN
SID(308B) - SYSIN
END(2400) - DEFAULT
START(0000) - DEFAULT
DATE(92002,92366) - SYSIN
OUTDD(OUTDD3,TYPE(10:255)) - SYSIN
OUTDD(OUTDD2,TYPE(10:255)) - SYSIN
OUTDD(OUTDD1,TYPE(0,2,10,15:40)) - SYSIN
INDD(INDD2,,OPTIONS(DUMP)) - SYSIN
INDD(INDD1,OPTIONS(ALL)) - SYSIN
```

Figure 21. Example output listed in SYSPRINT data set

Example 2: One method of running the SMF data set dump program is to enter jobs that specify the SMF data set dump program into the system, and hold them on the job queue until a dump is required. Another method is to start a reader to an input stream containing the JCL for the SMF data set dump program. Figure 22 on page 50 shows two sample procedures (DUMPX and DUMPY) for dumping the SMF data sets to a standard-labeled tape (VOL=SER=SMFTAP) with the operator START command. In both procedures, the default tape specified on the PROC statements is 192. Figure 22 on page 50 shows sample JCL for adding these procedures to SYS1.PROCLIB.

```
//UPDATE    JOB   MSGLEVEL=1
//UPDATE    EXEC  PGM=IEBUPDTE,PARM=NEW
//SYSUT1    DD    DSN=SYS1.PROCLIB,DISP=SHR
//SYSUT2    DD    DSN=SYS1.PROCLIB,DISP=SHR
//SYSPRINT  DD    SYSOUT=A
//SYSIN     DD    DATA
./          ADD   NAME=DUMPX,LIST=ALL
//DUMPX     PROC  TAPE=192
//SMFDMP    EXEC  PGM=IFASMFDP
//DUMPIN    DD    DSNAME=SMFDATA,UNIT=&TAPE,DISP=(MOD,KEEP),
//                LABEL=(,SL),VOL=SER=SMFTAP
//SYSPRINT  DD    SYSOUT=A
./          ADD   NAME=DUMPY,LIST=ALL
//DUMPY     PROC  TAPE=192
//SMFDMP    EXEC  PGM=IFASMFDP
//DUMPIN    DD    DSNAME=SYS1.MANY,DISP=SHR
//DUMPOUT   DD    DSNAME=SMFDATA,UNIT=&TAPE,DISP=(MOD,KEEP),
//                LABEL=(,SL),VOL=SER=SMFTAP
//SYSPRINT  DD    SYSOUT=A
./ENDUP
/*
```

Figure 22. Sample procedures for dumping the SMF data sets

Example 3: Figure 23 on page 50 shows an example to get statistics information for type 90 and 101 records with the FLDSTATS parameter. This job will gather statistics individually for type 90 and 101 and also for them combined. Each interval will consist of 1000 records.

```
//RUNSMFDP JOB  MSGLEVEL=(1,1),NOTIFY=&SYSUID
//SMFDMP   EXEC PGM=IFASMFDP
//DUMP03   DD DSN=SYS1.MANQ,DISP=SHR,VOL=SER=183PAK,UNIT=3390
//DUMP04   DD DUMMY
//SYSPRINT DD SYSOUT=*
//SYSIN    DD *
     INDD(DUMP03,OPTIONS(DUMP))
      OUTDD(DUMP04,TYPE(90,101))
     FLDSTATS(1000)
```

Figure 23. Sample JCL for dumping a SMF log stream with the FLDSTATS option

Example 4: Figure 24 on page 50 shows an example of using the NOSIGSTRIP and SIGVALIDATE parameters to retain and validate the signature records.

```
//IFASMFDP  JOB  MSGLEVEL=(1,1),NOTIFY=&SYSUID
//STEP      EXEC  PGM=IFASMFDP
//INDD1     DD    DSN=SMFDATA,UNIT=TAPE,DISP=SHR,VOL=SER=SMFTAP
//OUTDD1    DD    DSN=ALLSMF.TYPE10.TYPE255,DISP=SHR
//SYSPRINT  DD    SYSOUT=A
//SYSIN     DD    *
       INDD(INDD1,OPTIONS(DUMP))
       OUTDD(OUTDD1,TYPE(10:255))
       DATE(14001,14365)
       SID(308A)
       NOSIGSTRIP
       SIGVALIDATE(HASH(hash),TOKENNAME(tokenname))
/*
```

Figure 24. Sample job for dumping SMF data sets with digital signature validation

Return codes from the SMF data set dump program

The dump utility of the SMF data set dump program issues the following return codes:

Code
Meaning

00
The dump was successful; no errors were encountered.

04
The dump was successful; one or more errors were detected but processing continued.

08
The dump was not successful; an error terminated processing. Possible reasons include:

- Bad return code from an ICSF service

- Bad environment (such as lack of authorization for ICSF services)
- Bad record found

Action: Check the SMF record report and signature reports in the JOBLOG.

Reports produced by the SMF dump programs

Depending on the parameters you specify, the SMF dump programs may produce one or more reports.

- "Summary activity report" on page 51
- "Flood statistics report" on page 53
- "IFASMFDP record validation report" on page 54

Summary activity report

The SMF data set dump program creates a summary activity report when the DUMP option was specified for any of the input data sets and at least one record was read or written.

Figure 25 on page 51 shows an example of the summary activity report when you specify the REPORTOPTS(NOSUBTYPE) parameter or allow it to default.

```
                                            SUMMARY ACTIVITY REPORT
     START DATE-TIME  06/17/2019-13:57:42                       END DATE-TIME  06/17/2019-14:15:36
     RECORD       RECORDS          PERCENT       AVG. RECORD   MIN. RECORD   MAX. RECORD        RECORDS
       TYPE          READ         OF TOTAL            LENGTH        LENGTH        LENGTH        WRITTEN
          2           296          47.36 %            605.34            18           612            297
          3             1            .16 %             18.00            18            18              2
         14            52           8.32 %            432.00           432           432             52
         15            48           7.68 %            432.00           432           432             48
         17            10           1.60 %            100.00           100           100             10
         30            44           7.04 %          1,148.20           480         1,570             44
         42           173          27.68 %            399.43           270           484            173
         84             1            .16 %          1,344.00         1,344         1,344              1
     TOTAL            625            100 %            550.98            18         1,570            627
     NUMBER OF RECORDS IN ERROR              0
```

Figure 25. Example of summary activity report (without subtypes)

Figure 26 on page 51 shows an example of the summary activity report when specify the REPORTOPTS(SUBTYPE) parameter. If the record header indicates that subtypes are not valid for a given record type, a dash (-) appears in the SUBTYPE column for that record type.

```
                                            SUMMARY ACTIVITY REPORT
     START DATE-TIME  06/17/2019-13:57:42                       END DATE-TIME  06/17/2019-14:15:36
   RECORD         RECORDS          PERCENT       AVG. RECORD   MIN. RECORD   MAX. RECORD        RECORDS
TYPE / SUBTYPE       READ         OF TOTAL            LENGTH        LENGTH        LENGTH        WRITTEN
   2 /     1           86          13.76 %            596.00           596           596             86
   2 /     2          209          33.44 %            612.00           612           612            209
   2 /     -            1            .16 %             18.00            18            18              2
   3 /     -            1            .16 %             18.00            18            18              2
  14 /     -           52           8.32 %            432.00           432           432             52
  15 /     -           48           7.68 %            432.00           432           432             48
  17 /     -           10           1.60 %            100.00           100           100             10
  30 /     1           11           1.76 %            480.09           480           481             11
  30 /     3            1            .16 %          1,300.00         1,300         1,300              1
  30 /     4           22           3.52 %          1,347.72         1,240         1,360             22
  30 /     5           10           1.60 %          1,429.00         1,240         1,570             10
  42 /     6           99          15.84 %            438.90           332           484             99
  42 /    24           29           4.64 %            270.00           270           270             29
  42 /    27           45           7.20 %            396.00           396           396             45
  84 /     3            1            .16 %          1,344.00         1,344         1,344              1
     TOTAL            625            100 %            550.98            18         1,570            627
     NUMBER OF RECORDS IN ERROR              0
```

Figure 26. Example of summary activity report (with subtypes)

The meaning of each heading is:

- **START DATE-TIME** indicates the date and time of the earliest record read, excluding record types 2, 3, and those greater than 127. Under most circumstances this date and time will not equal the date and time of the first record written.
- **END DATE-TIME** indicates the date and time of the latest record read, excluding record types 2, 3, and those greater than 127. Under most circumstances this date and time will not equal the date and time of the last record written.

- **RECORD TYPE** indicates the identifying number of each record type read by the SMF dump program.
- **RECORD SUBTYPE** indicates the identifying number of the subtype of each record type read by the SMF dump program when you specify the REPORTOPTS(SUBTYPE) parameter.
- **RECORDS READ** indicates the number of input records read for each record type.
- **PERCENT OF TOTAL** indicates the number of records read for each type divided by the total number of records read. A value of *** indicates that the percent could not be calculated because the total number of records read exceeds 99,999,999,999.
- **AVG RECORD LENGTH**, **MIN RECORD LENGTH**, and **MAX RECORD LENGTH** indicate, respectively, the average, minimum, and maximum lengths of the records read for each record type.
- **RECORDS WRITTEN** indicates the number of output records written to the output data sets as specified by the SYSIN parameters.
- **TOTAL** indicates the total activity for each column.
- **NUMBER OF RECORDS IN ERROR** indicates the number of records that were not dumped because of errors. There are two types of errors:

  1. Incorrectly-spanned records cannot be read. (A spanned record is larger than the control-interval size of the SMF data set.) These records may be encountered if a physical I/O error occurred on a recording data set while a spanned record was being written. The SMF data set dump program is unable to read incorrectly-spanned records.
  2. Incorrectly-formatted time or date values in record-header fields prevent processing of the record. The record is read but not written or processed. If your installation writes user records (record types ranging from 128 through 255), see "Standard and Extended SMF record headers" on page 162 for a description of the proper header format.

  If there are any records in error, the INDD-name or LSNAME-name, type of error (INVALID TIME OR DATE or INCONSISTENT SPANNED RECORD), record sequence number, and the first 32 bytes of the record (in error) are printed. This processing is performed only for the first 500 records in error of each SMF recording data set. When more than 500 records in error are found, the SMF data set dump program writes message IFA024I to the SYSPRINT data set. Subsequent records in error are not printed, but are counted in the total number of records in error. The record sequence number is the sequential number of the record in the INDD.

Figure 27 on page 52 shows an example of a record in error.

```
                           INDD: INDD1


ERROR TYPE: INCONSISTENT SPANNED RECORD
RECORD SEQUENCE NUMBER: 5
005B0000 1E140056 51510092 060FF3F0 F9F0D4E2 E3D1C3D3 F0F00056 4D840092  * j 3090MSTJCL00 *


ERROR TYPE: INVALID TIME OR DATE
RECORD SEQUENCE NUMBER: 1,555,988
021D0000 1E3C0000 00000000 000003F0 F9F04040 4040E4D7 00000028 000A0001  * j 3090 UP      *




                           INDD: INDD2


ERROR TYPE: INCONSISTENT SPANNED RECORD
RECORD SEQUENCE NUMBER: 8
010A0000 DE1E0056 51510092 060FF3F0 F9F0E2E3 C3400001 00000070 00160001  * j 3090STC      *
```

Figure 27. Example of a Record in Error

When using IFASMFDL to process digitally signed SMF records, see "Using IFASMFDL to carry signatures to data sets" on page 149 for information about how signature data is included in the summary report.

Note: When running z/OS V2R1 and V2R2, records that include SMF extended header information appear as Type 126 records in the report. Because the dump utilities in releases V2R1 and V2R2 cannot write extended header records, the RECORDS READ count is non-zero and the RECORDS WRITTEN count is zero. When records with extended headers or record types larger than 255 characters are encountered, the following line is added to the summary activity report.

```
Records with extended headers were not written.
```

Flood statistics report

The SMF dump programs create a flood statistics report to display statistics for each record type that matched the specified filters. This report is generated by using the FLDSTATS(*xxxx*) keyword.

- Considerations for running the flood statistics report from IFASMFDP:
  - The input SMF records must contain data that is mapped in conformance with the standard SMF header description. IBM record types 0 – 127 and 1152 – 2047 will contain standard header data; however, user-defined SMF record types 128 – 1151 may not contain standard SMF headers. SMF records with header data that do not conform to the standard header layout will not be processed correctly by IFASMFDP for producing the Flood Statistics Report. See "Standard and Extended SMF record headers" on page 162 for details about the SMF record header.
  - The SMF input data must be sorted by the date and time fields in the SMF standard header section. The IBM DFSORT utility parameter for sorting the data in this way would be: `SORT FIELDS=(11,4,BI,A,7,4,BI,A)`
- Considerations for running the flood statistics report from IFASMFDL:

  If multiple logstreams being dumped contain the same data, such as if the same record type was collected into multiple logstreams, interval statistical data will be calculated multiple times for the same data.

Table 4 on page 53 shows an example of the flood statistics report the SMF data set dump program creates.

- The detail lines in the report are generated for record types that contain at least one interval worth of data, as specified by the FLDSTATS parameter.
- The total line reflects "overall," rather than cumulative, data. These values are aggregated to show interval statistics against all record types, rather than against individual record types, as is shown in the detail lines. As such, the statistics in this line are not directly related to the statistics that are shown in the detail lines.

Table 4. Flood statistics report

START DATE-TIME 05/28/2009-10:45:57				**END DATE-TIME 05/28/2009-11:16:47**	
RECORD TYPE	**TOTAL INTERVALS**	**LOW INTERVAL**	**HIGH INTERVAL**	**AVERAGE INTERVAL**	**STANDARD DEVIATION**
4	11	50	5,286	642	1,404
5	1350	50	5,236	546	1,308
6	14	50	5,176	506	1,263
7	15	40	5,116	383	1,226
8	17	40	5,055	340	1,146
9	19	40	5,015	307	1,082
10	2	40	5,452	2,746	2,706
11	2	40	5,453	2,746	2,706
12	2	40	5,447	2,743	2,703
13	2	40	5,438	2,739	2,699
14	2	1385	5,444	3,415	2,029

Table 4. Flood statistics report (continued)					
START DATE-TIME 05/28/2009-10:45:57				**END DATE-TIME 05/28/2009-11:16:47**	
RECORD TYPE	**TOTAL INTERVALS**	**LOW INTERVAL**	**HIGH INTERVAL**	**AVERAGE INTERVAL**	**STANDARD DEVIATION**
15	3	40	5,438	1,842	2,291
16	3	40	5,419	1,836	2,283
17	3	40	5,420	1,837	2,283
20	4	50	5,416	1,745	2,083
26	5	50	5,389	1,402	1,917
30	6	50	5,361	1,181	1,842
TOTAL	130	3	4,737	58	415

The meaning of each heading is:

- **START DATE-TIME** indicates the date and time of the earliest record read, excluding record types 2, 3, and those greater than 127. Under most circumstances this date and time will not equal the date and time of the first record written.
- **END DATE-TIME** indicates the date and time of the latest record read, excluding record types 2, 3, and those greater than 127. Under most circumstances this date and time will not equal the date and time of the last record written.
- **RECORD TYPE** indicates the record type for this record.
- **TOTAL INTERVALS** indicates the number of complete intervals for all record types read, as specified by the FLDSTATS option.
- **LOW INTERVAL** indicates the lowest time it took for a complete interval. This is the interval with the fastest velocity. This value is in tenths of a second.
- **HIGH INTERVAL** indicates the highest time it took for a complete interval. This is the interval with the slowest velocity. This is in tenths of a second.
- **AVERAGE INTERVAL** indicates the average of all the intervals. This value is in tenths of a second.
- **STANDARD DEVIATION** indicates the standard deviation for the set of complete intervals. This value is given in tenths of a second.

Note: If two log streams are dumped and they both include the same data, the intervals are double calculated into the statistics.

IFASMFDP record validation report

When you specify the SIGVALIDATE parameter, the SMF data set dump program (IFASMFDP) creates a record validation report to summarize the validation results. This information can also assist with diagnosis in the event of a validation failure. If a validation failure occurs, a message indicating the reason will also appear in the JOBLOG.

The record validation report displays a line for each SMF record type and subtype processed, by system ID (SID), and indicates whether any validation failures were detected. Each report line includes the time span and counts for records that were verified. Counts include the number of records, groups, and intervals that were processed.

The report also indicates the overall validation success or failure. A signature failure is the highest level of failure. Additional checking is performed to see if the error could be due to a missing or added record, or an entire missing interval of records. Manual examination will be required to determine the root cause of the validation failure.

Figure 28 on page 55 shows an example of a record validation report.

```
                            RECORD VALIDATION REPORT FOR SY1
RECORD   RECORD   VALIDATION      VALIDATION START       VALIDATION END       RECORDS       GROUPS      INTERVALS
  TYPE  SUBTYPE      FAILURE            DATE-TIME             DATE-TIME     VALIDATED    VALIDATED      VALIDATED
   128       *             N   10/23/2014-11:00:00  10/23/2014-13:00:00            60           10              2
   145       1             N   10/23/2014-11:00:00  10/23/2014-13:00:00             3            3              2
   160       *             N   10/23/2014-11:00:00  10/23/2014-13:00:00            10            2              2
VALIDATION SUCCEEDED
```

Figure 28. Sample IFASMFDP record validation report

The fields shown in the record validation report are:

Record type
The SMF record types that were validated.

Record subtype
The SMF record subtypes that were validated.

Validation failure
The validation results for the record type and subtype.

N
Validation of this record type and subtype was successful (no failures occurred).

Y
Validation of this record type and subtype was unsuccessful (failures occurred).

Validation start date-time
The starting date and time of the time span that was validated.

Validation end date-time
The ending date and time of the time span that was validated.

Records validated
The number of records that were validated.

Groups validated
The number of groups that were validated. A group is a subset of records that were signed together.

Intervals validated
The number of intervals that were validated. An interval is the signature generated on the SMF-configured interval time.

Validation succeeded
This message indicates that all data was successfully validated.

In the event of a validation failure, this message would instead provide more information about the failure.

Reading SMF data sets directly without using the dump programs

Installations that choose to read the SMF data sets directly rather than using the SMF data set dump program, should note that SMF preformats its data sets with dummy records. A dummy record is shorter than any valid SMF record and is easily identified because it contains the characters “SMFEOFMARK”. The SMF data set dump program terminates processing when it encounters a dummy record, thereby improving data set processing performance.

Cancelling the SMF data set dump program is not advised, as it can leave the SMF data sets in an unpredictable state.

Programs that access the output of the SMF data set dump program are required to specify the correct logical record length (LRECL) value. Failure to specify a large enough LRECL value might result in an 002 abend. The LRECL value must equal the length of the longest SMF record being created plus four bytes for the record descriptor word (RDW). The LRECL value can be larger than the BLKSIZE value because the records can be segmented.

Your installation can give control during dump processing to three 24-bit addressable installation exit routines. By doing this, you can examine or modify the record before it is written. When each exit is invoked, register 1 contains the address of a three-word parameter list (Figure 29 on page 56).

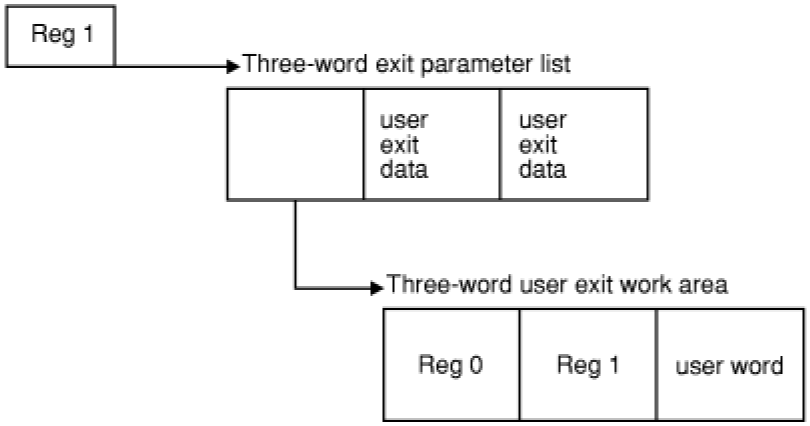


Figure 29. SMF Dump Program Input Parameter Structure

The first word is the address of a three word user work area. The contents of the user work area are:

word 1
: register 0 on entry to the SMF data set dump program

word 2
: register 1 on entry to the SMF data set dump program

word 3
: reserved for user. This word is initialized to zero before the first installation exit is invoked.

The contents of the second and third words depend on the installation exit being invoked. The installation exits are described in "Specifying parameters for the SMF data set dump program" on page 42.

Chapter 4. Customizing SMF

An installation has several ways to customize SMF to meet its needs:

SMF parameters in the SMFPRM*xx* parmlib member
: The SMF parameters are discussed in "Using SMFPRMxx parameters" on page 57 and are further described in *z/OS MVS Initialization and Tuning Reference*.

Installation-written exit routines
: SMF installation exits are discussed in "Using installation exit routines" on page 71 and are further described in *z/OS MVS Installation Exits*. (SMF dump program exits are discussed in Chapter 3, "Using the SMF dump programs," on page 29.)

Operator commands
: These operator commands are discussed in "Using operator commands" on page 75 and are further described in *z/OS MVS System Commands*.

Using SMFPRMxx parameters

For the complete definition of the SMFPRMxx parmlib member including its use, values, and syntax, see SMFPRMxx in *z/OS MVS Initialization and Tuning Reference*.

You can use SMF parameters as follows:

- "PROMPT — Recording status changes" on page 57
- "RECORDING — Specifying whether to write SMF records to data sets or log streams" on page 58
- "DEFAULTLSNAME and LSNAME — Specifying SMF log stream names" on page 58
- "DSNAME — Specifying SMF data set names" on page 59
- "SUBPARM — Passing data to a subsystem" on page 59
- "TYPE and NOTYPE — Selecting and directing SMF records" on page 59
- "SYS and SUBSYS with TYPE and NOTYPE — Selecting subtypes for SMF recording" on page 59
- "SID — Specifying the system identifier" on page 60
- "INTVAL and SYNCVAL — Performing interval accounting" on page 60
- "STATUS — Collecting SMF statistics" on page 64
- "DETAIL or NODETAIL — Performing TSO/E command accounting" on page 64
- "SYS and SUBSYS — Performing started task accounting" on page 66
- "BUFSIZMAX, BUFUSEWARN, DSPSIZMAX, PERMFIX, NOBUFFS, and SMFTBUFF — Specifying SMF buffer options" on page 67
- "FLOOD and FLOODPOL — Specifying SMF record flood options" on page 68
- "SMFDLEXIT and SMFDPEXIT — Specifying the dump program exit" on page 68
- "RECSIGN — Digitally signing SMF records" on page 69

PROMPT — Recording status changes

Record type 90 describes changes in SMF and system status. The type 90 record allows the installation to track operator changes (such as the use of the SET SMF or SETSMF command), and with the PROMPT option, to establish availability and reliability statistics for the processor.

If PROMPT (IPLR or ALL) is specified, the system issues a message when an IPL occurs. This message prompts the operator to reply with the time when the failure occurred, the name of the operator, and the reason for the IPL. This information is recorded in a type 90 record.

The installation can set up standard operator replies to the prompt message and then use a post processing program to summarize the reliability data contained in the type 90 record. For example, an operator reply of FTIME=00.00.00 might indicate a scheduled IPL while any other reply indicates a system failure. A standard set of IPL reasons might be provided to the operator, such as scheduled production, processor failure, channel failure, JES failure code *xxxx*, or scheduled test.

Unless otherwise indicated, the SMFPRMxx parameters apply to both SMF log stream recording and data set recording.

RECORDING — Specifying whether to write SMF records to data sets or log streams

To specify whether you want to write SMF records to SMF data sets or to an SMF log stream, use the RECORDING parameter. Specify RECORDING(DATASET), which is the default to write SMF records to SMF data sets specified on the DSNAME parameter. Specify RECORDING(LOGSTREAM) to write SMF records to log streams specified on the DEFAULTLSNAME or LSNAME parameters.

You can set up your SMFPRMxx parmlib member so that you can switch dynamically between SMF data set recording and SMF logging:

1. First, set up your SMF configuration in SMFPRMxx for both SMF data set recording and SMF logging by defining both SMF data sets (DSNAME parameter) and SMF log streams (LSNAME and DEFAULTLSNAME parameters).
2. Now you can toggle between the two methods using the RECORDING(DATASET | LOGSTREAM) SMFPRMxx parameter in one of the following ways:
   - Change the RECORDING parameter in a new SMFPRMxx parameter, and then use the SET SMF=*xx* command to switch the system to using that SMFPRMxx parmlib member.
   - Issue the SETSMF RECORDING(DATASET | LOGSTREAM) command to switch to the method you wish. Note that this method requires that PROMPT(LIST) or PROMPT(ALL) be specified in the active SMFPRMxx parmlib member to allow use of the SETSMF command.

DEFAULTLSNAME and LSNAME — Specifying SMF log stream names

To specify the log stream names for recording SMF data to log streams, use the DEFAULTLSNAME and LSNAME parameters in the SMFPRMxx parmlib member.

- **LSNAME** allows you to specify a log stream where you want to record particular record types (on the TYPE subparameter). You can specify the same record type on multiple LSNAME parameters to specify that the system write the record to all specified log streams. For example, you might have an SMFPRMxx parmlib member containing the following:

  ```
  DEFAULTLSNAME(IFASMF.DEFAULT)
  LSNAME(IFASMF.PERF,TYPE(30,89))
  LSNAME(IFASMF.JOB,TYPE(30))
  RECORDING(LOGSTREAM)
  ```

  This allows you to collect job-related SMF data in the JOB log stream, and performance related SMF data in the PERF log stream. And because record type 30 fits into both categories, you can specify that it is written to both log streams. Note that this arrangement can result in duplicate records being dumped if both log streams are dumped to the same OUTDD output data set by IFASMFDL.
- **DEFAULTLSNAME** allows you to specify a default log stream name where you want the system to write SMF records if they are not already specified on LSNAME parameters. When you specify DEFAULTLSNAME (and do not override it with the LSNAME parameter), records will be queued and written to the default log stream name specified. For example, if SMFPRMxx parmlib member contained the following:

  ```
  DEFAULTLSNAME(IFASMF.DEFAULT)
  LSNAME(IFASMF.PERF,TYPE(30,89))
  RECORDING(LOGSTREAM)
  ```

  This results in record types 30 and 89 going to log stream IFASMF.PERF, while all other record types will go to default log stream IFASMF.DEFAULT.

DSNAME — Specifying SMF data set names

To specify an SMF data set name, use the DSNAME parameter in the SMFPRMxx parmlib member. This parameter allows the installation to specify the set of data sets to be used for SMF data set recording.

Note that this parameter does not apply to SMF log stream recording, but can be specified as a fallback option when recording to logstreams.

For more information on the DSNAME parameter see *z/OS MVS Initialization and Tuning Reference*.

SUBPARM — Passing data to a subsystem

SMF allows an installation to pass up to 60 characters of information (such as accounting information) to a user-defined subsystem. A user-defined subsystem is any subsystem other than TSO/E, ASCH, STC, JES2, or JES3. You specify the information to be passed in the SUBPARM parameter of the SMFPRM*xx* parmlib member, and it can be changed by an IPL or by the SET or SETSMF operator command.

To use the information, the subsystem issues the SMFSUBP macro during its initialization to determine if any SUBPARM information is present or if the values have been changed by a subsequent IPL. (See *z/OS MVS Programming: Authorized Assembler Services Reference SET-WTO* for more information.)

In response to a SET command, SMF issues a subsystem interface (SSI) call to all user-defined subsystems that have a SUBSYS or SUBPARM option specified. In response to a SETSMF command, SMF issues an SSI call only to the subsystem specified in the SETSMF command.

When each subsystem receives the SSI call, it must issue the SMFSUBP macro instruction to determine if any values that affect its operation have been changed. If the subsystem determines that the information string passed to it is incorrect, it uses the SMFCHSUB macro instruction to change the information. (See *z/OS MVS Programming: Authorized Assembler Services Reference SET-WTO* for more information.)

TYPE and NOTYPE — Selecting and directing SMF records

Selecting records: You can select the SMF records you want to write by specifying either the type desired (or the types not desired) with the TYPE or NOTYPE option of the SYS or SUBSYS parmlib parameter. If any one of record types 14, 15, 17, 62, 63, 64, 67, or 68 is specified with the TYPE option, data is collected for all of those record types. However, only those records that are selected by a TYPE or NOTYPE request are written to the SMF data set.

Installation-written exit routines IEFU83, IEFU84, IEFU85, and IEFU86 (SMF writer) and IEFACTRT (termination) can control which records are to be written to a SMF data set. After inspecting an SMF record, these routines return a code to the system indicating whether the record is to be written to a SMF data set.

Directing records to a log stream: For SMF log stream recording, you can direct record types to particular log streams using the TYPE subparameter on LSNAME. You still select the records you want to write with the TYPE/NOTYPE option of SYS or SUBSYS. Note that this means that it's possible to specify record types on the TYPE subparameter of LSNAME that the system is not actually recording, because they are not specified on SYS or SUBSYS.

SYS and SUBSYS with TYPE and NOTYPE — Selecting subtypes for SMF recording

Subtype selectivity for SMF records is an option of the TYPE or NOTYPE option on the SYS and SUBSYS parameters used for SMF recording. Subtype selectivity allows more flexibility in post-processing records and helps control the amount of data stored in SMF data sets.

The subtype selectivity function supports only those records which use the standard SMF record header. The header requires the subtype field is at offset 22 (decimal) and the ‘subtypes used’ bit (bit position 1), of the system indicator byte at offset 4 (decimal), is set to X'1'. SMF processes the record for subtype selectivity when both conditions are met. To see if subtypes are used, check the individual records in Chapter 17, “SMF records ,” on page 167.

The TYPE option of the SYS and SUBSYS parameter provides inner parentheses to indicate the subtypes to be collected. If subtype selection is not used, the default is all subtypes. The following is an example of how the TYPE option should be used to record subtypes 1, 2, 3, 5, 6, 7, and 8 for the type 30.

```
SYS(TYPE(30(1:3,5:8)))  or  SUBSYS(STC,TYPE(30(1:3,5:8)))
```

The NOTYPE option provides inner parentheses to indicate the subtypes **not** to be collected. If subtype selection is used, all subtypes except the ones specified are collected. The following is an example of how the NOTYPE option should be used to record all subtypes except subtype 4 for the type 30 record. If subtype selection is not used, the default is to exclude all subtypes of the specified record type.

```
SYS(NOTYPE(30(4)))  or  SUBSYS(STC,NOTYPE(30(4)))
```

When using the NOTYPE keyword, data is collected for all records **except** those specified. In the preceding example, data is collected for record types 0 through 29; all record 30 subtypes except subtype 4; and records 31 through 2047.

Notes:

1. If subtype selectivity is specified for a record type for which subtypes are not supported, the specification of the subtype(s) is ignored and the record type is recorded. No warning message is used.
2. The specification of a subtype more than once is accepted. No warning message is issued.
3. If an incorrect range is specified (that is, the first value of the range is greater than the second value) a message IEE948I is issued (for more information, see *z/OS MVS System Messages, Vol 7 (IEB-IEE)*. The operator must then re-enter the valid range.

SID — Specifying the system identifier

The SID parameter specifies the system identifier that is used in all SMF records. For more information on the SID parameter see *z/OS MVS Initialization and Tuning Reference*.

INTVAL and SYNCVAL — Performing interval accounting

With interval accounting, you specify an interval of time called a **recording interval**. This interval repeats continuously, starting when a unit of work begins to run. Interval accounting allows you to periodically save resource data for the work unit so that, if a system failure occurs, not all of this data is lost.

A work unit (such as a job or job step) uses system resources to accomplish its tasks. As the work unit runs, the system saves data about the resources that it uses at the end of each recording interval. If the system fails during an interval, you do not lose the resource data generated through the end of the previous interval. Only the data accumulated since the end of the last interval is lost.

Example: Assume that you specify an interval of 30 minutes, that a job starts at 9:10 and runs for an hour and 42 minutes, and that the job uses resources as follows:

Time	Action	Resources Used Since Job Start	Resources Used During Interval
9:10 AM	job starts	—	—
9:40 AM	30 minute interval ends	7	7
10:10 AM	30 minute interval ends	12	5
10:40 AM	30 minute interval ends	21	9
10:52 AM	job ends	23	2

Interval accounting allows you to see how many resources the work unit used during a specified interval of time. In this example, the job used 5 resources between 9:40 and 10:10 AM (a 30-minute interval) and used a total of 12 resources since the job started.

SMF global recording interval

The SMF global recording interval is a recording interval that is available globally to SMF, RMF, and other requestors. The installation can specify the length of the SMF global recording interval which can be from 1 through 60 minutes; the system default is 30. Specify the length using the INTVAL parameter.

The SMF global recording interval is always synchronized with some part of the hour. The installation can specify that the SMF global recording interval be synchronized with the beginning of the hour (00 minutes past the hour) or any number of minutes past the hour up to 59; the system default is 00. Specify the synchronization value using the SYNCVAL parameter.

Example: Assume the installation wants the SMF global recording interval to have a length of 15 minutes and to be synchronized with 15 minutes past the hour, which means that the SMF global recording interval ends at 15, 30, 45, and 60 minutes past the hour. To establish this interval, code the following statements in the SMFPRMxx parmlib member:

```
INTVAL(15)
SYNCVAL(15)
```

Listening for the occurrence of accounting events

Using the ENFREQ macro, an authorized program can request notification when SMF accounting events occur. Event code 37 signals SMF accounting events. For more information about how to use the ENFREQ macro, see *z/OS MVS Programming: Authorized Assembler Services Guide*. The macro that maps the parameter list for SMF events is IFAENF37; see *z/OS MVS Data Areas* in the z/OS Internet library (www.ibm.com/servers/resourcelink/svc00100.nsf/pages/zosInternetLibrary).

The system signals the end of each SMF global recording interval. SMF, RMF, and any other requestors listening for this event can schedule their own interval accounting function based on the end of this interval.

If the installation changes either the length value (using INTVAL) or the synchronization value (using SYNCVAL) for the SMF global recording interval, the system ends the interval, schedules a new interval based on that changed value. SMF, RMF, and any other requestors that are listening for either event can synchronize with this new interval.

The following table lists all of the SMF accounting events. Each event is identified by an ENFREQ qualifier:

ENFREQ Qualifier	SMF Accounting Event Signalled	Example Application
ENF37Q00	SMF completed initialization or reinitialization.	Start collecting data to generate interval records.
ENF37Q01	SMF ended abnormally.	Defer generating interval records until SMF is reinitialized. See ENFREQ qualifier ENF37Q00.
ENF37Q02	The global interval value (INTVAL option) has changed. The new value is passed as a parameter of the ENF signal.	Make appropriate changes based on recalculated SMF global recording interval.
ENF37Q03	The global synchronization value (SYNCVAL option) has changed. The new value is passed as a parameter of the ENF signal.	Make appropriate changes based on recalculated SMF global recording interval.
ENF37Q04	The SMF global recording interval ended. The interval end time is passed as a parameter of the ENF signal.	Generate interval records when the SMF global recording interval ends. **Note:** Use the interval end time on any record that a requestor generates as a result of this signal. Using this time allows for the exact merging of all such records.

ENFREQ Qualifier	SMF Accounting Event Signalled	Example Application
ENF37Q05	An SMF global recording interval processing error (which also causes messages IEE500I and IEE068A) occurred.	Stop listening for event code 37.

Using interval synchronization to compare interval records

With interval synchronization, you can directly compare type 23, 30, 32, and 42 interval records generated by SMF with interval records generated by other requestors (such as RMF). These other requestors can use the global interval and synchronization values that SMF provides to generate interval records whenever the SMF global recording interval ends.

For example, your installation might need to compare type 30 SMF records (user-level data) with RMF interval records (system-level data) to gain a more complete picture of system activity during a specified time period. If a performance problem occurred between 9:30 AM and 10:00 AM, you could easily compare RMF interval record data with type 30 SMF record data, because global synchronization allowed them both to be generated at 10:00 AM. Without synchronization, interval records are generated at different times. It is hard to compare records generated at different times because work units use resources unpredictably during an interval.

SMF Type 30 record interval accounting

For type 30 (common address space work) SMF interval records, you can:

- specify interval accounting that is synchronized or not synchronized.
- request interval accounting at the system or subsystem level.

For type 30 SMF records, there are five subtype records that provide address space level accounting information. SMF writes a subtype 1 record at the start of a work unit (such as a job), a subtype 2 record at the end of each recording interval, subtype 3 and 4 records at the end of a job step, and a subtype 5 record at the end of a work unit (such as a job). See "Record type 30 (X'1E') — Common address space work" on page 292 for information about when these subtype records are written.

Type 32 SMF record interval accounting

If you have TSO/E installed, SMF generates type 32 (TSO/E user work accounting) records at the same intervals as type 30 records.

Nonsynchronized interval accounting

When interval accounting is not synchronized, SMF generates type 30 interval records for a work unit at the end of a recording interval based on the start time of a the work unit. Each interval record contains data for the resources used during the recording interval.

Example: Assume a recording interval of 30 minutes. If a job step starts at 9:10 AM, and runs for two hours and six minutes, then SMF generates a type 30 record at the following times:

```
 9:10 AM    (job step start time)
 9:40 AM    (30 minute interval ends)
10:10 AM    (30 minute interval ends)
10:40 AM    (30 minute interval ends)
11:10 AM    (30 minute interval ends)
11:16 AM    (job step completion time)
```

Changes to interval value

If the SET SMF or SETSMF command changes the interval value, the new interval does not take effect until the current interval expires. If interval recording is not active when a job starts, there is no interval recording for that job. If interval recording is turned off and then back on with a SET command, interval recording for a job starts at the new value, at the beginning of the next job step.

Synchronized interval accounting

When interval accounting is synchronized, SMF generates interval records for a work unit based on the end of the SMF global recording interval, rather than the start time of a job. Interval synchronization is particularly useful when you want to compare interval records generated by SMF, RMF, and other requestors.

Example: Assume the SMF global recording interval has a length of 30 minutes and is synchronized with 15 minutes past the hour. If a job starts at 9:10 AM, and runs for two hours and six minutes, then SMF generates a type 30 record at the following times:

```
  9:10 AM    (job start time)
  9:15 AM    (SMF global recording interval ends)
  9:45 AM    (SMF global recording interval ends)
 10:15 AM    (SMF global recording interval ends)
 10:45 AM    (SMF global recording interval ends)
 11:15 AM    (SMF global recording interval ends)
 11:16 AM    (job completion time)
```

Changes to interval value

If the SET SMF or SETSMF command changes the interval value, then the current interval ends immediately and the new interval takes effect. If interval recording is not active when a job starts, there is no interval recording for that job. If interval recording is turned off and then back on with a SET command, interval recording for a job starts at the new value, at the beginning of the next job step.

If either INTVAL or SYNCVAL are changed, then the system reschedules the SMF global recording interval at that time.

Specifying a system or subsystem recording interval

You can request a recording interval at the system level by using the SYS INTERVAL parameter (or at the subsystem level using SUBSYS INTERVAL) to:

- Specify an interval value, between 1 second and 24 hours, in *hhmmss* format.
- Request that SMF use the global interval value specified on the INTVAL parameter. Specify the SMF,NOSYNC subparameter.
- Request that SMF synchronize with the SMF global recording interval. Specify the SMF,SYNC subparameter.

If you do not request a value for a subsystem, the subsystem takes its interval value from SYS INTERVAL.

Example 1: Assume you want a recording interval of 30 minutes, that is not synchronized, for started tasks (such as VTAM®). SMF generates a type 30 record at 30-minute intervals after the beginning of every started task step if you specify:

SUBSYS(STC,INTERVAL(003000))

Example 2: Assume you set the global interval value to 15 minutes, and set the global synchronization value to 15 minutes past the hour. These values mean that the SMF global recording interval will end at 15, 30, 45, and 60 minutes past the hour. You want jobs of type “STC” (started tasks and system address spaces) to have type 30 records generated every 15 minutes. Therefore, you request that “STC” type jobs use the global interval and synchronization values. Code the following statements in the SMFPRMxx parmlib member:

```
INTVAL(15)
SYNCVAL(15)
SUBSYS(STC,INTERVAL(SMF,SYNC))
```

STATUS — Collecting SMF statistics

Type 23 records collect SMF statistics. Your installation can track SMF recording with the type 23 record, which is generated at the expiration of the recording interval specified in the STATUS parameter. Use the STATUS parameter to either:

- Specify an interval value, between 1 second and 24 hours, in *hhmmss* format.
- Request that SMF use the global interval value specified on the INTVAL parameter. Specify the SMF,NOSYNC subparameter.
- Request that SMF synchronize with the SMF global recording interval. Specify the SMF,SYNC subparameter. See "SMF Type 30 record interval accounting" on page 62 for information about interval accounting and synchronization.

DETAIL or NODETAIL — Performing TSO/E command accounting

Type 32 records allow the installation to keep track of individual TSO/E commands entered during a TSO/E session, during recording interval, or in a command list (CLIST). If no commands are entered during a reporting interval, no record is created. SMF writes record type 32 when a TSO/E user logs off or when an SMF recording interval expires.

Note: To use the type 32 record and TSO/E command accounting, you must have installed TSO/E Version 1 for MVS/XA or Version 2 for MVS/ESA.

The installation can specify, through the DETAIL parameter in SMFPRM*xx*, that the record is to include the total CPU time under task control blocks (TCB) and SRBs and the total number of TPUTs, execute channel programs (EXCP), transactions, and TGETs associated with the command. (See the description of the SMFPRM*xx* parameters in *z/OS MVS Initialization and Tuning Reference* for a detailed explanation of the difference between specifying DETAIL or NODETAIL.)

Many TSO/E commands, such as EDIT, have subcommands. These subcommands are counted in the type 32 record. However, these subcommands are not recorded as entered at the terminal. They are recorded with a prefix that associates the subcommand with a command. For example, under EDIT, the INPUT subcommand is recorded as EDINPUT. The prefixes are described in other topics.

The record includes all TSO/E commands attached directly by the terminal monitor program (TMP). However, some TSO/E products or, possibly, user applications currently do not count TSO/E commands and thus do not support the type 32 record. For example, the Interactive Problem Control System (IPCS) does not count TSO/E commands but TSO/E subcommands are counted.

The TSO/E command interface lets a user application avoid this problem. The user application must take the following steps both before each TSO/E command (or subcommand) to be counted begins and after the command completes:

1. Load register 1 with the address of a parameter list containing a four-byte flag word. The parameter list must start on a word boundary. The high-order bit of this word is set as follows:
   - 1 -- indicates the start of a command
   - 0 -- indicates that the command has completed.

Following the four-byte flag word is an eight-byte command (or prefixed-subcommand) name field. The command must be left-justified and padded with blanks.

- Load register 15 with X'19'
- Issue SVC 109.

The user must include the name of the command or prefixed-subcommand in module IEEMB846 before invoking the interface.

The IBM-supplied module IEEMB846, contains a partial list of the TSO/E commands, prefixed subcommands, and aliases that are counted in the type 32 record. All other commands are counted in the '***OTHER' field.

An installation can use the IBM-supplied IEEMB846 or create its own module in SYS1.LINKLIB. The SMFTSOCM member of SYS1.SAMPLIB is provided so that the user can add or delete commands for the installation. The SMFTSOCM member contains the source code for the IBM-supplied IEEMB846. The format of IEEMB846 is:

Offset	Length	Content
0	4	Number of commands in the module
4	4	Reserved
8	8	Command name field
16	8	Command name field
.	.	.
.	.	.
.	.	.
.	.	.

Each command name field is 8 characters long. Therefore, each name must be left-justified and padded with blanks. The commands can appear in any order. However, by placing the most frequently used commands near the beginning of the module and deleting the commands that are not used, an installation can reduce the average time SMF needs to find the command. For example, after the following CSECT is link-edited into SYS1.LINKLIB, the ALLOCATE, ALLOC, SEND and GETINPUT commands are recorded in record type 32. (The GETINPUT command is a locally-defined command.)

```
IEEMB846   CSECT
    DC     F'4'
    DC     F'0'
    DC     CL8'ALLOCATE'
    DC     CL8'ALLOCbbb'
    DC     CL8'SENDbbbb'
    DC     CL8'GETINPUT'
    END
```

Note: Both ALLOCATE and ALLOC, its alias, are specified. If ALLOC, or any other alias, is not explicitly specified in IEEMB846, each use of the alias is counted under '***OTHER' and not under the corresponding command.

When adding subcommand names to IEEMB846, use the following prefixes:

Command
    Subcommand Prefix

ACCOUNT
    AC

CONSOLE
    CN

EDIT
    ED

OUTPUT
    O

OPERATOR
    OP

TEST
    T

User-defined
    U

If the length of the prefix plus the subcommand name exceeds eight characters, the subcommand name is truncated on the right. For example, the CONTINUE subcommand of OUTPUT appears in IEEMB846 as OCONTINU.

The subcommand prefix “U” allows an installation to collect data on user-defined subcommands while they use the TSO/E Command interface. An installation that has more than one user-defined command processor can add a one-digit qualifier (0-9, A-Z) to the prefix to differentiate between user commands.

SYS and SUBSYS — Performing started task accounting

The system handles accounting for started tasks much as it does for batch jobs and TSO/E work. Started task accounting includes:

- Accumulating CPU time under started task TCBs and SRBs
- Counting started task I/O operations
- Invoking SMF exits for started tasks
- Creating SMF records for started task activity.

For accounting purposes, the system sees the following as started tasks:

- The master address space
- The system address spaces
- The mounts
- The job entry subsystem
- The tasks initiated with a START command (at the operator console as started tasks).

The SYS default in SMFPRM*xx* requests that SMF write all possible records for what the system sees as started tasks. If you are using SMF data set recording, you can suppress started task accounting records by suppressing the accounting record types through the SUBSYS option in SMFPRM*xx* (STC parameter). If you specify any other record types it might cause loss of data other than accounting data for started tasks. For example:

- A JES2 installation runs the Resource Measurement Facility (RMF), which the system sees as a started task, to monitor system activity. To suppress started task accounting records for RMF, the installation specifies record type 70. However, the installation has inadvertently suppressed important data collected by RMF about CPU activity.
- An installation suppresses record types 6 and 26 to eliminate accounting for started tasks. However, this eliminates record types 6 and 26 completely (even for batch jobs), because JES, as a started task, is told to not write these record types.

For an initiator, the only meaningful data in a type 4, 5, or 30 record is job or session name, program name, step name, and reader start time and date. IEFIIC in the program name field identifies an initiator record.

Because CPU time is accumulated for started tasks, wait time limits and job step time limit abends can occur. To avoid these abends, you can code TIME=1440 on the EXEC statement in the cataloged procedure or set on the system task bit in the program properties table (PPT). For more information on the program properties table, see *z/OS MVS Initialization and Tuning Reference*.

Note:

1. MSTRJCL includes TIME=1440 so that the master scheduler does not time out.
2. Many IBM-supplied entries in the PPT have the system task bit set on, which prevents an abend because of time limits.

BUFSIZMAX, BUFUSEWARN, DSPSIZMAX, PERMFIX, NOBUFFS, and SMFTBUFF — Specifying SMF buffer options

You can use the BUFSIZMAX, BUFUSEWARN, DSPSIZMAX, PERMFIX, NOBUFFS, and SMFTBUFF parameters to specify SMF buffering options. Note how these parameters apply:

- BUFUSEWARN and NOBUFFS apply to SMF log streams and data sets
- BUFSIZMAX applies to data set record
- DSPSIZMAX and PERMFIX applies to logstream recording
- SMFTBUFF, an IEASYSxx parameter, applies to the temporary buffer that SMF uses to hold data during IPL processing while SMF completes initialization.

The BUFSIZMAX parameter specifies the maximum amount of storage that SMF can allocate for buffering purposes. The value of BUFSIZMAX can range from a minimum of 128M to a maximum of 1G. The default value of BUFSIZMAX is 128M.

The DSPSIZMAX parameter specifies the maximum amount of storage that SMF can use for a given SMF logstream's buffer. The value of DSPSIZMAX can range from a minimum of 128M to a maximum of 2G. The default value is 2G.

The BUFUSEWARN parameter specifies the overall buffer warning level percentage which, when exceeded, causes SMF to start issuing message IEE986E. The value of BUFUSEWARN can range from 10 to 90 percent; the default value being 25 percent. When the overall SMF buffer in use percentage drops below the specified BUFUSEWARN value, SMF issues DOM message IEE986E.

The PERMFIX parameter specifies the default amount of storage SMF can keep permanently fixed for each log stream for purposes of communicating with the zEDC Express feature. Storage used by the zEDC Express feature must be page fixed; however, fixed pages are a constrained resource. Increasing this number can improve performance of SMF, but decrease the fixed storage available to the other applications. Decreasing this number can increase the fixed storage available to other applications, but may degrade SMF performance. PERMFIX can range from a minimum of 1M to a maximum of 2GB. The default value is NOPERMFIX. Due to processing needs, even if this value is NOPERMFIX, SMF may use up to 2MB of fixed storage for zEDC usage.

SMFTBUFF considerations:

- SMFTBUFF is an IEASYSxx parameter option. It is used to specify the size, in megabytes, of the buffer that SMF will use to hold data during IPL processing while SMF completes initialization. SMFTBUFF specifies the SMF temporary buffer size regardless of the recording mode (log stream or data set). Its value, if correctly specified, is reported in message IFA400I. Message IFA401I will report an erroneously specified SMFTBUFF value. The default SMF temporary buffer size is 5 megabytes.
- The following SMF fields can help determine an installation-appropriate SMFTBUFF value:
  - The SMF record type 23 field, SMF23MBU, reports the maximum number of bytes that SMF stored into the temporary buffer during IPL processing.
  - If data is lost during IPL processing due to a shortage of buffer space, the SMF record type 7 field, SMF7TBLS, reports the total number of bytes of SMF data that were lost.

You can specify NOBUFFS, BUFUSEWARN, PERMFIX, and DSPSIZMAX on the LSNAME and DEFAULTLSNAME keywords. The global NOBUFFS, BUFUSEWARN and DSPSIZMAX values are applied to any logstream that does not have any of the options specified.

```
DEFAULTLSNAME(logstreamname,
NOBUFFS(MSG|HALT),
BUFUSEWARN(nn),
DSPSIZMAX(nnnnM | nG))
PERMFIX(nnnnM)
LSNAME(logstreamname,
TYPE({aa,bb}|{aa,bb:zz}|{aa,bb:zz,..}),
NOBUFFS(MSG|HALT),
BUFUSEWARN(nn),
DSPSIZMAX(nnnnM | nG))
PERMFIX(nnnnM)
```

You can use the combination of BUFSIZMAX and BUFUSEWARN parameters to prevent SMF data loss conditions (see "Preserving SMF Data" on page 27).

After setting the SMF buffer options, if you still cannot prevent data loss conditions, use the SMF NOBUFFS parameter (see "Using SMFPRMxx parameters" on page 57), to specify what the system is to do in this situation. The following are the possible system actions:

1. Continue processing with the loss of SMF data and if parmlib option NOBUFFS(MSG) is in effect, message IEE979W will be issued. All records presented to SMF will be lost until buffers become available. When no buffers are available for a given SMF log stream and the NOBUFFS(MSG) action is specified, message IFA786W will be issued. SMF records have been lost and more might be lost until SMF can write the buffered records to the SMF log stream.
2. Enter a restartable wait state.

   Note: When the BUFSIZMAX parameter is specified, if the amount of storage requested is not available during initialization, SMF will take the specified value and decrease it by 20% and attempt to get that amount. If unsuccessful, SMF will retry this 4 additional times. Message IFA723E will be issued with the amount of storage which SMF was finally able to obtain.

   When the BUFSIZMAX parameter is specified by using a SETSMF or SET SMF=xx command, if the new larger area cannot be obtained, the current value will remain in effect. Message IFA723E will be issued to the console where the SETSMF or SET SMF=xx command was entered.

FLOOD and FLOODPOL — Specifying SMF record flood options

You can use the FLOOD and FLOODPOL parameters to specify SMF record flood options. Issue the SETSMF FLOOD(ON|OFF) command or update an SMFPRMxx with FLOOD(ON|OFF) to enable or disable the SMF record flood automation facility. No policy changes are performed as a result of this command. Turning the facility on and off will reset all counts and any active flood situations.

Use the FLOODPOL parameter in SMFPRMxx to specify a filter for the SMF record in flooding. Several options are required to define a flood policy. In the definition you must specify the following options:

- The type of the records that the filter is for
- The number of records in an interval for a given filter
- The minimum amount of time that it can take to match the number of records in an interval
- The number of intervals that can occur at a flooding rate before an action is taken
- The length of time an interval should take before returning to normal
- The action to take, either DROP or MSG

When the MSG filter is specified, message IFA780A is issued at the start of the flood to warn the user. Message IFA781I is issued when the flooding has stopped. When the DROP filter is specified, message IFA782A is issued at the start of the flood and dropping of records begins. Any attempts to write a record through SMFEWTM or SMFWTM macro will get a return code xx = 52. At the end of the flooding, message IFA783I is issued with the number of records dropped.

SMFDLEXIT and SMFDPEXIT — Specifying the dump program exit

To enable SMF dump programs to call user exits, you might need to define the user exits to the system using the following keywords:

SMFDLEXIT
SMFDLEXIT enables the IFASMFDL program to specify user exits.

SMFDPEXIT
SMFDPEXIT enables the IFASMFDP program to specify user exits. Validation only occurs for the IFASMFDP program when it runs in an APF authorized environment.

Both keywords have options—USER1, USER2, USER3, USER4, and USER5—to allow you to specify multiple exits for each user exit point in the respective dump program.

After you specify an exit using USER1, USER2, USER3, USER4, or USER5, it remains active until you redefine it in the SMFPRMxx parmlib member or use the SETSMF command (not to be confused with the SET SMF command).

Example: To have a user exit, SAMPEXIT, available as a USER2 exit for IFASMFDP, specify the following statement in the active SMFPRMxx member:

```
SMFDPEXIT(USER2(SAMPEXIT))
```

If you enter a SETSMF command with the following parameters:

```
SMFDPEXIT(USER1(SAMPEXT2))
```

it affects only the USER1 exit; the USER2 exit that you previously specified remains in effect.

For additional details, see SMFPRMxx in *z/OS MVS Initialization and Tuning Reference*.

RECSIGN — Digitally signing SMF records

You can use the RECSIGN parameter to specify that SMF records are to be digitally signed for later validation. You can specify the RECSIGN parameter globally or on a per-logstream basis. The default is not to sign SMF records (NORECSIGN).

When you specify RECSIGN to digitally sign SMF records, you must also specify options for the hash type, signature type, and token name. These parameters are described under the SMFPRM*xx* member in *z/OS MVS Initialization and Tuning Reference*.

For more information, see Chapter 13, “Signing and validating SMF records,” on page 147.

INMEM — Defining SMF in-memory resources

You can use the INMEM parameter to define one or more SMF in-memory resources to enable real-time access to SMF data.

When you specify the INMEM parameter, you must also specify options for the resource name, resource buffer size, and record types to be recorded to this in-memory resource. These parameters are described under the SMFPRM*xx* member in *z/OS MVS Initialization and Tuning Reference*.

For more information, see Chapter 14, “SMF real-time interface,” on page 153.

HFTSINTVL — Specifying the high-frequency throughput statistics interval

The HFTSINTVL parameter specifies the time interval, in seconds, for writing SMF type 98 records, which record high-frequency throughput statistics (HFTS). The value specified is ignored when the WIC parameter is specified. IBM z/OS Workload Interaction Correlator uses a 5 second interval for SMF type 98 records.

The supported values are 5, 10, 15, 20, 30, and 60 seconds.

When you specify a HFTSINTVL value, SMF type 98 records are written every five seconds for one minute each hour, at 0, 15, 30, and 45 minutes past each hour. For all other minutes during each hour, SMF type 98 records are written at the interval specified by the HFTSINTVL parameter. For instance, HFTSINTVL(20) writes 216 records every hour in the following manner:

- Minutes 0, 15, 30, and 45: write 1 record every 5 seconds, for a total of 48 records.
- The other 56 minutes: write 1 record every 20 seconds, for a total of 168 records.

IBM recommends a HFTSINTVL value of 5 seconds.

The NOHFTSINTVL parameter disables the HFTS interval and prevents the collection of type SMF type 98 records. This is the default value.

SMF collects type 98 records only when both the HFTSINTVL parameter and TYPE(98) parameter are specified. Specifying NOHFTSINTVL along with TYPE(98) allows you to disable the collection of type 98 records without changing the TYPE setting.

IBM benchmarks did not detect additional measurable CPU overhead due to collecting HFTS data.

IBM recommends configuring Hardware Instrumentation Services (HIS) to collect hardware counters as described in Collecting CPU MF (Counters) on z/OS (www.ibm.com/support/pages/system/files/inline-files/Detailed_CPU_MF_Counters_Enablement_Instructions_September_2019.pdf). Collecting hardware counters enriches the data collected in SMF type 98 subtype 1 records.

WIC — Specifying the generation of type 98 records for IBM z/OS Workload Interaction Correlator

When you specify the WIC parameter, the IBM z/OS Workload Interaction Correlator (WIC) is enabled on the system. z/OS components, middleware, and applications can use the IFAWIC service to register for instrumentation, request an instrumentation buffer for the job, and provide an exit routine.

The exit routine will be called to summarize instrumentation data and produce SMF records for type 98 subtype 2 or greater. This exit will be called every 5 seconds when all of the following conditions are true:

- The WorkloadIntCorr feature is enabled in the product enablement policy (IFAPRDxx).
- SETSMF or SMFPRMxx has specified WIC.
- SMF is collecting type 98 subtype 2 or greater records.

Correlator data generation controls are all contained in the SMFPRMxx member of parmlib. When an SMF type 98 subtype record is not collected, the exploiter does not instrument correlator data and its exit is not called.

SMF type 98 subtype 1 (supervisor) records are not generated through IBM z/OS Workload Interaction Correlator and will be generated when all of the following conditions are true:

- SETSMF or SMFPRMxx has specified WIC or HFTSINTVL(5) or greater.
- SMF is collecting type 98 subtype 1 records.

IBM recommends configuring Hardware Instrumentation Services (HIS) to collect hardware counters as described in Collecting CPU MF (Counters) on z/OS (www.ibm.com/support/pages/system/files/inline-files/Detailed_CPU_MF_Counters_Enablement_Instructions_September_2019.pdf). Collecting hardware counters enriches the data collected in SMF type 98 subtype 1 records.

IBM benchmarks did not detect additional measurable CPU overhead due to collecting HFTS data.

When you specify the WIC parameter, the HFTSINTVL parameter is ignored, and SMF type 98 subtype 1 records are generated every 5 seconds.

When you specify the NOWIC parameter, IBM z/OS Workload Interaction Correlator (WIC) is disabled on the system. The IFAWIC REQUEST=REGISTER service will fail for applications that call it. IFAWIC exploiters that are already registered for instrumentation will no longer have their exit routines called. When NOWIC is specified, HFTSINTVL is honored.

Entering SMFPRMxx in SYS1.PARMLIB

When you have determined which SMF parameters you want to change, place them in a SMFPRM*xx* parmlib member. The two alphameric characters, represented by *xx*, are appended to SMFPRM to identify your SMFPRM*xx* member. If you do not specify an SMFPRM*xx* member (with system parameters, such as SMF=01 for member SMFPRM01, or with an alternate member, such as IEASYS*xx*), the default member SMFPRM00 is used. You may place alternate values, or additional values, in one or more alternate SMFPRM*xx* members.

For information about coding the SMFPRMxx member, see *z/OS MVS Initialization and Tuning Reference*.

Adding SMFPRMxx to SYS1.PARMLIB

To add the SMFPRM*xx* parameters as a member of SYS1.PARMLIB, use the IEBUPDTE utility program. Figure 30 on page 71 shows sample JCL for using IEBUPDTE to enter SMFPRM01 into SYS1.PARMLIB.

To change the default member, SMFPRM00, or the installation-defined SMFPRM*xx* member, replace them with a new version by again running IEBUPDTE.

```
//ENTER    JOB   MSGLEVEL=1
//         EXEC  PGM=IEBUPDTE,PARM=NEW
//SYSPRINT DD    SYSOUT=A
//SYSUT2   DD    DSNAME=SYS1.PARMLIB,DISP=(OLD,KEEP)1
//SYSIN    DD    DATA
./         ADD   LIST=ALL,NAME=SMFPRM01,LEVEL=01,SOURCE=0
(SMFPRM01 member)
./        ENDUP
/*
```

[1]To access SMFPRM00 on the distribution package before system installation, use the SYS1.PARMLIB data set.

Figure 30. Sample JCL for Entering SMFPRM01 into SYS1.PARMLIB Using IEBUPDTE

If PROMPT (LIST or ALL) was specified, the operator can modify the values in a SMFPRM*xx* parameter from the console during system initialization or SET SMF processing. If parameter errors occur, the operator will be prompted for correct parameters regardless of the value specified for PROMPT.

Using installation exit routines

This topic provides a brief overview of installation-written exits. Detailed descriptions of the SMF installation exits appear in *z/OS MVS Installation Exits*, and detailed descriptions of the SMF dump program exits appear in Chapter 3, "Using the SMF dump programs," on page 29.

You can customize SMF to meet your installation's requirements by coding installation exit routines or by writing application programs that use SMF macros.

SMF provides exits in the control program that allow installations to add installation-written routines to the control program to perform additional processing. Installation-written routines at SMF exits receive control at different times as a job moves through the system. They receive control when specific events occur, such as when a job CPU-time limit expires. These installation-written routines could collect additional information, cancel jobs, or enforce installation standards.

The IEFUJV, IEFUJP, and IEFU85 exits must run in 31-bit addressing mode. All other exits can execute in either 24-bit or 31-bit addressing mode. IBM recommends that you use 31-bit addressing mode whenever possible.

Exit routines that access SMF records with sub-sections, such as record type 30, should be coded using triplets (offset to *xxx* section, number of *xxx* sections, length of *xxx* section) rather than coding the exit to access the fields directly. An installation can use the triplets to calculate the location of each field, and avoid the need to recompile the exit with the mapping macro each time a field is added to the end of a section. When the position of a field changes, the exit will locate the field relative to the beginning of the section in which it is contained.

Deciding which exits to use

Following is a list of the SMF-supplied exits along with a summary of when each exit receives control, the information passed to each exit, and the type of return from each exit to the control program. They can link to installation-written exit routines. For complete information about these exits, see *z/OS MVS Installation Exits*.

IEFACTRT — SMF job and job step termination exit

The termination exit (IEFACTRT) receives control on the normal or abnormal termination of each job step and job. A return code from this exit indicates whether the system is to continue the job (for job steps only) and whether SMF termination records are to be written.

The parameters passed to this exit are the addresses of:

- The common exit parameter area
- The job step name
- The programmer name
- The job CPU time
- The job accounting fields
- The step CPU time
- The step accounting fields
- The completion code
- The SMF termination record
- The name of the subsystem for the job being processed.

For details, see IEFACTRT — SMF job and job step termination exit in *z/OS MVS Installation Exits*.

IEFUAV — User account validation exit

The user account validation exit (IEFUAV) receives control during the set-up and execution of APPC/MVS transaction programs (TPs), and during the creation of a z/OS UNIX System Services forked or spawned address space whose profiles specify TAILOR_ACCOUNT(YES). IEFUAV is used to validate the accounting information of TP users and forked and spawned address spaces. Note that IEFUAV does not receive control for local spawns, as these only create processes in the same address space as the parent. A return code from this exit routine indicates whether processing for the unit of work should continue or be canceled.

The parameters passed to this exit are the addresses of the common exit parameter area, an area containing the programmer's name, an indication of the processing environment (Exit Function Code), accounting information, and an 80 byte area into which the exit can place a message to be issued to the APPC/MVS or z/OS UNIX System Services job log.

For details, see IEFUAV — User account validation exit in *z/OS MVS Installation Exits*.

IEFUJI — Job initiation exit

The job initiation exit (IEFUJI) receives control before a job on the input queue is selected for initiation. A return code from this exit indicates whether the system is to continue processing the job.

The parameters passed to this exit are the addresses of the common exit parameter area, programmer name, job priority, job accounting fields, and the name of the subsystem for the job being processed.

For details, see IEFUJI — Job initiation exit in *z/OS MVS Installation Exits*.

IEFUJP — Job purge exit

The job purge exit (IEFUJP) receives control when a job is ready to be purged from the system (after the job has terminated and all SYSOUT output that pertains to the job has been written). A return code from this exit indicates whether the SMF job purge record (type 26) is to be written to the SMF data set.

The parameters passed to this exit are the addresses of the common exit parameter area, and SMF job purge record.

For details, see IEFUJP — Job purge exit in *z/OS MVS Installation Exits*.

IEFUJV — Job validation exit

The job validation exit (IEFUJV) receives control before each job control statement in the input stream or cataloged procedure is converted. This exit receives control after all the JCL is converted and again after all the JCL is interpreted. IEFUJV is not invoked for JCL comment statements or null statements. A return code from this exit indicates whether the system is to continue processing the job. For an alternative to IEFUJV, examine JES exits in *z/OS JES2 Installation Exits* and *z/OS JES3 Customization*.

The parameters passed to this exit are the addresses of:

- The common exit parameter area
- The JCL statement image (this address is zero for entry codes 16 and 32)
- The entry code (type of JCL statement for all entry codes except 16 and 32)
- The converter parameter
- The name of the subsystem for the job being processed
- The environment indicator associated with the subsystem for the job being processed

For details, see IEFUJV — Job validation exit in *z/OS MVS Installation Exits*.

IEFUSI — Step initiation exit

The step initiation exit (IEFUSI) receives control before each job step is started (before allocation). A return code from this exit indicates whether the system is to continue processing the job step, or whether the job is to be canceled.

The parameters passed to this exit are the addresses of:

- The common exit parameter area
- The job step name
- The program name
- The step accounting fields
- An area which the exit can use to communicate to MVS the region size and region limit it desires for the job step
- A flag indicating whether the job is running V=R
- IBM-supplied default values for data spaces, hiperspaces, and data sharing (through the IARVSERV macro)
- The name of the subsystem for the job being processed
- MEMLIMIT information

For details, see IEFUSI — Step initiation exit in *z/OS MVS Installation Exits*.

IEFUSO — SYSOUT limit exit

The SYSOUT limit exit (IEFUSO) receives control when the number of records written to an output data set exceeds the output limit for that data set. A return code from this exit indicates whether the system is to continue processing the job with a new output limit or to cancel the job.

The parameter passed to this exit is the address of the common exit parameter area.

For details, see IEFUSO — SYSOUT limit exit in *z/OS MVS Installation Exits*.

IEFUTL — Time limit exit

The time limit exit (IEFUTL) receives control when one of the following time limits expires:

- The job CPU time limit (from the JOB statement).
- The step CPU time limit (from the EXEC statement, the default from the job entry subsystem).

- The continuous wait time limit for the job (from the SMFPRM*xx* JWT, SWT, or TWT parameters). Continuous wait time is defined as time spent waiting while the application program is in control. For example, for data sets allocated dynamically (while the application program is running, for example) either or both of the following count toward a job's continuous wait time:
  - The time required to recall a data set from HSM migration levels 1 or 2
  - The time required to mount a tape

  If a data set was allocated statically (that is, for a DD statement) only the second of these activities will be counted towards the job's continuous wait time.

A return code from this exit indicates whether the system is to continue processing the job step with a new time limit or cancel the job.

The parameters passed to this exit are the type of time limit that expired, and the addresses of the common exit parameter area, and the name of the subsystem being processed.

For details, see IEFUTL — Time limit exit in *z/OS MVS Installation Exits*.

IEFU29 — SMF dump exit

The SMF dump exit (IEFU29) receives control when an SMF data set becomes full. A return code from this exit indicates whether the dump message (IEE362I or IEE362A) is to be issued.

The parameter passed to this exit is the address of SMF data set name.

For details, see IEFU29 — SMF dump exit in *z/OS MVS Installation Exits*.

IEFU29L — SMF log stream dump exit

The SMF log stream dump exit (IEFU29L) allows you to archive SMF data from a log stream. This exit is invoked using the SWITCH SMF command.

The parameter passed to this exit is the address of a 44-character field that contains the name of the SMF log stream to be dumped. This field is left-justified and padded on the right with blanks.

For details, see IEFU29L — SMF log stream dump exit in *z/OS MVS Installation Exits*.

IEFU83 — SMF record exit

The SMF record exit (IEFU83) receives control before each record is written to the SMF data set. A return code from this exit indicates whether the system is to suppress the current SMF record.

The parameter passed to this exit is the address of the SMF record to be written.

For details, see IEFU83 — SMF record exit in *z/OS MVS Installation Exits*.

IEFU84 — SMF record exit

The SMF record exit (IEFU84) receives control when the SMF writer routine is branch-entered and is **not** entered in cross-memory mode. A return code from this exit indicates whether the system is to suppress the current SMF record.

The parameter passed to this exit is the address of the SMF record to be written.

For details, see IEFU84 — SMF record exit in *z/OS MVS Installation Exits*.

IEFU85 — SMF record exit

The SMF record exit (IEFU85) receives control when the SMF writer routine is branch-entered and is entered in cross-memory mode. A return code from this exit indicates whether the system is to suppress the current SMF record.

The parameter passed to this exit is the address of the SMF record to be written.

For details, see IEFU85 — SMF record exit in *z/OS MVS Installation Exits*.

IEFU86 — SMF record exit

The SMF record exit (IEFU86) receives control when the SMF writer routine is entered to write a record of any standard or extended type in any of the environments described by the IEFU83, IEFU84, or IEFU85 exits. A return code from this exit indicates whether the system is to suppress the current SMF record.

The parameter passed to this exit is mapped by the IFAEXITP macro.

For details, see IEFU86 — SMF record exit in *z/OS MVS Installation Exits*.

Using operator commands

The following operator commands affect SMF:

- SET SMF=*xx*
- SETSMF
- DISPLAY SMF.

Note: SET SMF, SETSMF, and DISPLAY SMF commands cannot run simultaneously; one waits for the other to complete before starting.

For detailed information about the SMF commands see *z/OS MVS System Commands*.

Using the SET command

Use the SET SMF=*xx* operator command to restart SMF or to dynamically modify the SMF recording options by specifying which SMFPRM*xx* parmlib member is to be used. If SMF ends, you can use the SET SMF=*xx* command to restart SMF. It is not necessary to IPL again.

The SET SMF=*xx* command allows you to replace the existing SMF options. For example, when NOACTIVE is specified after an IPL, you can activate SMF recording by using the SET SMF=*xx* command and choosing the parmlib member that contains the ACTIVE option. In addition, you can use the SET SMF=*xx* command to reactivate SMF recording after an I/O error has terminated recording; however, you should define a new data set or correct the cause of the I/O error before reactivating SMF recording.

Special considerations for the SET SMF=*xx* command

- To avoid installation exit communication problems, an installation should terminate:
  - All address spaces except the master scheduler address space.
  - The system address spaces (such as PCAUTH, ALLOCAS, and GRS)
  - The job entry subsystem before issuing a SET command that changes the EXIT keyword.
- The SET command cannot be used to change the SID parameter; if a value is specified, it is ignored. If processor serial numbers were displayed in message IEE967I prior to issuing the SET command, they will no longer be displayed following the SET command. Also, the SID parameter displayed in message IEE967I following the SET command will show an origin type of DEFAULT. In this case, DEFAULT indicates that the SID value is the value that was specified at IPL.
- The new values for STATUS or MAXDORM do not take effect until the old ones, if any, expire.
- For each IPL, you can define a maximum of eight subsystems to SMF (by use of the SUBSYS parameter). This is a combined total of subsystems specified at IPL and subsequent SET commands. If the maximum is reached, no new subsystems may be added. Subsystems previously specified can be given different options.
- In response to a SET command, SMF issues a subsystem interface (SSI) call to each user-defined subsystem specified in the SMF parameters SUBSYS and/or SUBPARM. This includes parameters specified in previous SET commands and at IPL.

- Unless it is necessary, recording data set switching does not take place at SET time. For example, if the current active data set is not included in the new options, the first empty data set in the new data set list becomes the active recording data set.
- If recording is not active at SET SMF time, the first non-full data set is used as the recording data set.
- An active connection to an in-memory resource does not prevent the SET SMF=*xx* command from removing that resource from the configuration. No new data will be recorded to that resource; however, the resource is not removed from the configuration until the last connection disconnects. Use the DISPLAY SMF,M command to display the connections to in-memory resources.
- An active connection prevents the SET SMF=*xx* command from changing the in-memory resource definition, such as changes to the **TYPE** or **RESSIZMAX** parameters.

Using the SETSMF command

The SETSMF operator command allows an installation to add a SUBPARM parameter or to replace any previously-specified parameter in the active SMF parmlib member except the ACTIVE, PROMPT, SID, or EXITS parameters. The SETSMF command cannot be used with a parmlib member that specified NOPROMPT.

The SETSMF command cannot be used to change the SID parameter; if a value is specified, it is ignored. If processor serial numbers were displayed in message IEE967I prior to issuing the SETSMF command, they will no longer be displayed following the SETSMF command. Also, the SID parameter displayed in message IEE967I following the SETSMF command will show an origin type of DEFAULT. In this case, DEFAULT indicates that the SID value is the value that was specified at IPL.

Using the DISPLAY command

The DISPLAY (D) operator command can be used to display the status of the SMF data sets or the current SMFPRM*xx* options to the operator console.

Chapter 5. Using SMF macros

This topic provides a detailed description of SMF macros to use in any application program.

SMF macros

SMF supplies the following macros that can be used in application programs or in installation-written exit routines.

IFAEXITP
Use the IFAEXITP macro to provide a map of the parameter list that is passed to the IEFU86 exit.

IFAHDR
Use the IFAHDR macro to provide a programmatic decoder of the standard SMF record header or extended header for retrieving the record type, subtype, or both.

IFASMFH
Use the IFASMFH macro to provide a map of the standard SMF header and the extended SMF header.

IFASMFR
Use the IFASMFR macro in any application program or in installation-written exit routines to symbolically address SMF record fields.

SMFCHSUB
Use the SMFCHSUB macro to change the information string specified in the current SUBPARM parameter.

SMFDETAL
Use the SMFDETAL macro to determine if detail recording is active for the current subsystem.

SMFEWTM
Use the SMFEWTM macro to write records to the SMF data set in APF-authorized programs and any exit routine that is in supervisor state, except where noted. See "Using a macro to write records" on page 77.

SMFEXIT
Use the SMFEXIT macro to branch directly to any installation-written SMF exit residing in the SYS1.LPALIB.

SMFINTVL
Use the SMFINTVL macro to determine the current interval and synchronization values.

SMFRTEST
Use the SMFRTEST macro to determine if a particular type, or subtype, of a record is being recorded.

SMFSUBP
Use the SMFSUBP macro to determine if any SUBPARM information is present or if the values have been changed.

SMFWTM
Use the SMFWTM macro to write records to the SMF data set in APF-authorized programs and any exit routine that is in supervisor state, except where noted. See "Using a macro to write records" on page 77.

Using a macro to write records

SMF supplies two macros that you can use to write records to the SMF data set: SMFWTM and SMFEWTM. These macros differ in the entry method that they use to the record-writing routine.

If a branch entry is required, use the SMFEWTM macro with BRANCH=YES. Use the SMFEWTM macro with BRANCH=NO (or the SMFWTM macro) if all of the following are true:

- The calling program is running enabled.

- The calling program is not in supervisor state.
- The calling program is APF-authorized.

The SMFWTM macro generates a supervisor call (SVC) instruction. For SMFEWTM BRANCH=NO, the SVC is generated by the code invoked by the SMFEWTM macro.

IFAEXITP – Parameter list map

Description

To provide a map of the parameter list that is passed to the IEFU86 exit.

Programming requirements

None.

Syntax

```
IFAEXITP
```

Parameter mapping

Header/self-defining section

Table 5. IFAEXITP mapping header/self-defining section

Offset	Length	Type	Description
0	4	EBCDIC	Eye catcher - 'SMXP'.
4	2	Binary	Length of this structure.
6	1	Binary	Version - 1.
7	1	Binary	Flags. **Bit** **Meaning when set** **0** Set by IBM. Indicates that writer routine was entered through an SVC call. **1** Set by IBM. Indicates that writer routine was entered as branch- and not in cross-memory code. **2** Set by IBM. Indicates that writer routine was entered as branch- and not in cross-memory code. **3 - 7** Reserved. Do not set or use.
8	4	Binary	Pointer to the SMF record.
C	2	Binary	Offset to the work area.
E	2	Binary	Length of the work area.
IEFU86 work area, described in IFAEXITP:			
0	n	Character	Work area located past the parameter list at an offset value located at + 'C'x into the parameter list. The length value of the work area is located at + 'E'x into the parameter list. The contents of this work area are not cleared on entry or return from the exit.

IFAHDR — Retrieves SMF record type

Description

Use the IFAHDR macro to provide a programmatic decoder of the SMF record header or extended header for retrieving the record type, subtype, or both.

Programming requirements

See "Environment" on page 79.

Syntax

```
IFAHDR REQUEST=GETINFO
            ,RECPTR=xrecptr
              [,TYPE=xtype]
                 [,SUBTYPE=xsubtype]
```

Parameters

The parameters are explained as follows:

REQUEST
This parameter is a required keyword input to specify the requested function.

REQUEST=GETINFO
This parameter retrieves information from the SMF record header.

RECPTR=*xrecptr*
This parameter is the name (RS-type), or address in register (2) - (12), of a required 8-byte input that contains the address pointer to the record header. This header is from where the data is retrieved. The area must contain an SMF record with a correctly formed standard or extended header.

TYPE=*xtype*
The name (RS-type) of an optional halfword output area where the requested data will be placed.

SUBTYPE=*xtype*
The name (RS-type) of an optional halfword output area where the requested data will be placed. If the X'40' bit of the flag byte at offset +4 into the record header is off, indicating that subtypes are not valid for the record, the subtype value returned will be zero.

Environment

Minimum authorization:	Problem or Supervisor state. Any PSW key.
Dispatchable unit mode:	Task mode
Cross memory mode:	PASN=HASN=SASN
AMODE:	24- or 31-bit. If in AMODE 64, before invoking this macro, specify SYSSTATE AMODE64=YES
ASC mode:	Primary
Interrupt status:	Enabled or disabled for I/O and external interrupts.
Locks:	No locks held
Control parameters:	None

ABEND codes

None.

Return codes

None.

Example

```
RECADDR   DS  A
RECTYPE   DS  H
SUBTYPE   DS  H

IFAHDR ,REQUEST=GETINFO,
            RECPTR=RECADDR,TYPE=RECTYPE,SUBTYPE=SUBTYPE

or

IFAHDR REQUEST=GETINFO,
            RECPTR=RECADDR,TYPE=RECTYPE

or

IFAHDR REQUEST=GETINFO,
            RECPTR=RECADDR,SUBTYPE=SUBTYPE
```

IFASMFH – SMF header map

Description

To provide a map of the standard SMF header and the extended SMF header.

Programming requirements

None.

Syntax

```
IFASMFH
```

Record mapping

The record mapping for the IFASMFH macro are explained in "Standard and Extended SMF record headers" on page 162.

IFASMFR — Addressing SMF record fields

Description

Use the IFASMFR macro in application programs or installation-written exit routines to symbolically address SMF record fields. If you do not want the IFASMFR macro to use part of the application program's storage, then supply a CSECT or DSECT statement ahead of the macro.

Note: If you invoke the IFASMFR macro within a DSECT, multiple record types are mapped contiguously. That is, each record type will not have a zero origin.

Do not specify both record type 14 and record type 15 in the same program. These records are identical, whenever record type 15 is specified in the IFASMFR macro, record type 14 is defined.

Programming requirements

None.

Syntax

```
IFASMFR n
```

Parameters

The parameters are explained as follows:

n

The *n* is the record type to be defined. You must specify at least one record type with the macro; if you specify more than one record type, you must enclose the record types in parentheses and separate them by commas. The values for *n* can be any of the current record types. Exceptions to this include record types 100, 101, 102 and 110. Other exceptions are record types that explicitly mention the proper macro to use.

Note: In all the SMF record formats, the "name" column contains the symbolic addresses defined by the IFASMFR macro.

IFACSMFR — Addressing SMF record fields

Description

Use the IFACSMFR header file, `ifacsmfr.h`, in application programs or installation-written exit routines to symbolically address SMF record fields. Similar to the way that you use the IFASMFR macro to get assembler mappings of many SMF records, you can include the `ifacsmfr.h` header file to get C mappings of many SMF records. Unlike the IFASMFR assembler macro which maps one SMF record at a time, the `ifacsmfr.h` header file maps all of the SMF records that it knows about within a single invocation, with each SMF record represented by one or more structures.

z/OS ships the `ifacsmfr.h` header file and the macros it includes in the SYS1.SIEAHDR.H data set and also in the `/usr/include/zos` file system path.

Programming requirements

None.

Syntax

```
#include <ifacsmfr.h>
```

Parameters

None.

SMFCHSUB — Changing subsystem parameters

A user-defined subsystem issues the SMFCHSUB macro to change the information string specified in the current SUBPARM parameter. A user-defined subsystem issues this macro when the subsystem determines that an error, such as a spelling error, exists in the information string. Issuing the macro instruction to correct the error causes the SMF options to be displayed correctly on the operator's console.

When you invoke the SMFCHSUB macro, you must include the IEESMCA mapping macro, which maps the SMCA.

Syntax

```
(label) SMFCHSUB SUBPARM={(reg)|addr}[,SUBSYS= {name|(reg)}]
```

Parameters

SUBPARM=(*reg*)
SUBPARM=*addr*
specifies the address *addr* of a 60-byte area or a register (*reg*, 2 - 12) that contains the address of the 60 bytes that is to replace the current SUBPARM value for the specified subsystem.

SUBSYS=*name*
SUBSYS=(*reg*)
Specifies the name (or address in register 2 - 12) of the 4-byte field containing the subsystem name. If you use a register, it must be enclosed in parentheses. If you do not specify the SUBSYS parameter, the SUBPARM value, if one exists, of the current subsystem is changed; for example, TSO for TSO/E users, ASCH for APPC/MVS transactions programs, STC for started tasks, or the name of the job entry subsystem (JES2 or JES3) for batch jobs..

Return codes

When the SMFCHSUB macro returns control, register 15 contains one of the following return codes.

Code dec (hex)
Meaning

00 (00)
Successful completion of the macro.

04 (04)
No SUBPARM value found; thus, the value was not changed.

08 (08)
A SETSMF or a SET SMF command is currently being processed. SUBPARM is not changed for this request. The subsystem can reissue the macro instruction.

12 (0C)
A DISPLAY command for SMF is currently being processed. SUBPARM is not changed for this request. The subsystem can reissue the macro instruction.

16 (10)
SMF has ended abnormally.

SMFDETAL — Testing detail recording

The SMFDETAL macro allows you to determine if detail recording is active for the current subsystem. A user subsystem can use this macro to determine what level of data to collect. For example, TSO/E uses SMFDETAL to determine if type 32 detail data or type 32 summary data is to be collected.

When you invoke the SMFDETAL macro, you must include the IEESMCA mapping macro, which maps the SMCA.

Syntax

```
[label] SMFDETAL [SUBSYS={ name}]
                 [       {(reg)}]
```

Parameters

SUBSYS=*name*
SUBSYS=(*reg*)

specifies the name (or address in register 2 - 12) of the 4-byte field containing the subsystem name. The subsystem name must be left-justified and padded with blanks. If you use a register, it must be enclosed in parentheses. The macro looks for the subsystem name in SMFPRM*xx* and uses the options for that subsystem to determine if detail recording is active. If the subsystem name is not found, the macro uses the options specified for the entire system on the SYS option in SMFPRM*xx* to determine if detail recording is active.

If you do not specify a SUBSYS, the macro uses the subsystem name of the current address space: for example, TSO for TSO/E users, ASCH for APPC/MVS transactions programs, STC for started tasks, or the name of the job entry subsystem (JES2 or JES3) for batch jobs. If the defaulted subsystem name is not found, the macro uses the options specified for the entire system on the SYS option in SMFPRMxx to determine if detail recording is active.

Return codes

When the SMFDETAL macro returns control, register 15 contains one of the following return codes.

Code dec (hex)
Meaning

00 (00)
Detail recording is in effect

04 (04)
Detail recording for the subsystem is not in effect

16 (10)
SMF has ended abnormally.

SMFEWTM — Writing SMF records

The SMFEWTM macro can be used to write records to the SMF data set. You can use this macro in any exit routine that is in supervisor state except IEFU83, IEFU84, IEFU85, IEFU86, and IEFU29 and in any application program that has APF authorization. The SMFEWTM macro verifies that SMF recording is active and allows the issuer to branch directly to SMF.

When you invoke the SMFEWTM macro, you must include the IEESMCA mapping macro, which maps the SMCA.

Note that you can also write SMF records without using a macro. See smf_record (BPX1SMF, BPX4SMF) — Write an SMF record in *z/OS UNIX System Services Programming: Assembler Callable Services Reference*.

For records of all types, you must complete the record descriptor word (RDW), and the record type must be provided in the standard or extended header, in accordance with record type requirements described in the “Standard and Extended SMF record headers” on page 162 section.

Record types 0 - 127, and 1152 - 2047, which are SMF-formatted records are reserved for IBM® products. For these record types SMF supplies the date and time and system ID in the standard header, and the extended TOD clock and time zone offset in the extended header, if used.

Record types 128 - 1151 are available for user-written records. When writing these record types, you must provide all of the information in the standard header, including the date, time, and system identifier. While the system identifier can be any four-character identifier, specifying the value of the SID parameter is consistent with the system records that SMF produces. For user-written records, SMF supplies the extended TOD clock and time zone offset in the extended header, if used.

If properly defined to the system, all SMF records are given to installation exit IEFU86 and then to installation exit IEFU84 or IEFU85 before they are written to the SMF data set or log stream.

Syntax

```
[label] SMFEWTM {record address}{,BRANCH=NO }[{,SUBSYS=name}{,WRKAREA=addr }[,MODE=XMEM]]
                {(r)} {,BRANCH=YES}[{,SUBSYS=(reg)}{,WRKAREA=(reg)}]
```

Parameters

record address
The symbolic address of the record to be written.

(*r*)
The register number (2 - 12), that contains the address of the record to be written.

Note: SMF does not preserve register 0 when processing SMFEWTM.

BRANCH=NO
BRANCH=YES
Specifies a branch entry (YES) or an SVC entry (NO) to the requested SMF writer routine. The default is BRANCH=NO.

If you specify BRANCH=NO, before SMF writes the record to the SMF data set, the SMF record is given to installation exit IEFU83.

If you specify BRANCH=YES, before SMF writes the record to the SMF data set, the SMF record is given to installation exit IEFU84, or IEFU85 if MODE=XMEM. To use BRANCH=YES, the caller must be in supervisor state, have a protection key of zero, and set register 13 to point to a standard 72-byte save area.

You should note therefore that if you change from using the SMFWTM macro to write SMF records and use the SMFEWTM macro, BRANCH=YES, then the SMF records are given to installation exit IEFU84 (rather than installation exit IEFU83) or IEFU85 if MODE=XMEM.

SUBSYS=*name*
SUBSYS=(*reg*)
Specifies the name (or address in register 2 - 12) of the 4-byte field containing the subsystem name. The macro looks for the subsystem name in SMFPRM*xx* and uses the options for that subsystem to determine if the record is written. The subsystem name must be left-justified and padded with blanks. If you use a register, it must be enclosed in parentheses. If the subsystem name is not found, then the macro uses the options specified for the entire system on the SYS option in SMFPRMxx to determine if the record is written.

If you do not specify SUBSYS, the macro will use the subsystem name for the current address space, for example, TSO for TSO/E users, STC for started tasks, ASCH for APPC/MVS transactions programs, or the name of the job entry subsystem (JES2 or JES3) for batch jobs. If the defaulted subsystem name is not found, then the macro uses the options specified for the entire system on the SYS option to determine if the record is written.

WRKAREA=*addr*
WRKAREA=(*reg*)
Specifies the address (*addr*) or a register (*reg*, 2 - 12) that contains the address of a five-word work area that you must supply for SMF to use. If you specify a register, it must be enclosed in parentheses. You must specify WRKAREA when you specify MODE=XMEM.

MODE=XMEM
Specifies that the caller is entered in cross-memory mode (the primary address space is not the home address space). The caller must be in primary ASC mode. If you specify MODE=XMEM, you must specify BRANCH=YES and WRKAREA.

Return codes

When the SMFEWTM macro returns control, register 15 contains one of the following return codes.

Code dec (hex)
Meaning

00 (00)
The record was written without error.

08 (08)
The record was not written because the length specified in the RDW was less than 18 bytes, or an SMF record exit changed the length in the RDW to be less than 18 bytes.

16 (10)
The record was not written because SMF is not active or has ended abnormally.

20 (14)
The record was not written because the installation-written IEFU83, IEFU84, or IEFU85, IEFU86 exit routine suppressed the record.

24 (18)
The record was not written because the data was lost.

36 (24)
The record was not written because the record type specified is not currently being recorded.

40 (28)
The record was not written because a buffer shortage caused the data to be lost.

44 (2C)
The record was not written because SMF could not establish recovery.

48 (30)
The caller was not in primary ASC mode or an incorrect ASID was encountered.

52 (34)
SMF cannot write this record because of an SMF record flooding filter.

56 (38)
Record not written because the record contains a malformed record header for an extended record type. See the "Generating records with Extended headers" on page 162 section for the rules for generating a record with an extended header.

60 (3C)
Record not written because the record was modified by an installation exit (IEFU83, IEFU84, IEFU85, or IEFU86) to contain a malformed record header for an extended record type. See the "Generating records with Extended headers" on page 162 section for the rules for generating a record with an extended header.

SMFEXIT — Branching to the SMF exits

The SMFEXIT macro allows the user to branch directly to any installation-written SMF exit residing in the SYS1.LPALIB. You must define the SMF exit name to SMF with the EXIT parameter before issuing the macro.

When you invoke the SMFEXIT macro, you must include the IEESMCA mapping macro, which maps the SMCA.

Register use

On entry to the macro, register 13 must point to a 72-byte save area. Parameters can be passed to the exit in register 0 or 1; the parameters must be placed in the registers before the macro is invoked.

When control returns to the issuer:

- The contents of register 2 will have been destroyed.
- A return code of zero in register 15 indicates one of the following:
  - The exit was not invoked because SMF is not active
  - The exit was not invoked because the exit is not active for the requested subsystem
  - The exit was invoked and issued a return code of zero

- The installation exit routine can place a return code (zero or any non-zero value) into register 15.

Syntax

```
[label] SMFEXIT exitname[,SUBSYS={name }]
                        [        {(reg)}]
```

Parameters

exitname
The name of the exit as it is specified in SMFPRMxx, with the format SYS.yyyy or SYSxxxx.yyyy.

SUBSYS=*name*
SUBSYS=(*reg*)
Specifies the name (or address in register 2-12) of the 4-byte field containing the subsystem name. The macro looks for the subsystem name in SMFPRM*xx* and uses the options for that subsystem to determine if the record is written. The subsystem name must be left-justified and padded with blanks. If you use a register, it must be enclosed in parentheses. If the subsystem name is not found, then the macro uses the options specified for the entire system on the SYS option in SMFPRMxx to determine which exit (if any) to call.

Note: SMF does not preserve register 0 when processing SMFEWTM.

If you do not specify a SUBSYS, the macro uses the subsystem name for the current address space: for example, TSO for TSO/E users, ASCH for APPC/MVS transactions programs, STC for started tasks, or the name of the job entry subsystem (JES2 or JES3) for batch jobs. If the defaulted subsystem name is not found, then the macro uses the options specified for the entire system on the SYS option to determine which exit (if any) to call.

SMFINTVL — Determining interval time

The SMFINTVL macro allows the requestor to determine the current interval and synchronization values. A requestor can use this value, for example, to set up interval recording for a subsystem.

Environment

Authorization:	None
Dispatchable unit mode:	Task or SRB
Cross memory mode:	PASN = HASN = SASN
AMODE:	24- or 31-bit (AMODE 31 is required if you specify the SYNC, GLOBAL, or INTEXPT keywords.)
ASC mode:	Primary
Serialization:	Enabled for I/O and external interrupts
Locks:	No Requirement
Control Parameters:	None

Register use

Register
Contents

AR 0 to 15
Unchanged

GPR 0 to 12
Unchanged — unless specified for macro output data

GPR 13
Pointer to 72-byte save area

GPR 14
Work Register

GPR 15
Return code

Syntax

```
[label] SMFINTVL (intvlreg)[,SUBSYS={(namereg)}][,SYNC=(syncreg)][,GLOBAL][,INTEXPT=(intexptreq)]
                           [        {name     }]
```

Parameters

(*intvlreg*)
Specifies a register (2 - 12). When the macro returns control, this register contains the address of an eight-byte area that contains the interval value. The interval value is in time-of-day (TOD) format, an unsigned 64-bit fixed-point number where bit 51 is equivalent to 1 microsecond.

SUBSYS=*name*
SUBSYS=(*namereg*)
specifies the name (or address in register 2 - 12) of the 4-byte field containing the subsystem name. The subsystem name must be left-justified and padded with blanks. If you use a register, it must be enclosed in parentheses. The macro looks for the subsystem name in SMFPRMxx and uses the options for that subsystem. If the subsystem name is not found, then the macro uses the options specified for the entire system on the SYS option in SMFPRMxx to determine the interval and synchronization values.

If you do not specify SUBSYS or GLOBAL, the macro returns the interval value for the subsystem represented by the current address space: for example, TSO for TSO/E users, ASCH for APPC/MVS transaction programs, STC for started tasks, or the name of the job entry subsystem (JES2 or JES3) for batch jobs. If the defaulted subsystem name is not found, then the macro uses the options specified for the entire system on the SYS option in SMFPRMxx to determine the interval and synchronization values.

If you specify GLOBAL, the system ignores SUBSYS (even if you specified it).

SYNC=(*syncreg*)
specifies a register (2 - 12). When the macro returns control, this register contains the 31-bit address of an eight-byte area that contains the synchronization value in time-of-day (TOD) format, an unsigned 64-bit fixed-point number where bit 51 is equivalent to 1 microsecond. This value is taken from the two-digit global synchronization value specified using the SYNCVAL parameter in the SMFPRMxx parmlib member.

The macro returns a value of -1 (X'FFFFFFFF') in *syncreg* if the subsystem specified by the SUBSYS parameter did not request synchronization.

GLOBAL
requests that the system return the 31-bit addresses of the global interval value in *(intvlreg)* and the synchronization value, if requested, in *syncreg*. These values were specified using the INTVAL and SYNCVAL options of SMFPRMxx. When you specify GLOBAL, the system ignores SUBSYS.

INTEXPT=(*intexptreg*)
specifies a register (2-12). When the macro returns control, this register contains the 31-bit address of an eight-byte area that contains the time when the next SMF global recording interval ends in time-of-day (TOD) format, an unsigned 64-bit fixed-point number where bit 51 is equivalent to 1 microsecond. This is the interval that is scheduled as a result of the combination of the INTVAL and SYNCVAL options of SMFPRMxx.

The macro returns a value of -1 (X'FFFFFFFF') in *intexptreg* when SMF interval synchronization processing is disabled.

Return codes

When the SMFINTVL macro returns control, register 15 contains one of the following return codes.

Code dec (hex)
Meaning

00 (00)
Successful completion. The requested information was returned in registers that were specified on the macro invocation.

04 (04)
No interval specified for the requested subsystem, or SMF is not active.

16 (10)
SMF has ended abnormally.

SMFRTEST — Testing record recording

The SMFRTEST macro allows you to determine if a particular type, or subtype, of a record is being recorded. Issue this macro before collecting data for a particular record or subtype to avoid the overhead of data collection if it is not written.

When you invoke the SMFRTEST macro, you must include the IEESMCA mapping macro, which maps the SMCA.

Register use

Registers 14 and 15 are used by the macro and are not reset. On entry to the macro, register 13 must point to a 72-byte save area.

Syntax

```
[label] SMFRTEST RECTYPE={record}[,SUBTYPE={subtype}][,SUBSYS={name }]
                        {(reg)  }[          {(reg)   }][         {(reg)}]
```

Parameters

RECTYPE=*record*
RECTYPE=(*reg*)
Specifies the SMF record type to be checked, where *record* can be one to four decimal digits in the range 0 - 2048. If you use a register, the register (*reg*, 2 - 12) contains the record type. You must code the parentheses if you code a register, and you must right justify the record type within the register.

SUBTYPE=*subtype*
SUBTYPE=(*reg*)
Specifies the SMF record *subtype* to be checked, where *subtype* can be one to five decimal digits in the range 0 - 32767. If *reg* is specified, the register (2 - 12) contains the record subtype. You must code the parentheses if you code a register, and you must right justify the record subtype within the register.

SUBSYS=*name*
SUBSYS=(*reg*)
Specifies the name (or address in register 2 - 12) of the 4-byte field containing the subsystem name. The macro looks for the subsystem name in SMFPRM*xx* and uses the options for that subsystem to determine if the record is written. The subsystem name must be left-justified and padded with blanks. If you use a register, it must be enclosed in parentheses. If the subsystem name is not found, then the macro uses the options specified for the entire system on the SYS option in SMFPRMxx to determine if the record is written.

If you do not specify a SUBSYS, the macro uses the subsystem name for the current address space. For example, TSO for TSO/E users, ASCH for APPC/MVS transactions programs, STC for started tasks, or the name of the job entry subsystem (JES2 or JES3) for batch jobs. The macro uses the options specified in the corresponding SUBSYS parameter for that subsystem in SMFPRMxx to determine if the record is written. If there is no corresponding SUBSYS parameter or if the SUBSYS parameter contains no information about whether the record would or would not be written for that subsystem, then the macro uses the options specified in the SYS parameter to determine if the record is written.

Return codes

When the SMFRTEST macro returns control, register 15 contains one of the following return codes.

Code dec (hex)
Meaning

00 (00)
The record type is being recorded

16 (10)
SMF is not active or has ended abnormally.

36 (24)
Information for the specified record type is not being recorded.

SMFSUBP — Determining subsystem parameters

An installation may pass information to a user-defined subsystem. The user-defined subsystem may issue the SMFSUBP macro during its initialization to determine if any SUBPARM information is present. The subsystem may also issue the SMFSUBP macro after initialization to determine if the SUBPARM information has changed.

The subsystem should issue the SMFSUBP macro after receiving the subsystem interface (SSI) call generated by a SET or SETSMF operator command. The user-defined subsystem may then determine if any values that affect its operation have changed.

When you invoke the SMFSUBP macro, you must include the IEESMCA mapping macro, which maps the SMCA.

Syntax

```
(label) SMFSUBP (smfsubp_reg)[,SUBSYS={(reg)}]
                             [        {name }]
```

Parameters

(smfsubp_reg)
specifies a register (2 - 12). You must enclose *smfsubp_reg* in parentheses. When the macro returns control, this register contains the address of the 60-byte information string followed by a sixteen-byte field that contains:

Bytes 1 - 2
Length of the field.

Byte 3
Source flags, as follows:

Bit
Meaning when set

0
SMF is active

1
Not applicable

2
Information string was issued by parmlib member

3
: Information string was issued by operator reply

4
: Information string was issued by default

5
: Information string was changed due to conflicts or errors

6
: Information string was changed by IPL, SET, or SETSMF

7
: Not applicable.

Byte 4
: Reserved.

Bytes 5 - 6
: 4-byte console identifier.

Bytes 9 - 16
: 8-character token field.

SUBSYS=(*reg*)
SUBSYS=*name*

Specifies the name (or address in register 2 - 12) of the 4-byte field containing the subsystem name. The subsystem name must be left-justified and padded with blanks. If you use a register, it must be enclosed in parentheses. If the subsystem name is not found, then the macro uses the SUBPARM options specified (if any) for the entire system on the SYS option.

If you do not specify SUBSYS=, the macro returns the address of the SUBPARM value (if any) for the subsystem name of the current address space: for example, TSO for TSO/E users, ASCH for APPC/MVS transactions programs, STC for started tasks, or the name of the job entry subsystem (JES2 or JES3) for batch jobs. If the defaulted subsystem name is not found, then the macro uses the options specified (if any) for the entire system on the SYS option.

Return codes

When the SMFSUBP macro returns control, register 15 contains one of the following return codes.

Code dec (hex)
: **Meaning**

00 (00)
: Successful completion of the macro

04 (04)
: No SUBPARM parameters are entered for the specified subsystem

16 (10)
: SMF has ended abnormally.

SMFWTM — Writing SMF records

The SMFWTM macro is used to write records to the SMF data set. You can use this macro in any exit routine that is supervisor state except for IEFU83, IEFU84, IEFU85, IEFU86, and IEFU29, and in any application program that is APF-authorized.

All SMF records are given to installation exits before they are written to the SMF data set. If you use SMFWTM, installation exits IEFU86 and IEFU83 are invoked.

Note: You can also write SMF records without using a macro. See smf_record (BPX1SMF, BPX4SMF) — Write an SMF record in *z/OS UNIX System Services Programming: Assembler Callable Services Reference*.

For records of all types, you must complete the record descriptor word (RDW), and the record type must be provided in the standard or extended header, in accordance with record type requirements described in the "Standard and Extended SMF record headers" on page 162 section.

Record types 0 - 127, and 1152 - 2047, which are SMF-formatted records are reserved for IBM® products. For these record types SMF supplies the date and time and system ID in the standard header, and the extended TOD clock and time zone offset in the extended header, if used.

Record types 128 - 1151 are available for user-written records. When writing these record types, you must provide all of the information in the standard header, including the date, time, and system identifier. While the system identifier can be any four-character identifier, specifying the value of the SID parameter is consistent with the system records that SMF produces. For user-written records, SMF supplies the extended TOD clock and time zone offset in the extended header, if used.

If properly defined to the system, all SMF records are given to installation exit IEFU86 and then to installation exit IEFU83 before they are written to the SMF data set or log stream.

Syntax

```
[label] SMFWTM {record address|(r)}
```

Parameters

record address
The symbolic address of the record to be written.

(*r*)
A a register containing the address of the record to be written. The value for *r* can be either the absolute register number or a symbol for the register. In either case, you must code the parentheses, for example, `(2)` or `(REG2)`.

Return codes

When the SMFWTM macro returns control, register 15 contains one of the following return codes.

Code dec(hex)
Meaning

00 (00)
The record was written without error.

08 (08)
The record was not written because the length specified in the RDW was less than 18 bytes, or an SMF record exit changed the length in the RDW to be less than 18 bytes.

16 (10)
The record was not written because SMF is not active or has ended abnormally.

20 (14)
The record was not written because the installation-written IEFU83 exit routine suppressed the record.

24 (18)
The record was not written because the data was lost.

36 (24)
The record was not written because the record specified is not currently being recorded.

40 (28)
The record was not written because a buffer shortage problem caused the data to be lost.

44 (2C)
The record was not written because SMF could not establish recovery.

52 (34)
SMF cannot write this record because of an SMF record flooding filter.

56 (38)

Record not written because the record contains a malformed record header for an extended record type. See the "Generating records with Extended headers" on page 162 section for the rules for generating a record with an extended header.

60 (3C)

Record not written because the record was modified by an installation exit (IEFU83, IEFU84, IEFU85, or IEFU86) to contain a malformed record header for an extended record type. See the "Generating records with Extended headers" on page 162 section for the rules for generating a record with an extended header.

Chapter 6. User-written report programs

You can use the SMF dump program (IFASMFDP) to create data sets containing certain record types and to also produce a summary activity report. You can use Tivoli Decision Support for z/OS, an IBM program product, to process data sets that are produced by SMF. An installation may want to produce their own report. Producing a report usually requires at least two operations: sorting the SMF records and then writing them in an appropriate format.

For those installations that choose to read the SMF data sets directly (rather than using the dump program), note that the SMF data sets are preformatted with dummy records. A dummy record is shorter than any valid SMF record and is easily identified because it contains the characters SMFEOFMARK. The SMF dump program terminates processing when it encounters a dummy record, improving data set processing performance.

Sorting SMF Records

Any sort/merge program can be used to sort SMF records; this topic describes two sample sort/merge exit routines that you may use with the IBM DFSORT (Data Facility Sort) Licensed Program (No. 5740-SM1).

Sample Sort/Merge Exit Routines

The IBM DFSORT Program Product can, during various phases of processing, pass control to routines designed and written to perform specific functions. SYS1.SAMPLIB has two sample routines that receive control from exits E15 and E35 of this sort/merge program. The sample E15 exit routine, called SMFE15, extracts all SMF records without a job log identification (job name, time, and date that the reader recognized the JOB card) from the SMF dump data set. The SMFE15 exit routine retains the dump header and dump trailer records (types 2 and 3) in the temporary data set HDRDATA. It retains all other system-oriented records (records without a job log identification) in the temporary data set SORDATA.

The sample E35 exit routine, called SMFE35, places all the records extracted by the SMFE15 routine in the sort output data set. These records are inserted in the data set as follows: dump header records, dump trailer records, all other system-oriented records, and the sorted job-oriented records.

Note: If tape work devices are used, the minimum block length the IBM Sort/Merge Program Product can sort is 18 bytes. Otherwise, the minimum is one byte. The sample routines SMFE15 and SMFE35 use SMF record types 0 through 13 for input; the minimum length of these SMF records is 18 bytes.

Figure 31 on page 94 shows sample JCL for obtaining a listing of the SMFE15 and SMFE35 exit routines from SYS1.SAMPLIB. Figure 31 on page 94 also shows sample JCL for obtaining a listing of the SYS1.SAMPLIB member named SMFSORT. SMFSORT contains sample JCL for running the IBM DFSORT Program Product.

```
//PRINT     JOB     123456,SMITH
//          EXEC    PGM=IEBPTPCH
//SYSPRINT  DD      SYSOUT=A
//SYSUT1    DD      DSNAME=SYS1.SAMPLIB,DISP=(OLD,KEEP),
//                  UNIT=xxxx,VOLUME=SER=xxxxxx[1]
//SYSUT2    DD      SYSOUT=A
//SYSIN     DD      *
            PRINT   TYPORG=PO,MAXNAME=4,MAXFLDS=4
            MEMBER  NAME=SMFSORT
            RECORD  FIELD=(80)
            MEMBER  NAME=SMFE15
            RECORD  FIELD=(80)
            MEMBER  NAME=SMFE35
            RECORD  FIELD=(80)
/*
```

1

The volume and unit parameters depend on your installation's request.

Figure 31. Sample JCL for Obtaining a Listing of Sample Sort Exit Routines

To include the sample exit routines in your sort application, you must first assemble and link-edit them before running the sort/merge program. Figure 32 on page 94 shows sample JCL for this procedure, including one possible sort application. In this example, SMF records are to be sorted first on the job log identification (major control field), and then on the time and date portions of the time stamp (minor control fields). Displacements of these fields (shown in the record formats in Chapter 17, “SMF records ,” on page 167) are 14, 6, and 2. However, you must add four bytes for the record descriptor word (RDW) and one byte for the sort procedures (initial count of 1) to these displacements. Hence, displacements 19, 11, and 7 are shown in the SORT FIELDS=statement in Figure 32 on page 94.

```
//SMFSORT          JOB     MSGLEVEL=1
//STEP1            EXEC    ASMFCL[1]
//ASM,SYSIN        DD      *
  (E15 Source Deck)
/*
//LKED.SYSLMOD     DD      DSNAME=SMF1.EXITS,UNIT=SYSDA,[2]
//                         DISP=(NEW,KEEP),SPACE=(TRK,(10,5,1)),
//                         VOL=SER=xxxxxx
//LKED.SYSIN       DD      *
                   NAME    E15(R)[3]
/*
//STEP2            EXEC    ASMFCL[1]
//ASM,SYSIN        DD      *
  (E35 Source Deck)
/*
//LKED.SYSLMOD     DD      DSNAME=SMF1.EXITS,DISP=(OLD,KEEP),[2]
//                         UNIT=SYSDA,VOL=SER=xxxxxx
//LKED.SYSIN       DD      *
                   NAME    E35(R)[3]
```

```
/*
//SORTSTEP         EXEC    PGM=SORT,REGION=100K[4]
//SYSOUT           DD      SYSOUT=A
//SORTLIB          DD      DSNAME=SYS1,SORTLIB,DISP=SHR
//EXITLIB          DD      DSNAME=SMF1,EXITS,DISP=(OLD,KEEP),[5]
//                         UNIT=SYSDA,VOL=SER=xxxxxx
//SORTIN           DD      UNIT=3480,VOL=SER=SYSMAN,DISP=OLD,[6]
//                 LABEL=(,SL),DCB=(RECFM=VBS,LRECL=600,BLKSIZE=200)[7]
//SORTWK01         DD      UNIT=SYSDA,SPACE=(CYL,(50),,CONTIG)[8]
//SORTWK02         DD      UNIT=SYSDA,SPACE=(CYL,(50),,CONTIG)[8]
//SORTWK03         DD      UNIT=SYSDA,SPACE=(CYL,(50),,CONTIG)[8]
//SORTOUT          DD      UNIT=3480,DSNAME=SMF1,SORTOUT,LABEL=(,SL),[9]
//                 DISP=(KEEP),DCB=(RECFM=VBS,LRECL=600,BLKSIZE=200)[7]
//SORDATA          DD      UNIT=SYSDA,SPACE=(CYL,(1,1)),[10]
//                         DCB=(RECFM=VBS,LRECL=600,BLKSIZE=200)[7]
//HDRDATA          DD      UNIT=SYSDA,SPACE=(TRK,(5,5)),[10]
//                         DCB=(RECFM=VBS,LRECL=600,BLKSIZE=200)[7]
//SYSIN            DD      *
  SORT                     FIELDS=(19,16,A,11,4,A,7,4,A),FORMAT=BI,SIZE=E4000[11]
  MODS                     E15=(E15,700,EXITLIB,N),E35=(E35,1500,EXITLIB,N)[11]
  END
/*
```

Figure 32. Sample JCL for Running a Sort Procedure

Footnotes:

[1] EXEC statement for catalogued procedure ASMFCL (assemble and link-edit). (For a description of the ASMFCL procedure, see *IBM High Level Assembler/MVS & VM & VSE Programmer's Guide*.)

[2] The sample sort exit routines will be link-edited into data set SMF1.EXITS.

[3] Link-edit control statements specifying that E15 and E35 will be the load module names of the exit routines.

[4] EXEC statement for the sort/merge program.

[5] Data set SMF1.EXITS is specified as the library in which sort exit routines can be found.

[6] Input to the sort program is the SMF dump data set, contained on a tape having a volume serial number of SYSMAN.

[7] The LRECL value can be larger than the BLKSIZE value because records might be segmented. The LRECL value must be as large as the longest SMF record being created plus four bytes for the RDW. Modify these parameters according to the longest record to be collected.

[8] Three sort work units are defined as being direct access devices.

[9] The sort output data set is to be written on tape.

[10] Two data sets required by the sample sort exit routines are defined on direct access devices.

[11] The sort/merge control statements define the sort control fields and exit routines to be used in this sort application.

Designing a Report Program

The basic operations of a report are formatting and printing data from SMF records. The input to a report program is normally the sorted SMF data set.

SYS1.SAMPLIB has a sample PL/1 source report program, called SMFFRMT, which formats record types 23 and 90. Contained within the program are declares for record types 23, 30, 32, and 90.

Before using the SMFFRMT program, you must compile the program using the PL/I compiler. Figure 33 on page 95 shows a sample JCL for running the SMFFRMT program after it is compiled and link-edited into SYS1.LINKLIB.

```
//FORMAT    JOB  MSGLEVEL=1
//FRMT      EXEC PGRM=SMFFRMT
//SYSPRINT  DD   SYSOUT=A
//RPORT23   DD   SYSOUT=A
//RPORT90   DD   SYSOUT=A
//SMFDATA   DD   DISP=(OLD,KEEP),LABEL=(,SL),VOL=SER=xxxxxx,DSN=nnn,
//               UNIT=3480
```

Figure 33. Sample JCL for Running SMFFRMT

Converting binary fields to time of day format

As stated earlier, the basic operations of a report program include formatting and printing data from SMF records. Many SMF records have timestamp fields that contain a binary value that represents the time since midnight, in hundredths of seconds. One example is the SMFxxTME field which exists in all SMF record headers and contains a value representing the time when the record was moved into the SMF buffer.

The following examples show the steps to follow in order to convert any timestamp into time of day format. For more information about SMF record headers, see "Standard and Extended SMF record headers" on page 162.

Note that the DISPLAY and OCCUR operators on the z/OS DFSORT ICETOOL utility include built in functions to convert the date and time. See *z/OS DFSORT: Getting Started*.

Example 1: Assume the time value in binary hundredths of a second past midnight is 005C5E00:

1. Convert the value of the binary timestamp to a decimal value:

- ```
  005C5E00 = 6053376
  ```

2. Detemine the number of hours past midnight the timestamp was created:
   a. Divide the decimal value from step 1 by 100. The result is the number of seconds past midnight.
   ```
   6053376/100 = 60533.76
   ```
   b. Divide by the number of seconds in an hour to obtain the number of hours past midnight. There are 3600 seconds in an hour. For this example the hours portion of the time of day is equal to 16.
   ```
   60533.76/3600 = 16.814933333
   ```
   c. Determine the number of hundredths of a second in that number of hours.
   ```
   16 * 3600 * 100 = 5760000
   ```
   d. Subtract that number of hundredths of a second from the original decimal value.
   ```
   6053376 - 5760000 = 293376
   ```
   The remainder from step 2 is 293376.
3. Determine the number of minutes past midnight the timestamp was created:
   a. Divide the remainder from step 2 by 100. This is the number of seconds past the hour.
   ```
   293376/100 = 2933.76
   ```
   b. Now divide your answer from part a by the number of seconds in a minute. The result is the number of minutes past the hour. In this example the minutes portion of the time of day is equal to 48.
   ```
   2933.76/60 = 48.896
   ```
   c. Determine the number of hundredths of a second in that number of minutes.
   ```
   48 * 60 * 100 = 288000
   ```
   d. Subtract that number of 100ths of a second from the remainder from step 2.
   ```
   293376 - 288000 = 5376
   ```
   The remainder from step 3 is 5376.
4. Determine the number of seconds, tenths, and hundredths.
   - Divide the remainder from step 3 by 100.
   ```
   5376/100 = 53.76
   ```
   Therefore, the actual time of day is 16:48:53.76.

Example 2: Assume the time value in binary hundredths of a second past midnight is 005D7740:

1. Convert the value of the binary timestamp to a decimal value:
   - ```
     005D7740 = 6125376
     ```
2. Detemine the number of hours past midnight the timestamp was created:
   a. Divide the decimal value from step 1 by 100. The result is the number of seconds past midnight.
   ```
   6125376/100 = 61253.76
   ```
   b. Divide by the number of seconds in an hour to obtain the number of hours past midnight. There are 3600 seconds in an hour. For this example the hours portion of the time of day is equal to 17.

```
61253.76/3600 = 17.014933333
```

c. Determine the number of hundredths of a second in that number of hours.

```
17 * 3600 * 100 = 6120000
```

d. Subtract that number of hundredths of a second from the original decimal value.

```
6125376 - 6120000 = 5376
```

The remainder from step 3 is 5376.

3. Determine the number of minutes past midnight the timestamp was created:

   a. Divide the remainder from step 2 by 100. This is the number of seconds past the hour.

   ```
   5376/100 = 53.76
   ```

   b. Now divide your answer from part a by the number of seconds in a minute. The result is the number of minutes past the hour. In this example the minutes portion of the timestamp equal 0.

   ```
   53.76/60 = 0.896
   ```

   c. Determine the number of hundredths of a second in that number of minutes.

   ```
   0 * 60 * 100 = 0
   ```

   d. Subtract that number of 100ths of a second from the remainder from step 2.

   ```
   5376 - 0 = 5376
   ```

   The remainder from step 3 is 5376.

4. Determine the number of seconds, tenths, and hundredths.

   - Divide the remainder from step 3 by 100.

   ```
   5376/100 = 53.76
   ```

   Therefore, the actual time of day is 17:00:53.76.

Table 6 on page 97 and Table 7 on page 98 list the number of hundredths of a second in each full hour (0-24) and the number of hundredths of a second in each full minute (0-60) respectively. They may be used to make the calculations easier by finding the numbers that are just below the numbers calculated and subtracting them. See the examples following these tables.

Table 6. Number of hundredths of a second in each full hour of a day

Hundredths of seconds	Hour
000000	0
360000	1
720000	2
1080000	3
1440000	4
1800000	5
2160000	6
2520000	7
2880000	8
3240000	9

Table 6. Number of hundredths of a second in each full hour of a day (continued)	
Hundredths of seconds	**Hour**
3600000	10
3960000	11
4320000	12
4680000	13
5040000	14
5400000	15
5760000	16
6120000	17
6480000	18
6840000	19
7200000	20
7560000	21
7920000	22
8280000	23
8640000	24

Table 7. Number of hundredths of a second in each full minute of an hour	
Hundredths of seconds	**Minutes**
000000	0
006000	1
012000	2
018000	3
024000	4
030000	5
036000	6
042000	7
048000	8
054000	9
060000	10
066000	11
072000	12
078000	13
084000	14
090000	15
096000	16
102000	17
108000	18

Table 7. Number of hundredths of a second in each full minute of an hour (continued)	
Hundredths of seconds	**Minutes**
114000	19
120000	20
126000	21
132000	22
138000	23
144000	24
150000	25
156000	26
162000	27
168000	28
174000	29
180000	30
186000	31
192000	32
198000	33
204000	34
210000	35
216000	36
222000	37
228000	38
234000	39
240000	40
246000	41
252000	42
258000	43
264000	44
270000	45
276000	46
282000	47
288000	48
294000	49
300000	50
306000	51
312000	52
318000	53
324000	54
330000	55

Table 7. Number of hundredths of a second in each full minute of an hour (continued)	
Hundredths of seconds	**Minutes**
336000	56
342000	57
348000	58
354000	59
360000	60

Example 3: Assume the time value in binary hundredths of a second past midnight is 005C5E00:

1. Convert the value of the binary timestamp to a decimal value:
   - `005C5E00 = 6053376`
2. Detemine the number of hours past midnight the timestamp was created:
   a. Find the value in Table 6 on page 97 which is closest to, but less than, the decimal value in step 1. In our example, the hours portion of the timestamp is equal to 16.

   ```
   5760000        16
   ```

   b. Subtract the number of hundredths of a second from the original decimal value:

   ```
   6053376 - 5760000 = 293376
   ```

   The remainder from step 2 is 293376.
3. Determine the number of minutes past midnight the timestamp was created:
   a. Find the value in Table 7 on page 98 which is closest to, but less than, the remainder of step 2. In our example, the minutes portion of the timestamp is equal to 48.

   ```
   288000        48
   ```

   b. Subtract the number of hundredths of a second from the remainder of step 2.

   ```
   293376 - 288000 = 5376
   ```

   The remainder from step 3 is 5376.
4. Determine the number of seconds, tenths, and hundredths.
   - Divide the remainder from step 3 by 100.

   ```
   5376/100 = 53.76
   ```

   Therefore, the actual time of day is 16:48:53.76.

Self-defining data

Records with self-defining data, such as the type 30 record, are variable in nature, and the location of the sections or fields within these records are subject to change over time. Therefore, always design programs to use the self-defining data for navigating to any section or field in these records.

Chapter 7. APPC/MVS accounting

Advanced Program-to-Program Communication/MVS (APPC/MVS) is the MVS support for cooperative processing. For example, an APPC/MVS administrator defines a host program to process user requests. A user of a PS/2 can run a PS/2 program to interact with this host program. APPC/MVS allows the PS/2 user to access host system (MVS) data without having to log on to the MVS system directly. This data can reside on more than one system, and can be maintained in distributed databases.

The host and PS/2 programs communicate using APPC/MVS services, and are called transaction programs (TPs). The interaction between the PS/2 TP and the host TP is called a conversation. After the conversation is established, each “partner” in the conversation can send data to, or receive data from, the other partner. Each partner in a conversation is identified by its logical unit name (LU name) which is the VTAM “port” on the system, through which communication flows.

APPC/MVS work consists of inbound and outbound conversations. From an MVS point of view, an inbound conversation originates from a TP that requests service of an MVS TP. The requesting TP may be external to MVS (**remote** — such as a PS/2 program) or internal to MVS (**local** — such as TSO/E users or batch jobs). An outbound conversation originates from an MVS TP to another TP. See “Recording SMF Information for APPC/MVS Work” on page 104 for information that SMF collects for inbound and outbound conversations.

SMF accounts for each TP scheduled by the APPC/MVS transaction scheduler (ASCH) as a single accountable entity, in the same way that batch jobs or TSO/E sessions are accountable entities. Your installation can collect, sort, and report on TP resources by using methods similar to those used for other work.

SMF also accounts for each conversation (inbound or outbound) in the system as a single accountable entity. Conversation-level accounting is particularly useful when your installation uses an APPC/MVS server application to process multiple conversations concurrently. Conversation level accounting allows your installation to collect information for each conversation in the server address space.

Note: SMF does not produce records 4, 5, 20, 34, 35 for TPs.

To use APPC conversation information and APPC/MVS transaction records, your installation must customize any accounting packages that read the SMF records.

Note: Use the user account validation exit (IEFUAV) to validate the accounting information of users of APPC/MVS TPs.

Transaction Programs (TPs)

To SMF, a TP scheduled by the APPC/MVS transaction scheduler (ASCH) is a separate address space (like a batch job or TSO/E user). APPC/MVS and ASCH each run in their own system address spaces.

The requested TP can run on either the same system as the request or on another system elsewhere in the network. SMF reports on whatever part of the function actually runs on the current MVS system. If an APPC/MVS-scheduled job requires resources from other systems, then you must correlate the accounting data for each participating system.

In contrast, if a TSO/E user requests a TP that runs on the same MVS system, then SMF reports on both ends of the conversation.

There are two kinds of scheduling available for APPC/MVS TPs: standard and multi-trans. And, as an alternative to scheduling, APPC/MVS also allows inbound conversation requests to be routed directly to an APPC/MVS server (thus bypassing a transaction scheduler). TPs that are processed by APPC/MVS servers are sometimes called *served TPs*.

This topic shows how SMF reports on each type of TP (standard, multi-trans, and served).

Standard TP Processing

APPC/MVS initializes standard TPs for each inbound conversation request and terminates them when they finish processing. With standard scheduling, a TP's resources are allocated and deallocated for each inbound conversation request. See Figure 34 on page 102 for an example.

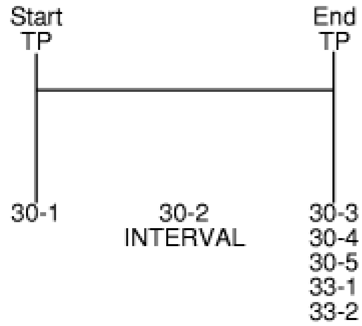


Figure 34. Example of standard TP processing

Note: Points at which SMF writes type 30 (subtypes 1, 2, 3, 4, and 5) and type 33 (subtypes 1 and 2) records to reflect standard TP processing.

Multi-trans TP Processing

A multi-trans TP remains active between inbound conversation requests, with its resources available. The first inbound request starts the multi-trans TP. Subsequent requests can use the same instance of the TP and avoid the overhead of repeated resource allocation and deallocation.

When a multi-trans TP is ready to run a user request, it issues a Get_Transaction call (GETTRANS — a request to get a transaction) to the APPC/MVS transaction scheduler. The scheduler informs the TP when there is work to do. If there is no work, the scheduler informs the TP, and then the TP ends itself.

When the multi-trans TP does some processing not directly related to a user request it can issue a Return_Transaction call (RETTRANS — a request to return a transaction).

Multi-trans Shell

A multi-trans TP is typically coded with a multi-trans shell, an environment that performs initialization and termination processing, surrounding the part of the TP that holds conversations.

Multi-trans shell processing can be distinguished by the generic ID (also indicated by a “generic” flag) associated with the type 33 record (see Figure 35 on page 103). The generic ID is charged for the setup and cleanup work done by the multi-trans TP when it begins and ends, and when it does processing following a Return_Transaction call. Charging a generic ID means the first user is not charged for initialization processing for all users, nor is the last user charged for cleanup processing for all users.

Your billing for the multi-trans shell will probably be similar to your billing procedures for system address spaces.

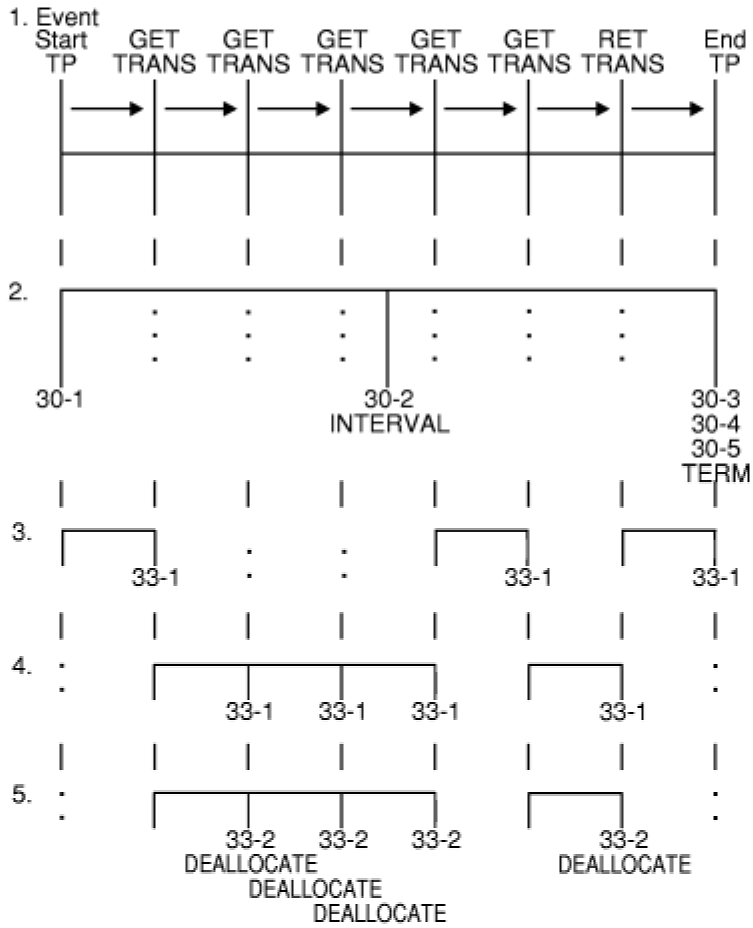


Figure 35. Example of multi-trans shell processing

1. Represents possible events in the life of a multi-trans TP. Items 2, 3, 4, and 5 correspond with these events.
2. Points at which SMF writes the type 30 (subtypes 1, 2, 3, 4, and 5) record. INIT represents initialization and TERM represents termination.
3. Points at which SMF writes a type 33 (subtype 1) record to reflect multi-trans shell activity. This record represents the time period since the last event. Multi-trans shell records do not contain scheduler data (such as LU names and queue times).
4. Points at which SMF writes a type 33 (subtype 1) record to reflect individual user requests to receive service (GETTRANS) from the multi-trans TP. This record represents the time period since the last event.
5. Points at which SMF writes a type 33 (subtype 2) record to reflect individual conversations within the multi-trans shell. DEALLOCATE represents conversation deallocation.

APPC/MVS Server Processing

Besides scheduling TPs in response to inbound requests, APPC/MVS also allows for inbound requests to be routed to an APPC/MVS server.

An APPC/MVS server is an MVS application that uses the Receive_Allocate callable service to receive inbound conversation requests directly (rather than through a transaction scheduler). APPC/MVS servers avoid the overhead associated with APPC/MVS scheduling. See Figure 36 on page 104 for an example.

Because APPC/MVS servers can process multiple inbound conversations concurrently, a single server address space might contain multiple *interleaved* (or overlapping) conversations concurrently.

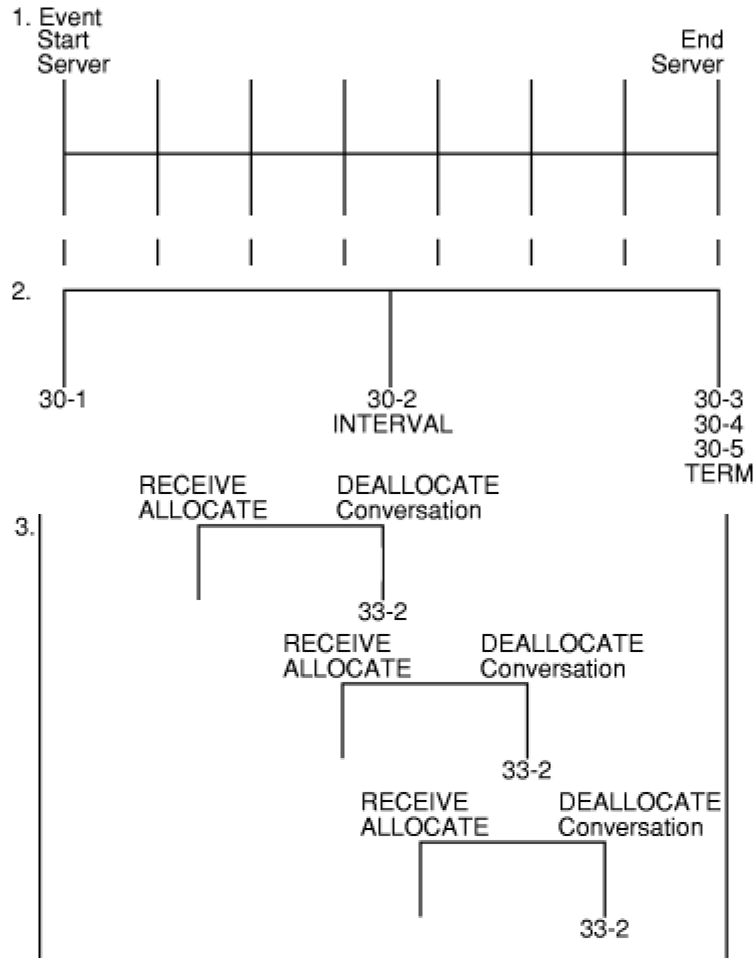


Figure 36. Example of APPC/MVS server processing

1. Represents possible events in the life of a server address space. Items 2 and 3 correspond with these events.
2. Points at which SMF writes the type 30 (subtypes 1, 2, 3, 4, and 5) record. INIT represents initialization and TERM represents termination.
3. Points at which SMF writes type 33 (subtype 2) records to reflect individual conversations within a server address space. RECEIVE ALLOCATE represents the start of conversation activity and DEALLOCATE represents conversation deallocation.

Recording SMF Information for APPC/MVS Work

For every job that issues APPC/MVS callable services, SMF writes summary conversation information in a type 30 record. This record reflects the total conversation activity for a particular job's address space. In addition, SMF writes type 33 records (subtypes 1 and 2) as follows:

- Subtype 1 records for individual APPC/MVS transactions that are scheduled by the APPC/MVS transaction scheduler.
- Subtype 2 records for individual APPC/MVS conversations (inbound and outbound) on the system. Subtype 2 records are written for work that is scheduled by the APPC/MVS transaction scheduler, or processed by an APPC/MVS server.

The following topics describe the contents of each of these SMF record types.

Record type 30

As it does for any address-space level recording in MVS, SMF writes a type 30 record for APPC/MVS work. When APPC/MVS work begins, SMF marks its beginning with a subtype 1 record and marks its end with subtype 4 and 5 records. All SMF type 30 records for APPC/MVS work include summary conversation information, such as the number of conversations, the number of sends and receives, and the amount of data sent and received. Summary conversation information appears in records generated for both outbound and inbound conversations.

You may choose to collect type 30 job level detail information for transactions by using record type selection control.

Record type 33, Subtype 1

When APPC/MVS inbound conversations create work scheduled by the APPC/MVS transaction scheduler, SMF writes a type 33 subtype 1 record. (APPC/MVS inbound conversations scheduled by a different transaction scheduler can also provide information to SMF for accounting.) For each TP request that is executed, SMF provides information such as TP name, local and partner LU names, user and account number, and I/O statistics. When a TP uses scheduling resources, SMF provides information such as:

- Schedule class
- Schedule type
- Specific dates and times that work was:
  - Received
  - Queued
  - Started
  - Ended.

The TP Usage Detail topic of the type 33 record contains zeroes for multi-trans shell processing records (a generic user ID is in effect). You can collect multi-trans TP resource information under a generic user ID or the account number associated with that TP. The costs can then be billed either to the specific users of the TP or to system users. Group these records together based on some criteria (TP name, job name), and charge users based on that criteria.

Record type 33, Subtype 2

When APPC/MVS conversations are deallocated by either partner program, SMF writes a type 33 subtype 2 record. For each conversation, SMF provides information such as:

- Conversation ID
- Name of the TP that issued the conversation request
- Local and partner LU name
- Number of sends and receives
- Amount of data sent and received.

For inbound conversations that are processed by APPC/MVS servers, rather than transaction schedulers, subtype 2 records also contain information that is specific to server processing. For example, SMF records the specific dates and times that the conversation request was:

- Received by APPC/MVS
- Added to the server's allocate queue
- Received by the server for subsequent processing
- Deallocated.

To help correlate conversations between partner programs, APPC/MVS applications can write user-specific information to a 255-byte user data field in the subtype 2 record through the

Set_Conversation_Accounting_Information service. For information about using this service, see *z/OS MVS Programming: Writing Transaction Programs for APPC/MVS*.

Chapter 8. z/OS UNIX System Services accounting

Much information regarding z/OS UNIX is available in various SMF records:

- Address space level information is available in the common address space work record (type 30).
- Data set caching information is available in the DFSMS statistics and configuration record (type 42).
- RMF support for z/OS UNIX Services is reflected in SMF record types 70 through 79.
- Activity data for the z/OS UNIX file system is available in SMF record type 92.

The common address space work record (type 30)

The common address space work record (type 30) provides the following information related to z/OS UNIX:

- Process accounting data for the address space
- Special accounting for the exec family of functions

Process accounting data

For address spaces which use z/OS UNIX callable services, a repeating section for process accounting is provided in SMF record type 30. Collection of process accounting data is triggered by the following events:

- Job step termination
- Invoking one of the exec functions (substep termination)
- SMF type 30 interval processing
- Invoking MVS process cleanup (undub)

Each time process accounting data is collected, another repeating section is added to the appropriate SMF type 30 subtype records.

Accounting for fork()

When a program issues a `fork()`, the activity of the child process is not included in the accounting data for the parent process. That is, when the program issues a `fork()`, the child process has its own SMF type 30 records. The parent's type 30 records do not include the activity of the child process. However, you can associate the parent process with the child process using the following:

- The process user ID, specified in the SMF30OUI field
- The process user group, specified in the SMF30OUG field
- The process session ID (SID), specified in the SMF30OSI field
- The process parent ID, specified in the SMF30OPP field

The field SMF30EXN provides the name of the program that was run. It is specified as up to 16 characters. After a `fork()`, the child process runs the same program as the parent. The program name of the child matches that of the parent at the time of the `fork()`. For more information about the contents of the SMF30EXN, see "Accounting for exec functions" on page 108.

Accounting for attach_exec

As part of setting up an interactive environment, the OMVS command must start another process, the shell, to interpret and run shell commands. When you specify the NOSHAREAS parameter, the shell is started using `fork()` and `exec`. However, when you specify the SHAREAS parameter, the OMVS command starts the shell using **attach_exec**. This function starts the shell process running in the address space of the OMVS command. Other applications can also use **attach_exec** to start a process without the overhead of an additional address space.

Because SMF data is collected on an address space basis, process identification (such as process ID and session ID) is recorded only for the parent process in the address space. However, z/OS UNIX resource consumption is accumulated for the parent process and all local child processes.

Accounting for exec functions

When a program issues an `exec` function, the requesting job goes through step termination, including record generation and the invocation of the IEFACTRT exit. Then the job goes through step initialization, including invocation of the IEFUSI exit. However, the new unit of work is not a job step, but a substep. The step number is unchanged, but the substep field is incremented. SMF provides the following fields to support exec processing:

- A “step completion” flag indicates the step is ending due to an `exec` request. The flag is in the Completion Section of the SMF type 30 record.

  This flag indicates that the step is not really terminating (in the normal sense) and that there is another step in the job with the same step name and number.
- A field reporting the substep number is in the ID section of the SMF type 30 record.

  This field is used in addition to job name, job start time, and step number to put records in sequence.
- The field SMF30EXN provides the name of the program that was run. It is specified as up to 16 characters.

  Load modules can be distinguished from z/OS UNIX executable files in the SMF30EXN field as follows:

  – Names that are longer than 8 bytes must be z/OS UNIX executable files

  – For names that are 8 bytes or less, check the terminating character:

    - X'00'—z/OS Unix executable file (z/OS UNIX program)
    - X'40'—Load module (MVS program)

  SMF30EXN contains information as follows:

  – `z/OS UNIX executable filename`. SMF30EXN provides the name of a z/OS UNIX file that is invoked using the exec family of functions. The filename can be up to 16 characters in length.

    For z/OS UNIX executable files, SMF30EXN contains the portion of the pathname after the last slash. z/OS UNIX filenames, if not truncated, are followed by the terminating character X'00'.

    For example, if the z/OS UNIX executable file with pathname `/bin/grep` is invoked using an exec function, SMF30EXN contains `grep` followed by the terminating character X'00'.

    z/OS UNIX filenames longer than 16 bytes (including the terminating character) are truncated. For example, the name `/usr/joe/somelongprogramname` is recorded as `somelongprogramn`. Because the filename is truncated, no terminating character is recorded.

    It is recommended that you not use blanks in z/OS UNIX filenames. An z/OS UNIX file with a name padded with blanks appears in the SMF type 30 record to be an load module name.

  – `Load module name`. For load modules invoked using exec functions, SMF30EXN contains the unqualified name of the load module, padded with blanks, to a length of 16 characters.

Address space accounting for z/OS UNIX file system activity

SMF type 30 records provide a summary of the I/O activity done using z/OS UNIX. The I/O activity is summarized in the following categories:

- I/O activity to regular files. This includes all I/O to file systems.
- I/O activity to pipe files. Although there is no physical I/O associated with pipes, this activity is still listed as I/O. This field contains I/O activity to pipe files and to UNIX domain sockets.

- I/O activity to special files. This includes I/O activity to terminals.
- I/O activity to network sockets. This field includes I/O activity to network sockets as returned by the TCP/IP physical file system.

  Note:

  1. These values may contain zeros if your TCP/IP physical file system does not support address space level accounting.
  2. Different TCP/IP physical file systems may account differently for the same network activity.

Sample SMF job flows

Figure 37 on page 109 shows the key for the following examples.

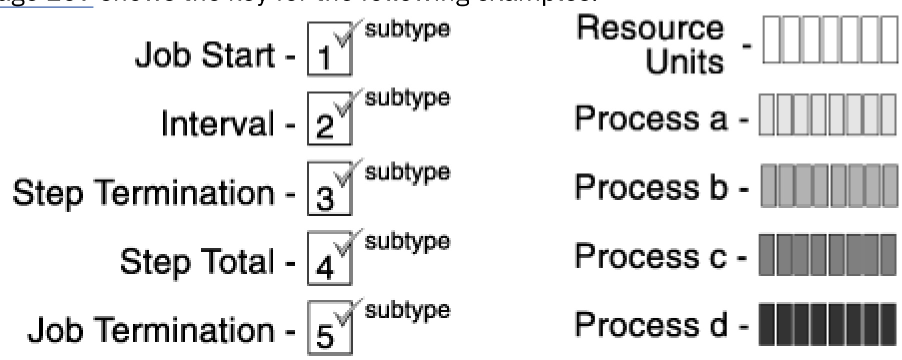


Figure 37. SMF job flow examples - key

The following examples show how the process data is accumulated and reported in several instances:

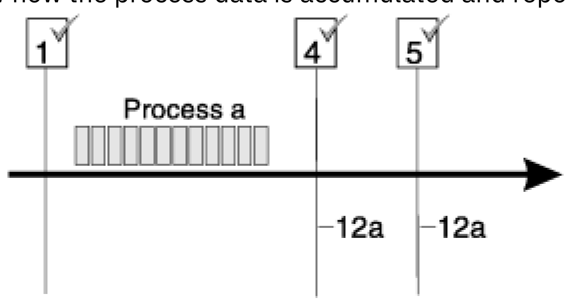


Figure 38. SMF record type 30: Example 1

In Figure 38 on page 109, the flow is as follows:

1. The job starts and a job start (subtype 1) record is written.
2. Process a begins and consumes 12 units of resource.
3. The step ends and a step total record (subtype 4) is written. This record contains one z/OS UNIX process section showing the 12 units of resource consumed by process a.
4. The job ends and a job termination record (subtype 5) is written. Because this job contained only one step, the job termination record contains one z/OS UNIX process section matching that of the step total record.

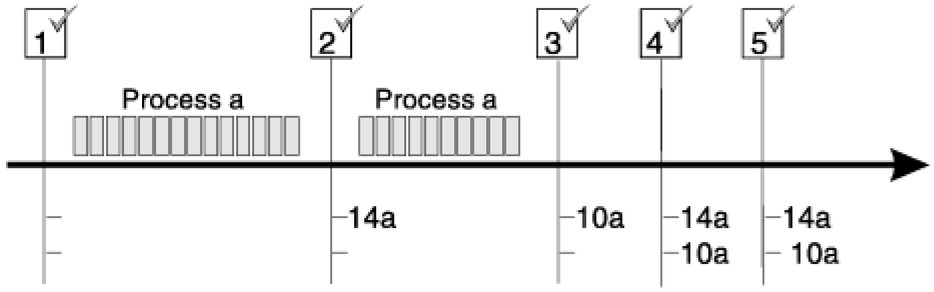


Figure 39. SMF record type 30: Example 2

In Figure 39 on page 110, the flow is as follows:

1. The job starts and a job start (subtype 1) record is written.
2. Process a begins and consumes 14 units of resource.
3. An Interval record (subtype 2) is written containing one z/OS UNIX process section showing the 14 units of resource consumed by process a.
4. The job continues and process a consumes an additional 10 units of resource.
5. The step ends:
   a. A step termination record (subtype 3) is written. This record contains a single z/OS UNIX process section showing the additional 10 units of resource consumed by process a after the interval.
   b. A step total record (subtype 4) is written. This record contains two z/OS UNIX process sections:
      - One showing the 14 units of resource consumed by process a before the interval
      - One showing the 10 units of resource consumed by process a after the interval
6. The job ends and a job termination record (subtype 5) is written. Because this job contained only one step, the z/OS UNIX process sections in the job termination record are identical to those written in the step total record.

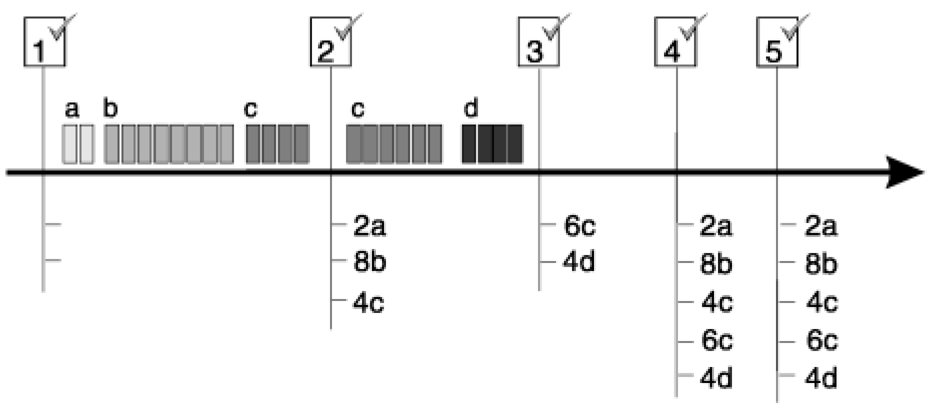


Figure 40. SMF record type 30: Example 3

In Figure 40 on page 110, the flow is as follows:

1. The job starts and a job start (subtype 1) record is written.
2. Process a begins and consumes 2 units of resource.
3. The job is “undubbed” and “dubbed” again as process b. Process b consumes 8 units of resource.
4. The job is “undubbed” and “dubbed” again as process c. Process c consumes 4 units of resource.
5. An Interval record (subtype 2) is written containing three z/OS UNIX process sections:
   - One showing the 2 units of resource consumed by process a
   - One showing the 8 units of resource consumed by process b

- One showing the 4 units of resource consumed by process c

6. The job continues and process c consumes an additional 6 units of resource.
7. The job is “undubbed” and “dubbed” again as process d. Process d consumes 4 units of resource.
8. The step terminates:

   a. A step termination record (subtype 3) is written. This record contains two z/OS UNIX process sections:

      - One showing the 6 units of resource consumed by process c after the interval
      - One showing the 4 units of resource consumed by process d

   b. A step total record (subtype 4) is written. This record contains five z/OS UNIX process sections:

      - One showing the 2 units of resource consumed by process a
      - One showing the 8 units of resource consumed by process b
      - One showing the 4 units of resource consumed by process c before the interval
      - One showing the 6 units of resource consumed by process c after the interval
      - One showing the 4 units of resource consumed by process d

9. The job ends and a job termination record (subtype 5) is written. Because this job contained only one step, the z/OS UNIX process sections in the job termination record are identical to those written in the step total record.

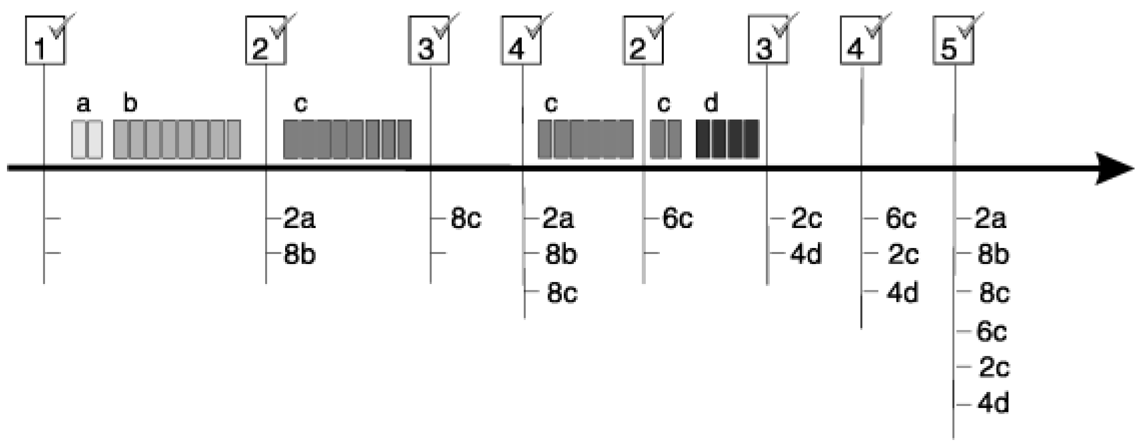


Figure 41. SMF record type 30: Example 4

In Figure 41 on page 111, the flow is as follows:

1. The job starts and a job start (subtype 1) record is written.
2. Process a begins and consumes 2 units of resource.
3. The job is “undubbed” and “dubbed” again as process b. Process b consumes 8 units of resource.
4. The job is “undubbed.”
5. An Interval record (subtype 2) is written containing two z/OS UNIX process sections:

   - One showing the 2 units of resource consumed by process a
   - One showing the 8 units of resource consumed by process b

6. The job is “dubbed” again as process c. Process c consumes 8 units of resource.
7. The `exec` service is invoked, causing the job to go through step termination and to start another substep.

   a. A step termination record (subtype 3) is written. This record contains one z/OS UNIX process section showing the 8 units of resource consumed by process c before the `exec`.

   b. A step total record (subtype 4) is written. This record contains three z/OS UNIX process sections:

    - One showing the 2 units of resource consumed by process a
    - One showing the 8 units of resource consumed by process b
    - One showing the 8 units of resource consumed by process c before the `exec`
8. The job continues processing the new substep and process c consumes an additional 6 units of resource.
9. An Interval record (subtype 2) is written containing one z/OS UNIX process section showing the 6 units of resource consumed by process c since the `exec`.
10. The job continues and process c consumes an additional 2 units of resource.
11. The job is “undubbed” and “dubbed” again as process d. Process d consumes 4 units of resource.
12. The step ends:
    a. A step termination record (subtype 3) is written. This record contains two z/OS UNIX process sections:
        - One showing the 2 units of resource consumed by process c after the second interval
        - One showing the 4 units of resource consumed by process d
    b. A step total record (subtype 4) is written. This record contains three z/OS UNIX process sections:
        - One showing the 6 units of resource consumed by process c after the `exec` but before the second interval
        - One showing the 2 units of resource consumed by process c after the second interval
        - One showing the 4 units of resource consumed by process d
13. The job ends and a job termination record (subtype 5) is written. This record contains all the z/OS UNIX process sections written with the first step total record followed by all the z/OS UNIX process sections written with the second step total record. The following six sections are written to the job termination record:
    - One showing the 2 units of resource consumed by process a
    - One showing the 8 units of resource consumed by process b
    - One showing the 8 units of resource consumed by process c before the `exec`
    - One showing the 6 units of resource consumed by process c after the `exec` but before the second interval
    - One showing the 2 units of resource consumed by process c after the second interval
    - One showing the 4 units of resource consumed by process d

DFSMS statistics and configuration record (type 42)

The DFSMS statistics and configuration record (type 42, subtype 6) provides information about data set level performance. Each IBM-supplied mountable file system resides in a data set. I/O statistics for those data sets represent I/O statistics for the mountable file system.

RMF record support (types 70–79)

RMF records provide the following support for z/OS UNIX.

1. RMF supports the forked address space type, OMVS, in the CPU activity report (type 70) and in various Monitor II reports (type 79).
2. RMF supports swap reason codes z/OS UNIX input wait and z/OS UNIX output wait in the paging activity report (type 71) and in various monitor II reports (type 79).
3. SRM supports SUBSYS=OMVS in the IEAICSxx member of SYS1.PARMLIB. Therefore, this subsystem type may appear in the workload activity report (type 72).
4. RMF provides an OMVS kernel activity report showing status on kernel resources. Data for this report can be found in SMF record type 74, subtype 3.

File system activity record (type 92)

The file system activity record (type 92) provides information on:

- Mount and unmount of a file system
- Quiesce and unquiesce of a file system
- Open and close of a file

All file system activity records contain information needed to associate them with a particular job and job step.

- Jobname
- Reader start time and date
- Step name
- z/OS UNIX process ID
- z/OS UNIX process group ID

All file system activity records also contain information needed to associate them with a particular user, when appropriate.

- System authorization facility (SAF) group ID
- SAF user ID
- z/OS UNIX real user ID
- z/OS UNIX real group ID
- z/OS UNIX session ID

These fields can be used to link file system records with related common address space records (type 30) or with other related file system records.

Accounting for open() and close()

An `open()` or `opendir()` request generates an open record. No open record is written for `dup()`, `pipe()`, or `fork()`. A `fork()` or `dup()` function results in more than one file descriptor accessing the same file with the same cursor. (A cursor refers to the current position in the file.) In this case, when you have more than one file descriptor with the same cursor, if a `close()` or `closedir()` request occurs, no close record is written until the last file descriptor associated with the cursor is closed.

Because of the `fork()` function, a close record may be written by a process other than the one that opened the file. Open records that are created have a correlator, called the open file token. The open file token can be used to correlate open and close records.

Chapter 9. System Logger accounting

System logger produces SMF record type 88 to record the system logger activity of a single system in a sysplex; these records are written to the active SMF data set on that system. Using the IBM DFSORT program product, or its equivalent, you can sort and merge SMF data sets from each system into a single dump data set. System logger provides a SAMPLIB program, IXGRPT1, to show how an installation might write a program to analyze the dump data set input and summarize system logger activity across the sysplex.

Capacity planning

For capacity planning purposes, IBM recommends that you view the steady-state performance requirements of an application. Various flags in the SMF record type 88 highlight exception scenarios for additional analysis or changes in report processing. For example, if a log stream was temporarily unavailable during an SMF global interval, you might decide to exclude records written during that interval from a capacity planning study, because the interval did not exhibit normal capacity demands.

This topic describes the following:

- "Record type 88" on page 115
  - "Primary storage full condition for Logstreams" on page 116
  - "Analysis of fields" on page 115
- "IXGRPT1 SAMPLIB program" on page 117
  - "System Logger interim storage related I/O activity" on page 117
  - "Nearness of the primary storage full condition for Logstreams" on page 118
  - "Selected capacity planning information" on page 118
  - "GROUP Information" on page 118

Record type 88

Record type 88 focuses on the log stream data for a system in a sysplex, including use of interim storage. **Interim storage** is where log data is initially written, before being written to DASD log data sets. Data in interim storage can be accessed quickly without incurring DASD I/O. In a coupling facility log stream, interim storage for log data is in coupling facility list structures. In a DASD-only log stream interim storage for log data is contained in local storage buffers on the system and duplexed to staging data sets. Using record type 88 can help an installation avoid the STRUCTURE FULL exception, and perform other tuning and/or capacity planning analysis.

Record type 88 focuses on the coupling facility structure data and the log stream data for a system in a sysplex. Using the record can help an installation avoid the STRUCTURE FULL exception, and perform other tuning and/or capacity planning analysis.

Given a specific log stream, a record type 88 summarizes all of that log stream's activity on that system, as long as at least one address space is connected to the log stream on that system. If no system logger write activity is performed against the log stream during a particular SMF interval, a record is produced showing zero for the various system logger activity total fields.

The system logger SMF record is cut for all log streams connected at the expiration of the SMF global recording interval. Record type 88 is also triggered by the disconnection of the last log stream on that system.

Analysis of fields

SMF fields relating to resource events, either structure full or staging data set full conditions, should be handled depending on the following:

- Whether the resource is shared sysplex-wide and each system will take action.
- Whether the resource is shared sysplex-wide but only one system will take action.
- Whether the resource is consumed on a system-local basis.

To obtain a sysplex-wide view of system logger activity, correct processing for most SMF 88 data fields is to sum the field contents for the target interval across all the SMF 88 records produced in the sysplex. There are, however, exceptions to this rule. Because each system must take its own action — that is, wait for an ENF signal indicating that system logger is available — an analysis program should use the maximum value for these fields: SMF88ERI, SMF88ERC, and SMF88ESF. For example, if a structure rebuild is initiated in a sysplex with three systems, the event is recorded on all three systems. The correct number of structure rebuild initiations is not three, however, it is one, or the maximum number provided SMF88ERI.

For DASD only log streams, staging data sets are a required part of the log stream configuration. For coupling facility log streams, on the other hand, use of staging data sets implies a trade-off between performance workload and data integrity. You should try to tune the staging data set size to minimize the number of Staging_Dataset_Threshold_Hit conditions. Without this type of tuning, such conditions can impact performance during staging data set processing. Note that only an installation can determine what the proper trade-off between performance and data integrity should be. For more information about staging data sets, for coupling facility log streams, see *z/OS MVS Setting Up a Sysplex*.

Because system logger maintains interim storage differently for coupling facility based versus DASD only log streams, the difference is reflected in SMF record 88 report:

- For a coupling facility based log stream, Structure (Interim Storage) Section of the record 88 report shows information about usage of coupling facility structure space allocated for a log stream and the flow of log data through the structure.
- For a DASD only log stream, the Structure (Interim Storage) section of the record 88 report shows information about usage of staging data set space and flow of data through the staging data set for the log stream.

  Not all fields in the Structure (Interim Storage) Section of the record 88 report apply to DASD only log streams. For a DASD only log stream, fields that do not apply will contain zeros. Field SMF88STN contains *DASDONLY* for a DASD only log stream because there is no structure name. Use this field to identify a DASD only log stream.

Primary storage full condition for Logstreams

When a system logger user issues the IXGWRITE macro for a Logstream, system logger writes data to primary storage. When the write completes, system logger categorizes the event as a type-1, type-2, or type-3 completion. These categorizations indicate how much space in the primary storage is being used by the Logstream when the IXGWRITE completion occurred. Field SMF88SC1 indicates a type-1 event, SMF88SC2 a type-2 event, and SMF88SC3 a type-3 event. SMF88SC3 will only be maintained for structure based Logstreams. It is not defined for DASDONLY Logstreams and will contain zero.

- A type-1 completion (field SMF88SC1) indicates that after the write completed, the percentage of resource in use by the primary storage was less than the high offload threshold.
- A type-2 completion (field SMF88SC2) indicates that after the write completed, the percentage of resource in use by the primary storage was equal to or greater than the high offload threshold, so system logger begins managing storage resources by migrating data from the coupling facility to DASD.
- A type-3 completion (field SMF88SC3) indicates that a given log stream is close to consuming all the coupling facility structure space or if the system logger configuration is tuned incorrectly. For example, access to the system logger DASD log data sets would be slowed if those data sets reside on the same device as some other heavily-used data sets. A type-3 completion can also occur if many Logstreams are defined to share the same structure, because each newly defined Logstream causes system logger to dynamically repartition storage among the existing Logstreams. If a log stream has a large proportion of type-3 completions, system logger is getting dangerously close to the STRUCTURE FULL condition. SMF88SC3 will not be defined for DASDONLY Logstreams.

Note: The counts of bytes written to the coupling facility structure and bytes written to DASD log data sets are sampled data; output totals are expected to be roughly proportional to the count of bytes written via IXGWRITE rather than a precise calculation.

IXGRPT1 SAMPLIB program

IXGRPT1 is available in SYS1.SAMPLIB. This program can help you analyze system logger SMF data for the systems in a sysplex. IXGRPT1 provides the following:

- System logger interim storage related I/O activity
- Nearness of the STRUCTURE FULL condition
- Selected capacity planning information

Note:

1. Input to IXGRPT1 should be sorted by timestamp and log stream name. For sorting purposes, analysis programs should use timestamp field SMF88LTD (note that this field is in GMT format), created when the ENF signal was issued, rather than fields SMF88TME and SMF88DTE, which indicate when a particular record was written. If IXGRPT1 detects a sorting error in the input, an error message is produced and the program ends.
2. When you use the IXGRPT1 program, make sure to include type 88 subtype 1 records and indicate whether or not you wish to include DASD only log stream information in this report or coupling facility data only. See the IXGRPT1 program for examples of how to do this.
3. Follow the instructions in the prolog of IXGRPT1 to run the utility or refer to JCL sample IXGRPT1J to run the utility.

System Logger interim storage related I/O activity

IXGRPT1 analyzes system logger-related I/O by calculating:

- Number of bytes written by users via IXGWRITE during the interval (SMF88LWB)
- Number of bytes written to interim storage during the interval (SMF88SWB)
- Number of bytes written to DASD during the interval (SMF88LDB)
- Number of bytes deleted from interim storage during interval without having been written to the log data set (SMF88SIB)
- Number of deletes from interim storage during interval without having been written to the log data set (SMF88SII)
- Number of bytes written to the DASD log data set and then deleted from interim storage during the interval (SMF88SAB)
- Number of deletes from interim storage during interval written to the DASD log data set and then deleted (SMF88SAI)
- Number of times the log stream was offloaded during interval (SMF88EO)
- Number of times a request was made by system logger to write log stream data to DASD during the expiring SMF interval (SMF88LIO)
- Number of times system logger had to suspend before writing log stream data to DASD because a previously-initiated write to DASD had not yet completed during the expiring SMF interval (SMF99LIS).

When the percentage of resource in use by a log stream exceeds the high offload threshold, data is asynchronously offloaded from interim storage to DASD log data sets, and then deleted from interim storage. Thus, SMF88SWB shows I/O from the main processor to interim storage. SMF88SIB shows the success of an application in avoiding offloads for data that it intends to delete from interim storage. SMF88SAB shows bytes deleted from interim storage and implies I/O from the interim storage to DASD log data sets.

Nearness of the primary storage full condition for Logstreams

IXGRPT1 analyzes the nearness of primary storage full condition for Logstreams as follows. For DASDONLY Logstreams the type-3 completion is not defined and will contain zero.

- Number of IXGWRITE invocations of completion type-1 (primary storage fullness in “normal” range).
- Number of IXGWRITE invocations of completion type-2 (primary storage fullness in “warning” range).
- Number of IXGWRITE invocations of completion type-3 (primary storage fullness in “critical” range). This field will be zero for DASDONLY Logstreams.
- Number of times all log stream in structure offloaded during interval
- Number of times the structure full condition was actually reached.

Selected capacity planning information

IXGRPT1 flags the existence of events that affect the interpretation of system logger data for capacity planning. Some events apply to coupling facility based log streams only, while others apply to both coupling facility and DASD only log streams.

Coupling facility log stream only events include:

- For every interval, IXGRPT1 displays the number of STRUCTURE FULL events that were detected for a coupling facility log stream. Frequent STRUCTURE FULL events can indicate a poorly sized coupling facility or that the applications writing to the coupling facility log stream have sporadic bursts of high activity. The installation should perform additional analysis.
- For every interval, IXGRPT1 displays the number of STRUCTURE REBUILD events that occur. Frequent STRUCTURE REBUILD events indicate a need for further analysis.

Coupling facility and DASD only log stream events include:

- For every interval, IXGRPT1 displays the number of bytes written to the coupling facility (SMF88SWB) and to the DASD log stream data set (SMF88LDB).
- For every interval, IXGRPT1 displays the number of staging data set full and staging data set threshold hit conditions for the log stream.
- For every interval, IXGRPT1 displays the number of DASD shift events that occur. Frequent DASD-shift events can indicate a poorly tuned system or a very high volume of system logger activity. The installation should perform additional analysis.

  Note: A DASD-shift event occurs when system logger determines that a log stream must stop writing to one log data set and start writing to a different data set. A DASD-shift event generally occurs when a log data set becomes full.
- For a given log stream, IXGRPT1 displays the number of systems in the sysplex which contribute to an SMF record during the interval. In some cases a system expected to contribute a record might not do so. The count of contributing systems therefore may be used as a signal for further analysis, or to exclude exception records from normal state capacity planning.

GROUP Information

IXGRPT1 will show the GROUP information for a log streams and structures. For more information about the GROUP classification for log streams and structures, see Setting up a sysplex.

Chapter 10. EXCP count

SMF record types 4, 14, 15, 30, 32, 34, 40, and 64 have fields that contain a count related to I/O activity. EXCP is the name of a macro that initiates I/O. These fields are called execute channel program (EXCP) counts. (In a typical system most counts are not EXCP. This term is used for simplicity only.) There are two levels of EXCP counts, the DD level and the address space level. The type 30 record provides the address space level counts in the I/O Activity section and the DDLEVEL counts in the EXCP section. All other records provide only the DDLEVEL.

Note:

1. Most I/O is VSAM (that counts channel programs that are not done with EXCP), or BSAM, QSAM, or BPAM (that count blocks).
2. The I/O counts that are started by VSAM do not include data sets being accessed in cross memory or SRB mode.

DD Level

The DD level EXCP count includes:

- I/O for system services, for example:
  - Joblib/steplib processing
  - Jobcat/stepcat processing
  - Overlay supervisor processing
  - Checkpoint data set processing.
- Number of channel programs for VSAM data sets
- Number of channel programs for VSAM data sets (excludes VSAM extended format data sets)
- Number of 4K blocks for DIV objects (includes reads, writes, and re-reads)
- Starting a channel program from an EXCP macro (includes VIO, excludes BSAM, QSAM, BPAM on DASD)
- Starting a channel program from TCBEXCP macro (includes VIO, excludes BSAM, QSAM, BPAM on DASD)
- Starting a channel program from an EXCPVR macro (includes VIO, excludes BSAM, QSAM, BPAM on DASD)
- Starting a channel program in a system or user provided channel-end appendage
- Starting a channel program in an abnormal-end appendage
- EXCPs for VIO data sets
- EXCPs issued to the SYSUDUMP, SYSABEND, and SYSMDUMP data sets when these data sets reside on a direct access or tape device.

The DD level EXCP count does not include:

- EXCPs issued by the job entry subsystem
- TPUTs and TGETs handled by macro instructions (For TPUTs and TGETs, EXCPs are accumulated on a system basis and are contained in SMF record types 30, 32 (if detail is specified), 34 and 35 only.)
- I/O to or from spool

Only the type 6 and 26 SMF records contain counts for a job or step I/O activity to spool data sets managed by either job entry subsystem.

Type 30 and 64 records are data set oriented and may contain the EXCP count for one or more concurrent users.

Address Space Level

The address space level EXCP count in the type 30 record contains all of the I/O counts described for the DD level, plus the following:

- Library searches and fetches from data sets in the LINKLIST
- I/O initiated to the JES2 spool data sets from the address space being reported
- Catalog management I/O activity and VTOC and VTOC index I/O activity done by DADSM.
- OPEN and CLOSE I/O activity beyond priming and purging the buffers.
- For z/OS UNIX System Services, I/O activity for:
  - The physical file system
  - Pipes, including FIFO special files (named pipes)
  - Sockets, including the UNIX domain and INET

  The address space EXCP level excludes all of the I/O counts that the DD level excludes, plus the following:

  - Paging and swapping I/O activity
  - VTAM I/O activity
  - MSCC, OLTEP, and IOS retry.

Note:

1. In SMF record types 14 and 15, the EXCP count accumulates over the entire job step. Therefore, if a data set is opened and closed twice during a single job step, the count in the second record is the sum of all EXCPs for both uses of the data set. For multi-volume data sets (such as tape files), the EXCP count is accumulated over the volumes if all the volumes of the data set are mounted on the same device. If more than one device is used, the EXCP counts will not be cumulative.
2. The EXCP count in the last type 14 and 15 records for a given job step equals the corresponding entry for the data set in the type 4 and 34 records.
3. If concatenated data sets reside on the same physical device, the EXCP count is accumulated in the first data set entry having that device entry.
4. If SMF cannot acquire storage to expand the area where the EXCP count is maintained, only the existing data sets are counted.
5. If a data set is dynamically unallocated, the EXCP count is in record types 30 and 40; there is no EXCP-count entry in record types 4 and 34.

Chapter 11. CPU time

SMF record types 4, 5, 30, 32, 34 and 35 have fields that contain the job and job step CPU times. This topic summarizes the different times that are included and those that are excluded in these CPU-time fields. This topic lists a few examples of some of the major causes of CPU-time variation between different runs of the same job or job step.

Job step CPU time is the amount of time devoted by the central processing unit to the processing of instructions for a given job step. Job CPU time is the sum of job step CPU times for all of the steps in a given job. CPU timing is done on an address space basis. The accumulation of CPU time is separated into processing time under TCBs and processing time under SRBs.

Note: If you want to account for CPU time for a single TCB or SRB (rather than a whole address space), use either the TIMEUSED. Do not use a store CPU timer (STPT) instruction, which can cause incorrect (such as negative) values. Use TIMEUSED either under a TCB or an SRB. See the *z/OS MVS Programming: Authorized Assembler Services Reference SET-WTO* for more information on the TIMEUSED macro.

CPU Time Under TCBs

This topic describes times related to the Vector Facility, and times under TCBs that are included or excluded in CPU-time fields of certain SMF record types.

Vector Facility Time

If the current task uses the Vector Facility (VF), the system accumulates VF affinity time and VF usage time; these times are found in record type 30. VF affinity time is the job step time for tasks accumulated while the task had affinity to processors with the Vector Facility. This time is useful for capacity management of the Vector Facility. VF usage time, a subset of the VF affinity time, is the time that the task actually spent processing vector instructions. The units for VF affinity and VF usage time are the same units as TCB time. Use the TIMEUSED macro to get the vector time usage for individual TCBs.

Included/Excluded TCB Times

Timing values accumulated for the address space under TCB control include:

- Problem program time
- SVCs
- Lock spins encountered in an MP environment
- EMS (emergency signals between CPUs) interrupt occurring within a lock spin
- Abend/Abterm
- User SPIE and ESPIE exit processing.

Times excluded are:

- External interrupt time
- Page fault processing time, including resolving page faults from expanded storage
- CPU “stopped” time if the QUIESCE command is used
- Attention processing time for TSO/E.

The following times are excluded but are available in record type 30:

- I/O interrupt time (accumulated separately in SMF30IIP)
- Swap-out/swap-in processing and I/O error recovery processing (accumulated separately in SMF30RCT)
- Managing hiperspaces

- Program check handling.

CPU Time Under SRBs

This topic describes times under SRBs that are included or excluded in CPU-time fields of certain SMF record types.

Included/Excluded SRB Times

Timing values accumulated for the address space under SRB control include:

- Swap control
- Cross-memory communications
- Any supervisor service under SRB control
- Page stealing
- I/O completion processing
- Enclave timing.

Times excluded are:

- Lock request suspension
- Hiperspace management.

CPU-Time Variation

There are many reasons why CPU time varies between different runs of the same job or job step. The following list describes some of the major causes of variation:

- Cycle stealing on systems with integrated channels — CPU instruction processing is temporarily suspended when channels require the use of hardware resources shared with the CPU.
- CPUs using a high speed buffer — CPU time may vary due to any of the following:
  - Buffer interference caused by concurrent tasks
  - Partial or full disabling of a buffer because of storage errors
  - Translation lookaside buffer (TLB) affect on instruction processing rate.
- Storage access — The CPU cannot access central storage if a channel is using it. Storage-access time depends on CPU architecture such as interleaving, data widths and paths.
- DASD space allocation — If the number of extents is not exactly the same as before, additional end-of-extent processing is required.
- Temporary I/O errors — Additional processing may be required for temporary I/O errors.
- Expanded storage frame accesses — If a run has a different number of such accesses than another run, the CPU time may differ. Accessing expanded storage requires more time than central.
- BLDL/FIND requests — If BPAM is used extensively, CPU time for processing BLDL/FIND requests varies if there was change in the PDS directory. That is, a change in the location of the entry for the required member is reflected by a change in the time needed to find the block containing it.
- STOW processing — A difference in the PDS directory may vary STOW processing time because of the additional reordering or bumping that may be necessary.
- Macro processing — Processing time for macros such as LINK, LOAD, XCTL, ATTACH and BLDL is affected by where the requested module is located. For example, CPU time may be less if the module is in the LPA and JOBLIBS and STEPLIBS are not used.
- Availability of serially reusable resources (locks) — For example, the system ENQ routine time will vary depending on whether the resource is available. DEQ time increases if other tasks have subsequently requested the resource that the current task is releasing.

- Wait processing — CPU time varies depending on whether ECBs have been posted before issuing the WAIT macro instruction.
- Lock spins — If a job is run on an MP, CPU time may vary due to lock spins encountered in supervisor services.
- Queue searching — System service time varies with the status of the queue environment.
- Generalized trace facility (GTF) — When GTF is active, CPU time increases depending on the system functions (SVC, SSCH, IO, PCI, DSP) that are selected for current GTF recording. If USR functions are to be recorded and the application contains GTRACE macros, the CPU time variability is even more pronounced.
- System resource manager (SRM) — SRM processing may cause CPU time to vary when it is invoked from supervisor services that issue SYSEVENT, such as ENQ, WAIT (LONG=YES option), TPUT and TGET.
- Page stealing — Page stealing affects the number of page faults that a particular job incurs. CPU time varies depending on both the number of page faults resolved by I/O and the number of page faults resolved by reclaim.
- Sequential access method and chain scheduling — CPU time can vary from run to run depending on the amount of chain scheduling that was successful. The number of starts for I/O will vary under different system loads.
- MP-serialization — Contention for resources between CPs in a processor will vary.
- Branch tracing and mode tracing — These operations require additional processing.
- SLIP PER trap — Dealing with PER interrupts requires additional processing.

Chapter 12. IFAUSAGE — Collecting usage data

Any product or application can measure usage. If you are a software vendor or application owner, use the information in this topic to enable your software product to measure its usage, perhaps to participate in measured usage pricing.

The measurement function collects data using SMF record types 30 and 89. SMF record type 30 (Version 5 only) contains usage data for the product's address space. System-wide usage data for each product is recorded on SMF record type 89. The control and writing of these records is the same as for any SMF record type.

Collecting Your Own Data Using the IFAUSAGE Macro

MVS provides the IFAUSAGE macro for collecting usage data as CPU time. For products that need to collect some other type of usage data, IFAUSAGE also allows a product to define its own usage data. Information about the IFAUSAGE macro appears in this topic. The data that IFAUSAGE collects is periodically written in type 89 SMF records. See "Record type 89 (X'59') — Usage Data" on page 827 for a complete description.

IBM provides a program (IFAURP) to generate usage reports so that customers can send usage reports to product owners. Information about the usage report program appears in Reporting product information in *z/OS MVS Product Management*. The reports are generated using the data in the type 89 SMF records. If these reports are not sufficient for the needs of your product, you can provide an exit routine that the usage reporting program will call or you can process the type 89 records via a program you provide for that purpose.

Collecting Usage Data

First you must decide what usage data you need. The IFAUSAGE macro supports collection of the following:

- all CPU time for an address space
- all CPU time for a task
- CPU time for a function
- data other than CPU time for a function.

In all cases you must identify the product for which usage data is to be collected. Use REQUEST=REGISTER on the IFAUSAGE macro to identify the product and to begin data collection. Issue REQUEST=DEREGISTER to end data collection.

Requesting the Status of the Measurement Function

You can verify that SMF is active and that the installation has requested SMF record 89 by specifying REQUEST=STATUS on the IFAUSAGE macro. Two reasons for requesting status are:

- to warn the user if usage data is not being collected
- to stop your product from being used if usage data is not being collected.

Collecting CPU Time for an Address Space or Task

You might want to collect CPU time for an address space or task when all of the processing for the address space or task is product processing. If your product is the job step task, collect all CPU time for the address space. When your product runs under some other task, collect CPU time for that task.

Use macro IFAUSAGE with REQUEST=REGISTER to begin collection of CPU time. To collect CPU time for the task, specify DOMAIN=TASK. To collect CPU time for the address space, specify DOMAIN=ADDRSP. When data collection is complete, specify REQUEST=DEREGISTER on the IFAUSAGE macro.

Collecting CPU Time for a Function

Some products run in a user address space to perform services requested by the user. In this case, not all processing for the address space or task is product processing. For this type of product, you need to collect usage data on a function basis.

Let's use an I/O system as an example. The user issues a GET or PUT to transfer data. Before the first GET request, the user must issue an OPEN so that the I/O system can recognize requests. After the last GET or PUT, the user issues a CLOSE to indicate that processing is complete. The I/O subsystem could collect CPU time on a function basis by capturing the CPU time for each GET and PUT request, as Figure 42 on page 126 shows.

```
User issues OPEN
        Product issues IFAUSAGE REQUEST=REGISTER,SCOPE=FUNCTION
User issues GET
        Product issues IFAUSAGE REQUEST=FUNCTIONBEGIN
                .
                .product processing
                .
        Product issues IFAUSAGE REQUEST=FUNCTIONEND
User issues PUT
        Product issues IFAUSAGE REQUEST=FUNCTIONBEGIN
                .
                .product processing
                .
        Product issues IFAUSAGE REQUEST=FUNCTIONEND
                .
                .
                .other GETs and PUTs
                .
User issues CLOSE
         Product issues IFAUSAGE REQUEST=DEREGISTER
```

Figure 42. Example of how the I/O subsystem could collect CPU time on a function basis

Collecting Data Other Than CPU Time

You might need to collect resource usage data other than CPU time. Examples of usage data you might chose to collect are number of transactions or number of bytes of data transferred.

To collect data other than CPU time, you must register with SCOPE=FUNCTION. Provide the resource data for accumulation by first issuing IFAUSAGE with REQUEST=FUNCTIONBEGIN. Collect the resource data by issuing IFAUSAGE with REQUEST=FUNCTIONDATA, specifying the resource data and its format. When you select the data format, consider how large you expect the numbers to be. Selecting floating point format allows any size number to be represented. If you select a different format, wrapping is possible, so you should ensure the unit of measure is one that will preclude wrapping. Resource data values are collected by adding the current resource data value to the accumulated resource data value.

Collection Intervals

If you are performing your own usage data analysis, (perhaps through an exit routine you provide for IEAURP), you may need to analyze two records. If your customer does not specify interval synchronization and are collecting data at the task level, you may receive multiple type 89 records for the same reporting interval. Without synchronization, task data collection, which is invoked by SMF address space interval processing, might not coincide with type 89 record generation (although both may have the same interval value, such as 30 minutes).

Suppose task data collection is scheduled for 4:45 and 5:15, and type 89 record generation is scheduled for 5:00 and 5:30. Both are on a 30 minute interval, but not synchronized. It is possible that the 5:30 reporting interval will include usage data from both the 4:00 - 5:00 and the 5:00 - 6:00 usage data intervals. Because the usage reporting program presents product usage in hourly buckets, SMF generates two records for the 5:30 interval. The first represents usage for the 4:00 - 5:00 usage data interval and the second reflects usage for the 5:00 - 6:00 usage data interval.

There can also be multiple type 89 records for a given interval if the number of products to be reported causes the record to exceed the maximum allowable size (32,756 bytes). In this case, the information is continued on a subsequent record.

IFAUSAGE macro

IFAUSAGE identifies individual products as users of a system and identifies the type and level of usage data for each product. If you do not provide your own product-specific usage data, IFAUSAGE collects data that already exists in the system, generally CPU time. (See Chapter 11, "CPU time," on page 121 for detailed information about CPU time.) The usage reporting program analyzes the usage data and produces a report that contains identification and usage data for each product over specific intervals of time. Together, IFAUSAGE and the usage reporting program enable you to track product usage on a system or a sysplex basis, assuming that the system or systems are running SMF.

You identify a product to SMF by issuing the IFAUSAGE macro with the REQUEST=REGISTER parameter. You must register a product before issuing any of the other REQUEST parameters.

When you specify REQUEST=REGISTER, the system returns a token that you can use on subsequent request options. Specifying this token eliminates the need to specify the product registration information (PRODOWNER, PRODNAME, PRODVERS, PRODQUAL, and PRODID parameters). If you do not code the optional parameters PRODVERS, PRODQUAL, and PRODID on REQUEST=REGISTER and any subsequent requests, a blank field will appear in the corresponding report field. For the report program only, specifying PRODOWNER=NONE, PRODNAME=NONE, or PRODVERS=NONE, has the same effect as not coding the parameter at all.

When registering a product, you also can identify the scope of data you want to accumulate for the eventual report. For example, you can attribute all CPU time for an address space or for a task to a specified product.

If you choose to accumulate data for a task, you can further choose to record the product's use of resources on the REQUEST=FUNCTIONDATA parameter. In this case, IFAUSAGE starts collecting data only when you specify REQUEST=FUNCTIONBEGIN, and it ends when you specify REQUEST=FUNCTIONEND. Resources identified on the FUNCTIONDATA parameter are recorded in the SMF type 89 record. The report program, IFAURP, does not currently process the FUNCTIONDATA fields in the type 89 record or include the data in its report.

You cannot specify any of the other request options for a particular product once you have specified REQUEST=DEREGISTER for the product. When you specify REQUEST=DEREGISTER for a product, the system no longer collects usage data for this registration instance of the product. If other registrations for the product are still active, data recorded under those registrations continues to be collected. The system stops collecting data for the product only when there are no active registrations for the product.

Programs in both supervisor and problem state can issue the IFAUSAGE macro. However, programs running in problem state can only issue LINKAGE=SVC with the REQUEST=REGISTER or REQUEST=STATUS parameters. For problem state programs, IFAUSAGE allows only two REQUEST=REGISTER invocations for each domain specified on the DOMAIN parameter. Problem state callers must pass parameters in storage with the same key as the initial execution key of the job step or attached program.

Environment

The requirements for the caller are:

Minimum authorization:	Problem state and any PSW key. For LINKAGE=BRANCH, supervisor state. Problem state callers must pass parameters in storage with the same key as the initial execution key of the job step or attached program.
Dispatchable unit mode:	Task.

Cross memory mode:	PASN=HASN=SASN.
AMODE:	31- or 64-bit. If in AMODE 31, do not use the following parameters: BEGTIME64 CURRENTDATA64 DATA64 ENDDATA64 ENDTIME64 PRTOKEN64 If in AMODE 64, specify SYSSTATE AMODE64=YES before invoking this macro. Do not use the following parameters in AMODE 64: BEGTIME CURRENTDATA DATA ENDDATA ENDTIME PRTOKEN Callers in AMODE 64 may pass in parameter list and parameter list data that resides in 31-bit or 64-bit storage.
ASC mode:	Primary.
Interrupt status:	Enabled for I/O and external interrupts.
Locks:	No locks may be held.
Control parameters:	None.

Programming requirements

None.

Restrictions

IFAUSAGE supports multiple versions. Some keywords are unique to certain versions. For details, see the description of the PLISTVER parameter.

Input register information

Before issuing the IFAUSAGE macro with LINKAGE=BRANCH, the caller must ensure that the following general purpose registers (GPRs) contain the specified information:

Register
: **Contents**

13
: The address of a standard 72-byte save area

Before issuing the IFAUSAGE macro, the caller does not have to place any information into any access register (AR) unless using it in register notation for a particular parameter or using it as a base register.

Output register information

When control returns to the caller, the GPRs contain:

Register
: **Contents**

0
Unchanged

1
Used by the system

2 - 13
Unchanged

14
Used by the system (LINKAGE=BRANCH) or unchanged (LINKAGE=SVC)

15
Return code

When control returns to the caller, the ARs contain:

Register
Contents

0 - 15
Unchanged

Some callers depend on register contents remaining the same before and after issuing a service. If the system changes the contents of registers on which the caller depends, the caller must save them before issuing the service, and restore them after the system returns control.

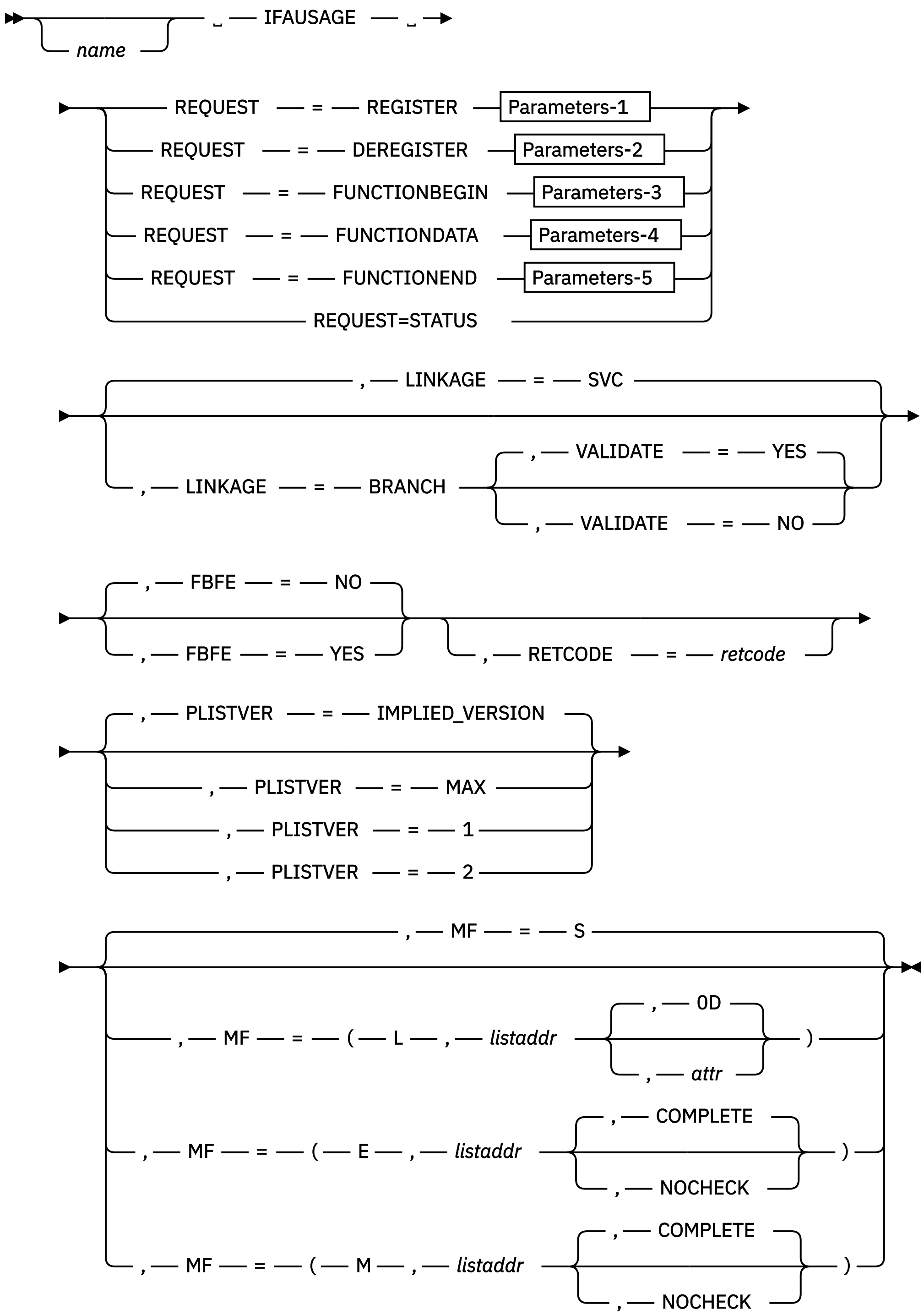
Performance implications

None.

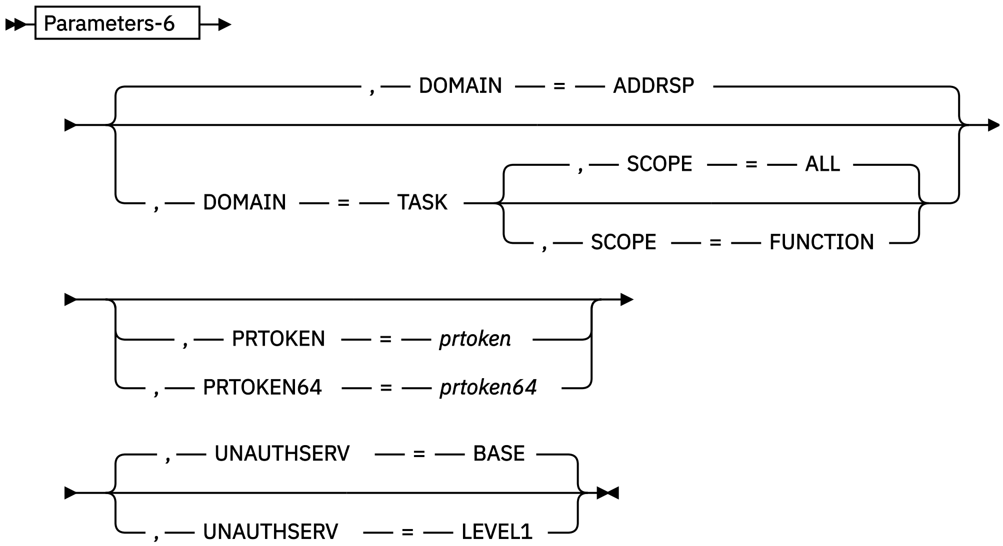
Syntax

The IFAUSAGE macro is written as follows:

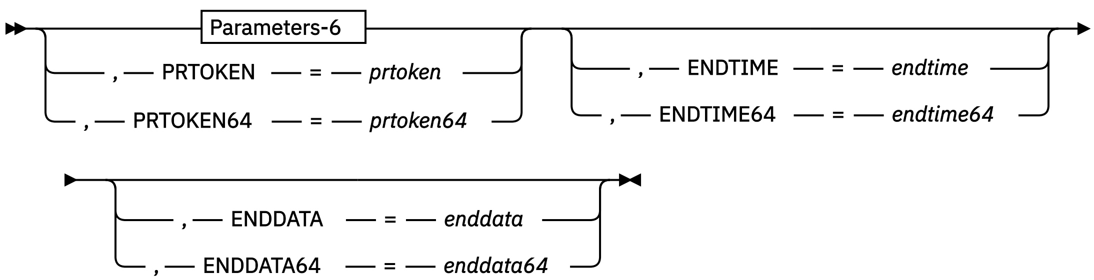
Main diagram



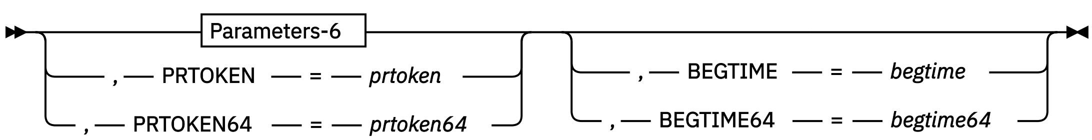
Parameters-1



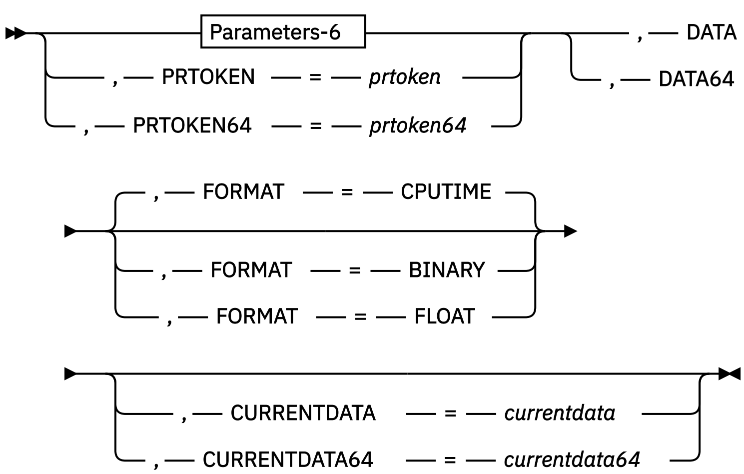
Parameters-2



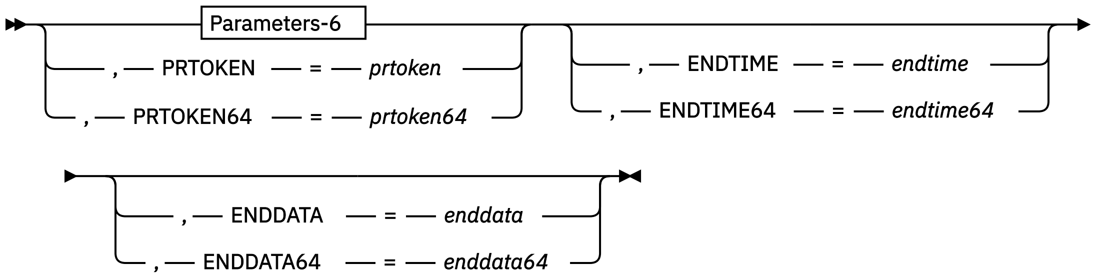
Parameters-3



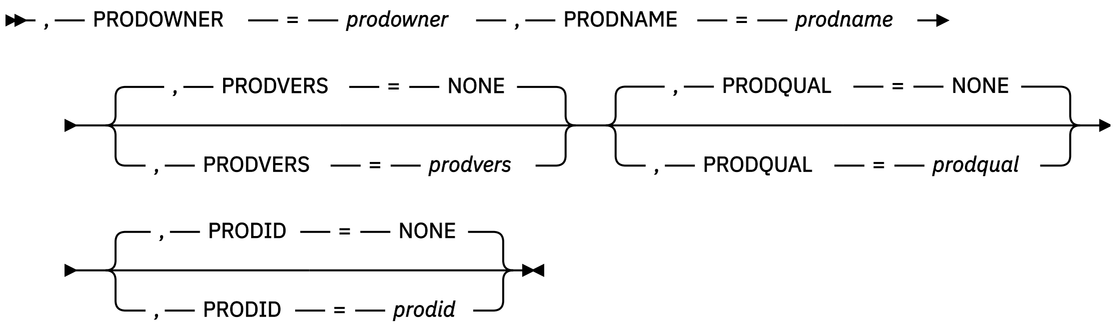
Parameters-4



Parameters-5



Parameters-6



Parameters that apply to all request types

name
An optional symbol, starting in column 1, that is the name on the IFAUSAGE macro invocation. The name must conform to the rules for an ordinary assembler language symbol.

REQUEST=REGISTER
REQUEST=DEREGISTER
REQUEST=FUNCTIONBEGIN
REQUEST=FUNCTIONDATA
REQUEST=FUNCTIONEND
REQUEST=STATUS
A required parameter that specifies the service to be invoked.

REQUEST=REGISTER
Specifies a request to identify a product for usage data collection and provide the domain and scope options to be used. See "Parameters for REQUEST=REGISTER" on page 135 for parameters that are specific to this request type.

REQUEST=DEREGISTER
Specifies a request to end data collection for the product in the current domain and scope. See "Parameters for REQUEST=DEREGISTER" on page 137 for parameters that are specific to this request type.

REQUEST=FUNCTIONBEGIN
Specifies a request to start collecting function-level data for the product in the current domain and scope. See "Parameters for REQUEST=FUNCTIONBEGIN" on page 138 for parameters that are specific to this request type.

REQUEST=FUNCTIONDATA
Specifies a request to provide product-specific usage data for the product in the current domain and scope. You must have issued a FUNCTIONBEGIN request before you can issue a FUNCTIONDATA request. See "Parameters for REQUEST=FUNCTIONDATA" on page 139 for parameters that are specific to this request type.

REQUEST=FUNCTIONEND
Specifies a request to stop collecting function-level data for the product in the current domain and scope. See "Parameters for REQUEST=FUNCTIONEND" on page 141 for parameters that are specific to this request type.

REQUEST=STATUS
Specifies a request to generate code which will check the status (available and active) of the usage data collection service and the installation recording request for the system-wide usage data record (type 89). The status is returned via a return code. The return code value will be in the variable specified by the RETCODE parameter, or in register 15 if the RETCODE parameter is not specified. For a list of the values that can be returned, see "Return codes" on page 143.

,LINKAGE=SVC
,LINKAGE=BRANCH
An optional parameter that specifies the type of linkage to be generated for the data collection service.

,LINKAGE=SVC
Requests that an SVC-type invocation of the service be generated.

,LINKAGE=BRANCH
Requests that direct CALL be used to invoke the service. Callers using LINKAGE=BRANCH must be in supervisor state.

Default: `,LINKAGE=SVC`

,VALIDATE=YES
,VALIDATE=NO
When LINKAGE=BRANCH is specified, an optional parameter that specifies whether certain validation (such as of the input token) is to be done.

,VALIDATE=YES
Requests that all validation be done.

,VALIDATE=NO
Requests that limited validation be done.

Default: `,VALIDATE=YES`

,FBFE=NO
,FBFE=YES
An optional parameter that specifies whether the caller intends to use FUNCTIONBEGIN and FUNCTIONEND processing to account for time. This keyword has no effect on internal processing.

,FBFE=NO
Specifies that FUNCTIONBEGIN and FUNCTIONEND will not be done.

,FBFE=YES
Specifies that FUNCTIONBEGIN and FUNCTIONEND will be done.

Default: `,FBFE=NO`

,RETCODE=*retcode*
An optional output parameter into which the return code is to be copied from GPR 15. If you specify 15, GPR15, REG15, or R15 (within or without parentheses), the value will be left in GPR 15.

To code: Specify the RS-type address of a fullword field, or register (2) - (12) or (15), (GPR15), (REG15), or (R15).

,PLISTVER=IMPLIED_VERSION
,PLISTVER=MAX
,PLISTVER=1
,PLISTVER=2
An optional input parameter that specifies the version of the macro. PLISTVER determines which parameter list the system generates. PLISTVER is an optional input parameter on all forms of the macro, including the list form. When using PLISTVER, specify it on all macro forms used for a request and with the same value on all of the macro forms. The values are:

IMPLIED_VERSION
Specifies the lowest version that allows all parameters specified on the request to be processed. If you omit the PLISTVER parameter, IMPLIED_VERSION is the default.

MAX
Specifies that the parameter list is to be the largest size currently possible. This size might grow from release to release and affect the amount of storage that your program needs.

If you can tolerate the size change, IBM recommends that you always specify PLISTVER=MAX on the list form of the macro. Specifying MAX ensures that the list-form parameter list is always long enough to hold all the parameters you might specify on the execute form when both are assembled with the same level of the system. In this way, MAX ensures that the parameter list does not overwrite nearby storage.

1
Supports all parameters except those specifically referenced in higher versions.

2
Supports the following parameters and those from version 1:

BEGTIME64
CURRENTDATA64
DATA64
ENDDATA64
ENDTIME64
PRTOKEN64

To code: Specify one of the following:

- IMPLIED_VERSION
- MAX
- A decimal value of 1 or 2

,MF=S
,MF=(L,*listaddr*)
,MF=(L,*listaddr*,*attr*)
,MF=(L,*listaddr*,0D)
,MF=(E,*listaddr*)
,MF=(E,*listaddr*,COMPLETE)
,MF=(E,*listaddr*,NOCHECK)
,MF=(M,*listaddr*)
,MF=(M,*listaddr*,COMPLETE)
,MF=(M,*listaddr*,NOCHECK)
An optional input parameter that specifies the macro form.

Use MF=S to specify the standard form of the macro, which builds an inline parameter list and generates the macro invocation to transfer control to the service. MF=S is the default.

Use MF=L to specify the list form of the macro. Use the list form together with the execute form of the macro for applications that require reentrant code. The list form defines an area of storage that the execute form uses to store the parameters. Only the PLISTVER parameter may be coded with the list form of the macro.

Use MF=E to specify the execute form of the macro. Use the execute form together with the list form of the macro for applications that require reentrant code. The execute form of the macro stores the parameters into the storage area defined by the list form and generates the macro invocation to transfer control to the service.

Use MF=M together with the list and execute forms of the macro for service routines that need to provide different options according to user-provided input. Use the list form to define a storage area; use the modify form to set the appropriate options; then use the execute form to call the service.

IBM recommends that you use the modify and execute forms of IFAUSAGE in the following order:

1. Use IFAUSAGE ...,MF=(M,*listaddr*,COMPLETE), specifying appropriate parameters, including all required ones.
2. Use IFAUSAGE ...,MF=(M,*listaddr*,NOCHECK), specifying the parameters that you want to change.

3. Use IFAUSAGE ...,MF=(E,*listaddr*,NOCHECK),to execute the macro.

listaddr
The name of a storage area to contain the parameters. For MF=S, MF=E, and MF=M, this can be an RS-type address or an address in register (1) - (12).

attr
An optional 1- to 60-character input string that you use to force boundary alignment of the parameter list. Use a value of 0F to force the parameter list to a word boundary, or 0D to force the parameter list to a doubleword boundary. If you do not code *attr*, the system provides a value of 0D.

COMPLETE
Specifies that the system is to check for required parameters and supply defaults for omitted optional parameters.

NOCHECK
Specifies that the system is not to check for required parameters and is not to supply defaults for omitted optional parameters.

Parameters for REQUEST=REGISTER

When you specify REQUEST=REGISTER, the following parameters apply:

,PRODOWNER=*prodowner*
A required input parameter that contains the product's owner or vendor name for this request. For instance, IBM products use the character string "IBM CORP."

To code: Specify the RS-type address or address in register (2) - (12) of a 16-character field.

,PRODNAME=*prodname*
A required input parameter that contains the name of the product for this request.

To code: Specify the RS-type address or address in register (2) - (12) of a 16-character field.

,PRODVERS=NONE
,PRODVERS=*prodvers*
An optional input parameter that contains the version of the product for the request.

Default: NONE

To code: Specify the RS-type address or address in register (2) - (12) of an 8-character field.

,PRODQUAL=NONE
,PRODQUAL=*prodqual*
An optional input parameter that contains the qualifier of the product for the request. You might wish to use this parameter when there are multiple iterations of the same product running on one system and you want to record usage data for each iteration, rather than grouping all product usage together. If a product is running multiple times on a specific system, you can record usage based on individual system use of the product. A subsystem product could use the subsystem name as the qualifier under which each copy of the product runs.

Default: NONE

To code: Specify the RS-type address or address in register (2) - (12) of an 8-character field.

,PRODID=NONE
,PRODID=*prodid*
An optional input parameter that contains the ID of the product (for instance, the product ID (PID) number) for the request.

Default: NONE

To code: Specify the RS-type address or address in register (2) - (12) of an 8-character field.

,DOMAIN=<u>ADDRSP</u>
,DOMAIN=TASK

An optional parameter that specifies the level of data to be collected for the product.

,DOMAIN=ADDRSP
Requests data collection at the address space level.

,DOMAIN=TASK
Requests data collection for the current task.

Default: `,DOMAIN=ADDRSP`

,SCOPE=<u>ALL</u>
,SCOPE=FUNCTION

An optional parameter that specifies the level of data collection within the task that is being requested.

,SCOPE=ALL
Requests that all the CPU time in the task be associated with the requesting product.

,SCOPE=FUNCTION
Requests that only the CPU time that is accumulated during the invocation of the FUNCTIONBEGIN and FUNCTIONEND requests be associated with this product. Additional invocations of the IFAUSAGE macro for FUNCTIONBEGIN and FUNCTIONEND requests is expected.

Default: `,SCOPE=ALL`

,PRTOKEN=*prtoken*
,PRTOKEN64=*prtoken64*

An optional output parameter into which the service will place a usage product token that can be used in subsequent service invocations. Using the token provides a shortened path length on those requests (eliminating the need to specify PRODNAME, PRODVERS, PRODOWNER, PRODQUAL, and PRODID each time), but is not required.

,PRTOKEN=*prtoken*
A parameter variable to hold the usage product token when invoking IFAUSAGE in AMODE 31. The parameter value must reside in 31-bit storage.

,PRTOKEN64=*prtoken64*
A parameter variable to hold the usage product token when invoking IFAUSAGE in AMODE 64. The parameter value may reside in 31-bit or 64-bit storage.

To code: Specify the RS-type address or address in register (2) - (12) of an 8-character field.

,UNAUTHSERV=<u>BASE</u>
,UNAUTHSERV=LEVEL1

An optional parameter that specifies the level of authorized services to which the unauthorized caller requires access.

Authorized callers can use all services without SAF authorization, and may use the LINKAGE=BRANCH interface.

,UNAUTHSERV=BASE
Specifies that an unauthorized caller does not need access to any IFAUSAGE services other than REGISTER and STATUS. Unauthorized callers that do not have SAF authorization are limited to two IFAUSAGE REGISTER requests per address space.

,UNAUTHSERV=LEVEL1
Specifies that an unauthorized caller requires access to IFAUSAGE services that are available to authorized callers. These services include DEREGISTER, FUNCTIONBEGIN, FUNCTIONDATA, and FUNCTIONEND. The unauthorized caller may also issue more than two IFAUSAGE REGISTER requests per address space.

The SAF facility is used to validate that the installation has authorized the user ID associated with this job or task to use LEVEL1 features. The user ID must have READ access to the

IFAUSAGE.*prodowner*.*prodname*.*prodqual*.*prodid* profile in the XFACILIT class. The *prodowner*, *prodname*, *prodqual*, and *prodid* are translated to upper case, and any special characters are translated to an underscore (_). Any fields that are blank are not represented in the profile name.

Default: ,UNAUTHSERV=BASE

Parameters for REQUEST=DEREGISTER

When you specify REQUEST=DEREGISTER, the following parameters apply:

,PRODOWNER=*prodowner*
,PRTOKEN=*prtoken*
,PRTOKEN64=*prtoken64*

A mutually exclusive set of required input parameters.

,PRODOWNER=*prodowner*

A parameter that contains the product's owner or vendor name for this request. You cannot specify PRODOWNER if you specify PRTOKEN or PRTOKEN64.

To code: Specify the RS-type address or address in register (2) - (12) of a 16-character field.

,PRTOKEN=*prtoken*

A parameter that contains the name of the product token that was returned on the associated REGISTER request when invoking IFAUSAGE in AMODE 31. The parameter value must reside in 31-bit storage. You cannot specify PRTOKEN if you specify PRODOWNER or PRTOKEN64.

To code: Specify the RS-type address or address in register (2) - (12) of an 8-character field.

,PRTOKEN64=*prtoken64*

A parameter that contains the name of the product token that was returned on the associated REGISTER request when invoking IFAUSAGE in AMODE 64. The parameter value may reside in 31-bit or 64-bit storage. You cannot specify PRTOKEN64 if you specify PRODOWNER or PRTOKEN.

To code: Specify the RS-type address or address in register (2) - (12) of an 8-character field.

,PRODNAME=*prodname*

When PRODOWNER=*prodowner* is specified, a required input parameter that contains the name of the product for this request. You must specify PRODNAME if you specify PRODOWNER. You cannot specify PRODNAME if you specify PRTOKEN or PRTOKEN64.

To code: Specify the RS-type address or address in register (2) - (12) of a 16-character field.

,PRODVERS=NONE
,PRODVERS=*prodvers*

When PRODOWNER=*prodowner* is specified, an optional input parameter that contains the version of the product for the request. You can only specify PRODVERS if you specify PRODOWNER. You cannot specify PRODVERS if you specify PRTOKEN or PRTOKEN64.

Default: NONE

To code: Specify the RS-type address or address in register (2) - (12) of an 8-character field.

,PRODQUAL=NONE
,PRODQUAL=*prodqual*

When PRODOWNER=*prodowner* is specified, an optional input parameter that contains the qualifier of the product for the request. You can only specify PRODQUAL if you specify PRODOWNER. You cannot specify PRODQUAL if you specify PRTOKEN or PRTOKEN64.

Default: NONE

To code: Specify the RS-type address or address in register (2) - (12) of an 8-character field.

,PRODID=NONE
,PRODID=*prodid*
When PRODOWNER=*prodowner* is specified, an optional input parameter that contains the ID of the product (for instance, the product ID (PID) number) for the request. You can only specify PRODID if you specify PRODOWNER. You cannot specify PRODID if you specify PRTOKEN or PRTOKEN64.

Default: NONE

To code: Specify the RS-type address or address in register (2) - (12) of an 8-character field.

,ENDTIME=*endtime*
,ENDTIME64=*endtime64*
An optional output parameter into which IFAUSAGE returns the amount of TCB time, from the time you issued the REGISTER request, or the time the task has run up to the time you issue the DEREGISTER request.

,ENDTIME=*endtime*
Use this parameter when invoking IFAUSAGE in AMODE 31. The parameter value must reside in 31-bit storage.

,ENDTIME64=*endtime64*
Use this parameter when invoking IFAUSAGE in AMODE 64. The parameter value may reside in 31-bit or 64-bit storage.

To code: Specify the RS-type address or address in register (2) - (12) of an 8-character field.

,ENDDATA=*enddata*
,ENDDATA64=*enddata64*
An optional output parameter into which IFAUSAGE returns data accumulated by all FUNCTIONDATA requests for the product recorded under this domain since the REGISTER request.

,ENDDATA=*enddata*
Use this parameter when invoking IFAUSAGE in AMODE 31. The parameter value must reside in 31-bit storage.

,ENDDATA64=*enddata64*
Use this parameter when invoking IFAUSAGE in AMODE 64. The parameter value may reside in 31-bit or 64-bit storage.

To code: Specify the RS-type address or address in register (2) - (12) of an 8-character field.

Parameters for REQUEST=FUNCTIONBEGIN

When you specify REQUEST=FUNCTIONBEGIN, the following parameters apply:

,PRODOWNER=*prodowner*
,PRTOKEN=*prtoken*
,PRTOKEN64=*prtoken64*
A mutually exclusive set of required input parameters.

,PRODOWNER=*prodowner*
A parameter that contains the product's owner or vendor name for this request. You cannot specify PRODOWNER if you specify PRTOKEN or PRTOKEN64.

To code: Specify the RS-type address or address in register (2) - (12) of a 16-character field.

,PRTOKEN=*prtoken*
A parameter that contains the name of the product token that was returned on the associated REGISTER request when invoking IFAUSAGE in AMODE 31. The parameter value must reside in 31-bit storage. You cannot specify PRTOKEN if you specify PRODOWNER or PRTOKEN64.

To code: Specify the RS-type address or address in register (2) - (12) of an 8-character field.

,PRTOKEN64=*prtoken64*
A parameter that contains the name of the product token that was returned on the associated REGISTER request when invoking IFAUSAGE in AMODE 64. The parameter value may reside in 31-bit or 64-bit storage. You cannot specify PRTOKEN64 if you specify PRODOWNER or PRTOKEN.

To code: Specify the RS-type address or address in register (2) - (12) of an 8-character field.

,PRODNAME=*prodname*
When PRODOWNER=*prodowner* is specified, a required input parameter that contains the name of the product for this request. You must specify PRODNAME if you specify PRODOWNER. You cannot specify PRODNAME if you specify PRTOKEN or PRTOKEN64.

To code: Specify the RS-type address or address in register (2) - (12) of a 16-character field.

,PRODVERS=NONE
,PRODVERS=*prodvers*
When PRODOWNER=*prodowner* is specified, an optional input parameter that contains the version of the product for the request. You can only specify PRODVERS if you specify PRODOWNER. You cannot specify PRODVERS if you specify PRTOKEN or PRTOKEN64.

Default: NONE

To code: Specify the RS-type address or address in register (2) - (12) of an 8-character field.

,PRODQUAL=NONE
,PRODQUAL=*prodqual*
When PRODOWNER=*prodowner* is specified, an optional input parameter that contains the qualifier of the product for the request. You can only specify PRODQUAL if you specify PRODOWNER. You cannot specify PRODQUAL if you specify PRTOKEN or PRTOKEN64.

Default: NONE

To code: Specify the RS-type address or address in register (2) - (12) of an 8-character field.

,PRODID=NONE
,PRODID=*prodid*
When PRODOWNER=*prodowner* is specified, an optional input parameter that contains the ID of the product (for instance, the product ID (PID) number) for the request. You can only specify PRODID if you specify PRODOWNER. You cannot specify PRODID if you specify PRTOKEN or PRTOKEN64.

Default: NONE

To code: Specify the RS-type address or address in register (2) - (12) of an 8-character field.

,BEGTIME=*begtime*
,BEGTIME64=*begtime64*
An optional output parameter into which IFAUSAGE returns the beginning CPU time for the product.

,BEGTIME=*begtime*
Use this parameter when invoking IFAUSAGE in AMODE 31. The parameter value must reside in 31-bit storage.

,BEGTIME64=*begtime64*
Use this parameter when invoking IFAUSAGE in AMODE 64. The parameter value may reside in 31-bit or 64-bit storage.

To code: Specify the RS-type address or address in register (2) - (12) of an 8-character field.

Parameters for REQUEST=FUNCTIONDATA

When you specify REQUEST=FUNCTIONDATA, the following parameters apply:

,PRODOWNER=*prodowner*
,PRTOKEN=*prtoken*
,PRTOKEN64=*prtoken64*
A mutually exclusive set of required input parameters.

,PRODOWNER=*prodowner*
A parameter that contains the product's owner or vendor name for this request. You cannot specify PRODOWNER if you specify PRTOKEN or PRTOKEN64.

To code: Specify the RS-type address or address in register (2) - (12) of a 16-character field.

,PRTOKEN=*prtoken*
A parameter that contains the name of the product token that was returned on the associated REGISTER request when invoking IFAUSAGE in AMODE 31. The parameter value must reside in 31-bit storage. You cannot specify PRTOKEN if you specify PRODOWNER or PRTOKEN64.

To code: Specify the RS-type address or address in register (2) - (12) of an 8-character field.

,PRTOKEN64=*prtoken64*
A parameter that contains the name of the product token that was returned on the associated REGISTER request when invoking IFAUSAGE in AMODE 64. The parameter value may reside in 31-bit or 64-bit storage. You cannot specify PRTOKEN64 if you specify PRODOWNER or PRTOKEN.

To code: Specify the RS-type address or address in register (2) - (12) of an 8-character field.

,PRODNAME=*prodname*
When PRODOWNER=*prodowner* is specified, a required input parameter that contains the name of the product for this request. You must specify PRODNAME if you specify PRODOWNER. You cannot specify PRODNAME if you specify PRTOKEN or PRTOKEN64.

To code: Specify the RS-type address or address in register (2) - (12) of a 16-character field.

,PRODVERS=NONE
,PRODVERS=*prodvers*
When PRODOWNER=*prodowner* is specified, an optional input parameter that contains the version of the product for the request. You can only specify PRODVERS if you specify PRODOWNER. You cannot specify PRODVERS if you specify PRTOKEN or PRTOKEN64.

Default: NONE

To code: Specify the RS-type address or address in register (2) - (12) of an 8-character field.

,PRODQUAL=NONE
,PRODQUAL=*prodqual*
When PRODOWNER=*prodowner* is specified, an optional input parameter that contains the qualifier of the product for the request. You can only specify PRODQUAL if you specify PRODOWNER. You cannot specify PRODQUAL if you specify PRTOKEN or PRTOKEN64.

Default: NONE

To code: Specify the RS-type address or address in register (2) - (12) of an 8-character field.

,PRODID=NONE
,PRODID=*prodid*
When PRODOWNER=*prodowner* is specified, an optional input parameter that contains the ID of the product (for instance, the product ID (PID) number) for the request. You can only specify PRODID if you specify PRODOWNER. You cannot specify PRODID if you specify PRTOKEN or PRTOKEN64.

Default: NONE

To code: Specify the RS-type address or address in register (2) - (12) of an 8-character field.

,DATA=*data*
,DATA64=*data64*
A required input parameter that contains the resource data you want to accumulate. Fixed data should right-justified and padded with zeros.

,DATA=*data*
Use this parameter when invoking IFAUSAGE in AMODE 31. The parameter value must reside in 31-bit storage.

,DATA64=*data64*
Use this parameter when invoking IFAUSAGE in AMODE 64. The parameter value may reside in 31-bit or 64-bit storage.

To code: Specify the RS-type address or address in register (2) - (12) of an 8-character field.

,FORMAT=CPUTIME
,FORMAT=BINARY
,FORMAT=FLOAT
An optional input parameter that specifies the data type of the value in the DATA or DATA64 parameter.

,FORMAT=CPUTIME
The value in the DATA parameter is a CPU time in STCK format.

,FORMAT=BINARY
The value in the DATA parameter is in 64-bit binary format.

,FORMAT=FLOAT
The value in the DATA parameter is in long floating-point hexadecimal format.

,CURRENTDATA=*currentdata*
,CURRENTDATA64=*currentdata64*
An optional output parameter into which IFAUSAGE returns the data accumulated by this and previous FUNCTIONDATA requests.

,CURRENTDATA=*currentdata*
Use this parameter when invoking IFAUSAGE in AMODE 31. The parameter value must reside in 31-bit storage.

,CURRENTDATA64=*currentdata64*
Use this parameter when invoking IFAUSAGE in AMODE 64. The parameter value may reside in 31-bit or 64-bit storage.

To code: Specify the RS-type address or address in register (2) - (12) of an 8-character field.

Parameters for REQUEST=FUNCTIONEND

When you specify REQUEST=FUNCTIONEND, the following parameters apply:

,PRODOWNER=*prodowner*
,PRTOKEN=*prtoken*
,PRTOKEN64=*prtoken64*
A mutually exclusive set of required input parameters.

,PRODOWNER=*prodowner*
A parameter that contains the product's owner or vendor name for this request. You cannot specify PRODOWNER if you specify PRTOKEN or PRTOKEN64.

To code: Specify the RS-type address or address in register (2) - (12) of a 16-character field.

,PRTOKEN=*prtoken*
A parameter that contains the name of the product token that was returned on the associated REGISTER request when invoking IFAUSAGE in AMODE 31. The parameter value must reside in 31-bit storage. You cannot specify PRTOKEN if you specify PRODOWNER or PRTOKEN64.

To code: Specify the RS-type address or address in register (2) - (12) of an 8-character field.

,PRTOKEN64=*prtoken64*
A parameter that contains the name of the product token that was returned on the associated REGISTER request when invoking IFAUSAGE in AMODE 64. The parameter value may reside in 31-bit or 64-bit storage. You cannot specify PRTOKEN64 if you specify PRODOWNER or PRTOKEN.

To code: Specify the RS-type address or address in register (2) - (12) of an 8-character field.

,PRODNAME=*prodname*
When PRODOWNER=*prodowner* is specified, a required input parameter that contains the name of the product for this request. You must specify PRODNAME if you specify PRODOWNER. You cannot specify PRODNAME if you specify PRTOKEN or PRTOKEN64.

To code: Specify the RS-type address or address in register (2) - (12) of a 16-character field.

,PRODVERS=NONE
,PRODVERS=*prodvers*
When PRODOWNER=*prodowner* is specified, an optional input parameter that contains the version of the product for the request. You can only specify PRODVERS if you specify PRODOWNER. You cannot specify PRODVERS if you specify PRTOKEN or PRTOKEN64.

Default: `NONE`

To code: Specify the RS-type address or address in register (2) - (12) of an 8-character field.

,PRODQUAL=NONE
,PRODQUAL=*prodqual*
When PRODOWNER=*prodowner* is specified, an optional input parameter that contains the qualifier of the product for the request. You can only specify PRODQUAL if you specify PRODOWNER. You cannot specify PRODQUAL if you specify PRTOKEN or PRTOKEN64.

Default: `NONE`

To code: Specify the RS-type address or address in register (2) - (12) of an 8-character field.

,PRODID=NONE
,PRODID=*prodid*
When PRODOWNER=*prodowner* is specified, an optional input parameter that contains the ID of the product (for instance, the product ID (PID) number) for the request. You can only specify PRODID if you specify PRODOWNER. You cannot specify PRODID if you specify PRTOKEN or PRTOKEN64.

Default: `NONE`

To code: Specify the RS-type address or address in register (2) - (12) of an 8-character field.

,ENDTIME=*endtime*
,ENDTIME64=*endtime64*
An optional output parameter into which IFAUSAGE returns the current accumulation of CPU time for the product since the FUNCTIONBEGIN request was issued.

,ENDTIME=*endtime*
Use this parameter when invoking IFAUSAGE in AMODE 31. The parameter value must reside in 31-bit storage.

,ENDTIME64=*endtime64*
Use this parameter when invoking IFAUSAGE in AMODE 64. The parameter value may reside in 31-bit or 64-bit storage.

To code: Specify the RS-type address or address in register (2) - (12) of an 8-character field.

,ENDDATA=*enddata*
,ENDDATA64=*enddata64*
An optional output parameter into which IFAUSAGE returns the current accumulation of resource data for the product since the FUNCTIONBEGIN request was issued.

,ENDDATA=*enddata*
Use this parameter when invoking IFAUSAGE in AMODE 31. The parameter value must reside in 31-bit storage.

,ENDDATA64=*enddata64*
Use this parameter when invoking IFAUSAGE in AMODE 64. The parameter value may reside in 31-bit or 64-bit storage.

To code: Specify the RS-type address or address in register (2) - (12) of an 8-character field.

ABEND codes

IFAUSAGE may issue system completion (ABEND) code 655. For details, see *z/OS MVS System Codes*.

Return codes

When the IFAUSAGE macro returns control to your program, GPR 15 (and *retcode*, when you code the RETCODE parameter) contains a return code.

The following table identifies the hexadecimal return codes.

Table 8. Return codes and reason codes for the IFAUSAGE macro

Return code	Meaning and action
00	**Meaning**: The IFAUSAGE request completed successfully. **Action**: None.
04	**Meaning**: The error is due to one of the following conditions: • **REGISTER** — Another product has already registered for the domain specified on the DOMAIN parameter. IFAUSAGE records the data for both products. **Action**: No action is necessary. However, you may receive duplicate data for each product. • **FUNCTIONDATA** — The data format specified on the FORMAT parameter of the FUNCTIONDATA request does not match the format specified by a previous caller. All subsequent invocations of REQUEST=FUNCTIONDATA must specify the same data format as the first caller. **Action**: Check usage records or read SMF type 89 records to identify the specified data format. Ensure that you specify the same format on the FORMAT parameter on any subsequent invocations of REQUEST=FUNCTIONDATA. • **STATUS** — You specified REQUEST=STATUS, but the installation is not collecting SMF record type 89. **Action**: Ensure that the installation intends to collect type 89 records. If it does not, do not issue IFAUSAGE. If the installation does intend to collect type 89 records, check with your installation programmer that the record type is specified in the SMFPRMxx parmlib member.

Table 8. Return codes and reason codes for the IFAUSAGE macro (continued)	
Return code	**Meaning and action**
08	**Meaning**: The error is due to one of the following conditions: • **REGISTER** — The unauthorized request would have caused the unauthorized request limit to be exceeded; IFAUSAGE cannot process more than two unauthorized (problem state) program invocations of REQUEST=REGISTER for a domain. **Action**: Do not specify REQUEST=REGISTER more than two times for any specific domain. • **DEREGISTER** — The caller issued a DEREGISTER request for a product for which a prior REGISTER request has not been issued. **Action**: Issue IFAUSAGE with the REQUEST=REGISTER parameter to identify the product to the system for usage data collection. • **FUNCTIONBEGIN** — The caller issued a FUNCTIONBEGIN request for a product for which a prior REGISTER request has not been issued. **Action**: Issue IFAUSAGE with the REQUEST=REGISTER parameter to identify the product to the system for usage data collection. • **FUNCTIONDATA** — The caller issued a FUNCTIONDATA request for a product for which a prior FUNCTIONBEGIN request has not been issued. **Action**: Issue IFAUSAGE with the REQUEST=FUNCTIONBEGIN parameter to identify the function to the system for usage data collection. • **FUNCTIONEND** — The caller issued a FUNCTIONEND request for a product for which a prior FUNCTIONBEGIN request has not been issued. **Action**: Issue IFAUSAGE with the REQUEST=FUNCTIONBEGIN parameter to identify the function to the system for usage data collection. **Note:** This return code also results if the specification of the PRODOWNER, PRODNAME, PROVERS, PRODQUAL, or PRODID parameter on a DEREGISTER, FUNCTIONBEGIN, FUNCTIONDATA, or FUNCTIONEND request does not match the parameter coded on the associated REGISTER request.
12	**Meaning**: The PRTOKEN parameter specifies a token that the system cannot identify; the token is not defined. **Action**: Check your specification of the PRTOKEN parameter and ensure that it is the same token returned by the REGISTER request. Also verify that the REGISTER request completed with a return code of 0.
16	**Meaning**: IFAUSAGE cannot complete processing because the SMF usage data collection function is not available on this system. **Action**: Do not issue the IFAUSAGE macro on this system.
20	**Meaning**: The error is due to one of the following conditions: • **REGISTER, DEREGISTER, FUNCTIONBEGIN, FUNCTIONDATA, or FUNCTIONEND** — The current task environment does not support usage data collection. This only applies to invocations from system tasks (those tasks at or above the initiator task in an address space) or tasks in system address spaces where the TCB does not have a valid SMF Timing Control table as indicated by TCBTCT=0. This table is necessary to store Usage Data information. **Action**: Do not issue the IFAUSAGE macro from this task. • An internal parameter error was detected. Record the return code and contact IBM Support.
24	**Meaning**: A REGISTER request was specified with the UNAUTHSERV=LEVEL1 keyword to enable all services for an unauthorized caller, but the SAF resource check failed. **Action**: Ensure that the SAF resource profile exists and that the user ID associated with this program is permitted to that resource.
28	**Meaning**: An unauthorized program specified REQUEST=REGISTER,UNAUTHSERV=LEVEL1,DOMAIN=ADDRSP while running in an address space with multiple SAF environments established.

IFAUSAGE – List Form

Use the list form of the IFAUSAGE macro together with the execute form of the macro for applications that require reentrant code. The list form of the macro defines an area of storage, which the execute form of the macro uses to contain the parameters.

The list form of the IFAUSAGE macro is written as follows.

name	*name:* symbol. Begin *name* in column 1.
ƀ	One or more blanks must precede IFAUSAGE.
IFAUSAGE	
ƀ	One or more blanks must follow IFAUSAGE.
MF=(L,*list addr*)	*list addr:* symbol.
MF=(L,*list addr,attr*)	*attr:* 1- to 60-character input string.
MF=(L,*list addr*,0D)	**Default:** 0D

The parameters are explained under the standard form of the IFAUSAGE macro with the following exception:

MF=(L,*list addr*)
MF=(L,*list addr,attr*)
MF=(L,*list addr*,0D)
Specifies the list form of the IFAUSAGE macro.

list addr is the name of a storage area to contain the parameters.

attr is an optional 1- to 60-character input string, which can contain any value that is valid on an assembler DS pseudo-op. You can use this parameter to force boundary alignment of the parameter list. If you do not code *attr*, the system provides a value of 0D, which forces the parameter list to a doubleword boundary.

IFAUSAGE – Execute Form

Use the execute form of the IFAUSAGE macro together with the list form of the macro for applications that require reentrant code. The execute form of the macro stores the parameters into the storage area defined by the list form.

The execute form of the IFAUSAGE macro is written as follows:

name	*name:* symbol. Begin *name* in column 1.
ƀ	One or more blanks must precede IFAUSAGE.
IFAUSAGE	

ƀ	One or more blanks must follow IFAUSAGE.
	The parameters on the execute form are identical to those on the standard form with the exception of the MF and COMPLETE parameters.
,MF=(E,*list addr*)	*list addr:* RX-type address or address in register (2) - (12).
,MF=(E,*list addr*,COMPLETE)	**Default:** COMPLETE

The parameters are explained under the standard form of the IFAUSAGE macro with the following exception:

,MF=(E,*list addr*)
,MF=(E,*list addr*,COMPLETE)

Specifies the execute form of the IFAUSAGE macro.

list addr specifies the area that the system uses to contain the parameters.

COMPLETE, which is the default, specifies that the system is to check for required parameters and supply defaults for omitted optional parameters.

Chapter 13. Signing and validating SMF records

You can use digital signatures to detect a change, addition, or removal of an SMF record from a group of records. Using industry standard encryption methods, digital signatures provide a built-in mechanism to validate SMF records, providing protection and verification for your SMF data.

Overview of digital signatures and SMF

This topic describes what digital signatures are and how SMF uses them to sign records.

What are digital signatures?

Digital signatures provide a way to ensure the source and validity of data using a public/private key pair.

- The signer hashes the data and then encrypts the hash using the signer's private key. The encrypted hash is the signature.
- A consumer can hash the same data and decrypt the signature using the public key to obtain the signer's hash. The hashes can then be compared.
- When the consumer's hash value matches the signer's decrypted hash value, the data is considered to be verified. If the hashes do not match, it indicates that some form of data corruption or tampering has occurred.

How SMF digitally signs records

SMF data is signed on its way to the system logger.

- As each record is written to the log stream, it is hashed. SMF maintains a running hash for each unique record type and subtype.
- Periodically, SMF digitally signs the hash by encrypting it with the private key, and writes the signature data to the log stream as a signature record.
- On the global interval, SMF creates a signature for all of the data hashed during the interval (again using the private key) and writes the signature data to the log stream.

The IFASMFDL dump program understands signature records and, optionally, moves them along with the records of an associated SMF record type and subtype.

When signature records are available in the data, the IFASMFDP dump program can verify that a set of SMF records has not been corrupted or tampered with. IFASMFDP uses the public key to perform this operation.

To perform all hash and signature processing, SMF uses the PKCS #11 services provided by Integrated Cryptographic Services Facility (ICSF), specifically, the CSFPOWH function. For information about the requirements for using PKCS #11 services, see *z/OS Cryptographic Services ICSF Writing PKCS #11 Applications*. For more information about the requirements for using ICSF, see *z/OS Cryptographic Services ICSF Administrator's Guide*.

Setting up and using digitally signed SMF records

The basic steps to set up and use digitally signed SMF records are:

1. Create the keys that will serve as the public/private key pair.
2. Update the SMFPRM*xx* member of parmlib to specify that you want SMF to sign records.
3. Use the IFASMFDL dump program to carry signature records to data sets.
4. Use the IFASMFDP dump program to validate records.

Creating the keys

Perform this task to create a public/private key pair.

Before you begin

You should be familiar with your system's cryptographic hardware, the PKCS#11 standard, and with using z/OS Cryptographic Services Integrated Cryptographic Service Facility (ICSF) services to create a public/private key pair.

About this task

You will use ICSF to create a public/private key pair for use in creating and validating signature records in SMF. You must also ensure that the SMF address space and any invoker of the IFASMFDP program have access to ICSF, PKCS#11, and the appropriate key.

Procedure

1. Create a public/private key pair according to the information in *z/OS Cryptographic Services ICSF Administrator's Guide*.

   Note the following information about the public/private key pair:

   - The type of key (clear or secure) does not matter to SMF, as long as the available hardware can support it.
   - The scope of the key usage can be per enterprise, sysplex, system, or logstream.
   - Bind the key to only one certificate to avoid an error (RC=8, RSN=BD2) indicating that the z/OS PKCS #11 token or object handle syntax is invalid.
   - SMF needs the token name to perform the PKCS#11 functions via ICSF, as well as the type of encryption (such as, RSA or Elliptical Curve). You will need to specify the token name later in "Updating SMFPRMxx to sign SMF records" on page 148 and "Using IFASMFDP to validate records" on page 150.
2. Permit access to ICSF, PKCS#11, and the appropriate key for the SMF address space and for any invoker of IFASMFDP for signature validation purposes.

   See the information about defining resource profiles in the SAF CRYPTOZ, CSFSERV, and CSFKEYS classes in *z/OS Cryptographic Services ICSF Administrator's Guide*.

Results

You now have a public/private key pair for use in creating and validating SMF digital signatures.

What to do next

Use the key token name to enable digital signatures in "Updating SMFPRMxx to sign SMF records" on page 148.

Updating SMFPRM*xx* to sign SMF records

Perform this task to specify that you want SMF to produce signature records.

About this task

The default is for SMF not to sign records (NORECSIGN). Use the RECSIGN parameter in the SMFPRM*xx* member of parmlib to specify that SMF is to sign records, either globally or on a per logstream basis.

Procedure

Update the SMFPRM*xx* member to specify the RECSIGN parameter and supply values for the HASH, SIGNATURE, and TOKENNAME subparameters, as described in *z/OS MVS Initialization and Tuning Reference*.

You can specify the RECSIGN parameter globally or as a subparameter of the LSNAME and DEFAULTLSNAME parameters.

Note: The RECSIGN parameter and its subparameters are dynamic; however, changing them requires some operational coordination. Data can only be verified with a single set of parameters, so new and old data must be segregated. That is, records that were signed before the RECSIGN values were changed can only be validated using the values that were in effect at that time. Likewise, records that were signed after a RECSIGN change must be validated using the new values.

Example

```
RECSIGN(HASH(SHA512),SIGNATURE(RSA),
TOKENNAME(TAMPER#RESISTANT#SMF#TOKEN#NAME1))
```

What to do next

Use the same HASH and TOKENNAME values that you specified for these SMF records later in order to perform signature validation, as described in "Using IFASMFDP to validate records" on page 150.

Using IFASMFDL to carry signatures to data sets

Perform this task to move signature data along with SMF records from log streams to output data sets.

About this task

The default behavior is for the IFASMFDL log stream dump program not to carry signature data along with the SMF records (SIGSTRIP). You must use the NOSIGSTRIP parameter to cause IFASMFDL to carry signature data with the SMF records to the OUTDD data sets.

IFASMFDL carries the signature records transparently. If there are multiple OUTDD statements for different record types and subtypes, IFASMFDL will carry the correct signature records to each OUTDD data set.

Procedure

Run the IFASMFDL program with the NOSIGSTRIP parameter.

For details about IFASMFDL, see "Specifying parameters for the SMF log stream dump program" on page 30 and "Running the SMF log stream dump program" on page 38.

Tip: In order to validate data from a full day, use the IFASMFDL ARCHIVE, RELATIVEDATE, and NOSIGSTRIP options to dump data from a full day or range of days. IFASMFDP can then validate data for a full day from the resulting dump data set. For an example, see "Using IFASMFDP to validate records" on page 150.

Results

IFASMFDL carries signature records to the OUTDD data sets.

In the log stream, signature data is stored with the corresponding SMF records, so the IFASMFDL output includes signature data as read with the corresponding SMF records in the summary report. IFASMFDL writes signature data as type 2 subtype 1 or subtype 2 records when NOSIGSTRIP is specified, and the IFASMFDL output includes signature data that is written as type 2 subtype 1 or subtype 2 records in the summary report.

What to do next

To validate the SMF records, proceed with "Using IFASMFDP to validate records" on page 150.

Using IFASMFDP to validate records

Perform this task to validate signature records.

About this task

The default behavior is for the IFASMFDP data set dump program not to carry signature records (SIGSTRIP) and not to perform signature validation (NOSIGVALIDATE). You must use the NOSIGSTRIP and SIGVALIDATE parameters to cause IFASMFDP to carry signature data and perform signature validation.

Procedure

Run the IFASMFDP program with the following SYSIN parameters:

a) Specify the NOSIGSTRIP parameter to carry signature records.

   This is required in order to perform signature validation. NOSIGSTRIP behaves the same way as for the IFASMFDL program.

b) Specify the SIGVALIDATE parameter along with the HASH and TOKENNAME subparameters to perform signature validation.

   The HASH and TOKENNAME values that you specify here must match those that were specified for these SMF records on the RECSIGN parameter in the SMFPRM*xx* parmlib member. The TOKENNAME is associated with the public/private key pair; however, IFASMFDP only needs access to the public key.

   Example:

```
SIGVALIDATE(HASH(SHA512),
TOKENNAME(TAMPER#RESISTANT#SMF#TOKEN#NAME1))
```

c) Examine and set the DATE, START, END, and SID parameters to ensure successful validation.

   - The requested begin and end DATE values must specify the same day.
   - The START and END range must align with SMF intervals that were active when the data was collected.
   - IFASMFDP can only perform SIGVALIDATE against a single SID. If the SMF data contains records from multiple SIDs, specify a single SID value. The SMF data must be contiguous and fully populated with digitally signed data for the requested types and subtypes, SID, and date/time range.

   The records must retain the same order and contain the same contents as they were originally written in order for signature validation to succeed.

   Example: Given that records were collected on a system with 15-minute SMF intervals:

```
INDD(DUMPIN1,OPTIONS(DUMP))
  DATE(2018334,2018334)
  START(1645) END(1800)
  SID(SYS1)
  OUTDD(OUT01,TYPE(0:255))
  NOSIGSTRIP
  SIGVALIDATE(HASH(SHA512),
  TOKENNAME(TAMPER#RESISTANT#SMF#TOKEN#NAME1))
```

d) To validate records from a single full day, run the IFASMFDL utility with the ARCHIVE, RELATIVEDATE, and NOSIGSTRIP options to dump data from a day or range of days prior to the current date.

   Data from a single full day can then be validated by IFASMFDP.

   Note: This method requires that the log stream contain data from a single SID.

Example: The following JCL snippet dumps the signed records from the log stream using the ARCHIVE, RELATIVEDATE, and NOSIGSTRIP options.

```
//SMFDL    EXEC PGM=IFASMFDL
//DUMPOUT  DD DSN=PROD1.SMF.BYDAY,
//            DISP=(NEW,CATLG),
//            DCB=(RECFM=VB,LRECL=32756,BLKSIZE=32760),
//            SPACE=(CYL,(50,5),RLSE)
//SYSPRINT DD  SYSOUT=*
//SYSIN    DD  *
 LSNAME(IFASMF.MULTSYS.STREAM1,OPTIONS(ARCHIVE))
 NOSIGSTRIP
 OUTDD(DUMPOUT,TYPE(0:255))
 RELATIVEDATE(BYDAY,1,1)
/*
```

The data from the PROD1.SMF.BYDAY data set can then be validated using IFASMFDP as shown in the following JCL snippet.

```
//SMFDMP   EXEC PGM=IFASMFDP
//DUMPIN   DD DSN=PROD1.SMF.BYDAY,DISP=SHR
//DUMPOUT  DD DSN=PROD1.SMF.BYDAY.VALID,
//            DISP=(NEW,CATLG),
//            DCB=(RECFM=VB,LRECL=32756,BLKSIZE=32760),
//            SPACE=(CYL,(50,5),RLSE)
//SYSPRINT DD    SYSOUT=*
//SYSIN    DD    *
 INDD(DUMPIN,OPTIONS(DUMP))
 OUTDD(DUMPOUT,TYPE(0:255))
 NOSIGSTRIP
 DATE(2019140,2019140)
 START(0000) END(2400)
 SIGVALIDATE(HASH(SHA256),
    TOKENNAME(TAMPER#RESISTANT#SMF#TOKEN#NAME1))
/*
```

For details about IFASMFDP, see "Specifying parameters for the SMF data set dump program" on page 42 and "Running the SMF data set dump program" on page 48.

Results

IFASMFDP performs signature validation and produces a record validation report. For details about the report, see "IFASMFDP record validation report" on page 54. Note that IFASMFDP ends processing after the first failure is detected.

Using alternate signature algorithms

This topic describes SMF use of digital signatures and algorithms.

SMF supports the use of a second (or alternate) digital signature in the signature records. The steps needed to set up and use a second digital signature are similar to the steps for using a primary digital signature described in "Setting up and using digitally signed SMF records" on page 147.

Key creation using ICSF is similar to that of the primary signature; however, the alternate signature will require different encryption algorithms.

The alternate signature is specified in SMFPRMxx using the ARECSIGN parameter in addition to the RECSIGN parameter. When using ARECSIGN, RECSIGN must also be specified.

When using an alternate digital signature, the signature records will contain two signatures. IFASMFDL will carry the entire signature record to the output data sets when NOSIGSTRIP is in effect, meaning that if an alternate signature is present, both signatures will be carried to the OUTDD data sets.

When an alternate digital signature is in use, IFASMFDP can be used to validate only the first signature or both signatures. In order to validate both signatures, both the SIGVALIDATE and ASIGVALIDATE parameters must be specified in the SYSIN parameters to IFASMFDP.

The size of the digital signature records generated by SMF is dependent on the signature options that are in effect. Use of an alternate digital signature will result in larger digital signature records.

Generation and validation of Dilithium (or LI2) digital signatures require z/OS V2R4, the Cryptographic Support for z/OS V2R2 -V2R4 (HCR77D1) feature, and z15™.

Chapter 14. SMF real-time interface

SMF provides an application programming interface (API) that offers real-time access to SMF in-memory resources. You can use the callable services that comprise the SMF real-time interface from an application program to access SMF records from an in-memory resource as they are written.

About the SMF real-time interface

The SMF real-time interface provides applications with a high-speed data feed with low system overhead, both in terms of CPU time and elapsed time. The real-time interface is designed to offer the following advantages over accessing records using the IEFU83, IEFU84, IEFU85, and IEFU86 user exits:

SMF real-time interface	IEFU83, IEFU84, IEFU85, IEFU86 user exits
• Maintains low latency and is non-disruptive to SMF processing. • You can specify which SMF record types you want written to an in-memory resource and, thus, presented to your application. • No requirement for application programs to be authorized; access to in-memory resources is controlled by SAF resources.	• Responsibility to maintain low latency falls on the user exit programmer, as the exits are called before an SMF record is buffered. • All records are presented to the user exits, unconditionally. • User exits run in an authorized code path.

"SMF real-time callable services" on page 155 provides details about using the real-time interface to access SMF data.

About SMF in-memory resources

SMF must be running in logstream recording mode in order to define and use in-memory resources and, thus, the real-time interface. Records can be recorded to an in-memory resource without also being written to a logstream.

Note: Record types that are defined to an in-memory resource are not recorded in the logstream defined to SMF with the DEFAULTLSNAME option. For a record to be written to both an in-memory resource and a logstream, the record type must be defined to one or more LSNAME logstreams and one or more in-memory resources.

An SMF in-memory resource is a wrap-around buffer that keeps selected records in memory and provides real-time access to those records. You can specify the size when you define an in-memory resource.

Note: There is no protection for discarded data. When an in-memory resource is full, new records overwrite the oldest records. Therefore, plan your in-memory resource capacity accordingly to avoid missing data.

You can define one or more in-memory resources, each with a unique set of record types, up to a maximum of 32 in-memory resources. This is useful both for managing resource capacity and usage, and for segregating record types by application requirements.

"Defining in-memory resources" on page 153 describes the process to define in-memory resources.

Defining in-memory resources

Perform this task to define one or more SMF in-memory resources.

Before you begin

SMF must be running in logstream recording mode.

Procedure

1. Determine the names that you want to use for each in-memory resource.

   As described in *z/OS MVS Initialization and Tuning Reference* , each resource name must be in the form `IFASMF.rname`, where *rname* is a name of your choice.
2. Consult your security administrator to perform the following steps for each in-memory resource that you want to define:
   a) Define a new SAF resource in the FACILITY class to protect the in-memory resource.

      The SAF resource profile name must start with the `IFA.` high-level qualifier, followed by the same in-memory resource name that you determined in step "1" on page 154.

      Example: If you use a resource name of `IFASMF.XYZ`, you must specify `IFA.IFASMF.XYZ` for the SAF resource profile name.
   b) Permit READ access to the SAF resource to each user ID that will access the in-memory resource.
3. Update the SMFPRM*xx* parmlib member to specify the **INMEM** parameter, resource name, and values for the **RESSIZMAX** and **TYPE** subparameters for each in-memory resource that you want to define.

   Use the same resource name or names that you determined in step "1" on page 154.

   Note: Record types that you specify on an **INMEM** parameter are not written to the default logstream, if any, defined by the **DEFAULTLSNAME** parameter. If you want certain record types to be written to both an in-memory resource and a logstream, specify those record types on both an **INMEM** parameter and an **LSNAME** parameter.

   See *z/OS MVS Initialization and Tuning Reference* for more information about the SMFPRM*xx* parmlib member and the **INMEM** parameter and subparameters.
4. Issue the SET SMF=*xx* command to activate the updated SMFPRM*xx* member.

   When the system processes an **INMEM** parameter, it validates that a SAF resource with the correct name exists, and creates the in-memory resources. If the SAF check fails, SMF rejects the entire SMFPRM*xx* member.

Results

If step "4" on page 154 succeeds, the in-memory resources now exist, and SMF begins writing the selected record types to the in-memory resources.

What to do next

You can use the services described in "SMF real-time callable services" on page 155 to write application programs that access the SMF data in the in-memory resources.

Displaying SMF in-memory resources

You can use the **DISPLAY SMF,M** command to display the in-memory resources and the connections to them. The system issues the IFA714I message in response to this command.

Example: The following sample output lists four in-memory resources, one of which has an active connection.

```
d smf,m
IFA714I hh.mm.ss SMF STATUS
        IN MEMORY CONNECTIONS
          Resource: IFASMF.INMEM30
          No Connections
          Resource: IFASMF.INMEM
          Con#: 0001 Connect Time: yyyy.ddd hh:mm:ss
          ASID: 0029
          Resource: IFASMF.INMEM127
          No Connections
```

```
          Resource: IFASMF.SMFDB2.SYSTM1.INMEM
          No Connections
```

For more information, see the **DISPLAY SMF** command in *z/OS MVS System Commands*.

SMF real-time callable services

The following callable services support real-time access to SMF in-memory resources:

- "IFAMCON — Connect to an SMF in-memory resource" on page 155
- "IFAMGET — Obtain data from an SMF in-memory resource" on page 156
- "IFAMDSC — Disconnect from an SMF in-memory resource" on page 155
- "IFAMQRY — Query SMF in-memory resources" on page 156

The following steps describe the expected calling sequence:

1. Optional: Call the IFAMQRY service to determine which SMF in-memory resources are available to the application.
2. Call the IFAMCON service to connect to an in-memory resource.
3. Call the IFAMGET service in a loop to collect SMF records that are already in the in-memory resource or that are being recorded in real time.
4. Call the IFAMDSC service to disconnect from the in-memory resource and clean up resources.

These callable services are also described in *z/OS MVS Programming: Callable Services for High-Level Languages*.

IFAMCON — Connect to an SMF in-memory resource

Call the IFAMCON service to connect to an SMF in-memory resource.

Description

The IFAMCON service connects to SMF for in-memory data capture. The service establishes an environment to call the IFAMGET service to obtain SMF data from an in-memory resource. The caller must provide the target in-memory resource to access.

Notes:

- An active connection to an in-memory resource does not prevent the SET SMF=*xx* command from removing that resource from the configuration. No new data will be recorded to that resource; however, the resource is not removed from the configuration until the last connection disconnects. You can use the DISPLAY SMF,M command to display the connections to in-memory resources.
- An active connection prevents the SET SMF=*xx* command from changing the in-memory resource definition, such as changes to the **TYPE** or **RESSIZMAX** parameters.
- The system supports a maximum of 8 connections per in-memory resource, with a maximum of 128 connections per system.

For details about this service, see IFAMCON - Connect to an SMF in-memory resource in *z/OS MVS Programming: Callable Services for High-Level Languages*.

IFAMDSC — Disconnect from an SMF in-memory resource

Call the IFAMDSC service to disconnect from an SMF in-memory resource.

Description

The IFAMDSC service disconnects from an SMF in-memory resource when the calling program no longer needs to request any more data via the IFAMGET service.

For details about this service, see IFAMDSC - Disconnect from an SMF in-memory resource in *z/OS MVS Programming: Callable Services for High-Level Languages*.

IFAMGET — Obtain data from an SMF in-memory resource

Call the IFAMGET service to obtain data from an SMF in-memory resource.

Description

The IFAMGET service obtains real-time SMF data as it is being recorded to an in-memory resource. The service can immediately return to the caller when there are no records available, or it can wait for a new record to become available before returning.

For details about this service, see IFAMGET - Obtain data from an SMF in-memory resource in *z/OS MVS Programming: Callable Services for High-Level Languages*.

IFAMQRY — Query SMF in-memory resources

Call the IFAMQRY service to query the SMF in-memory resources that are available to the application.

Description

Your application can call the IFAMQRY service to determine which SMF in-memory resources are available. Only those in-memory resources that are available to this caller, as determined by SAF, access are returned.

Note: The returned data represents point-in-time information that is subject to change because of configuration changes before a call to IFAMCON is made. Results are determined based on the caller's access to the data.

For details about this service, see IFAMQRY - Query SMF in-memory resources in *z/OS MVS Programming: Callable Services for High-Level Languages*.

Chapter 15. IBM z/OS Workload Interaction Correlator

IBM z/OS Workload Interaction Correlator produces SMF type 98 records for subtypes that have been registered with the IFAWIC service.

Complete the following tasks to enable IBM z/OS Workload Interaction Correlator:

1. Enable the WorkLoadIntCorr feature of z/OS.
2. Collect workload interaction correlator records.

Optionally, complete the following tasks to write workload interaction correlator records to the z/OS file system (zFS) for analysis by analytics tools:

1. Record workload interaction correlator records to an in-memory resource.
2. Configure hardware instrumentation services (HIS) to write workload interaction correlator data to a z/OS UNIX file.

For more information about workload interaction correlator, see z/OS Workload Interaction Correlator in *z/OS MVS Programming: Authorized Assembler Services Guide*.

Enabling the WorkloadIntCorr feature of z/OS

Complete this task to enable the IBM z/OS Workload Interaction Correlator priced feature.

Procedure

1. Follow the steps described in Using dynamic enablement in *z/OS Planning for Installation*.

   The following example shows the product registration policy (IFAPRD*xx*) entry to enable z/OS Workload Interaction Correlator:

   ```
   PRODUCT OWNER('IBM CORP')
       NAME('z/OS')
       ID(5650-ZOS)
       FEATURENAME(WorkloadIntCorr)
       STATE(ENABLED)
   ```

2. Issue the SET PROD=*xx* command, where *xx* identifies the updated IFAPRD*xx* parmlib member to dynamically enable the feature.

   If no further action is taken, SMF will check the product registration policy at midnight to verify whether it is active.

   To activate the product registration immediately, reconfigure SMF to activate WIC, as described in "Collecting workload interaction correlator records" on page 158.

   When you switch to the SMFPRM*xx* WIC parameter, SMF also checks the product registration policy for the WorkloadIntCorr feature. You can also re-issue the SETSMF WIC command to have SMF re-check the product registration policy.

   You can use the DISPLAY SMF,WIC command to verify the state of the WorkloadIntCorr feature.

What to do next

Complete the steps in "Collecting workload interaction correlator records" on page 158.

Collecting workload interaction correlator records

Complete this task to enable the collection of workload interaction correlator records.

Before you begin

Complete the steps in "Enabling the WorkloadIntCorr feature of z/OS" on page 157.

Procedure

1. Configure SMF to activate WIC and enable the generation of all available SMF type 98 record subtypes, as described in "WIC — Specifying the generation of type 98 records for IBM z/OS Workload Interaction Correlator" on page 70.
2. Specify the TYPE parameter to specify that the system is to collect all SMF type 98 subtypes.

   For details, see "TYPE and NOTYPE — Selecting and directing SMF records" on page 59 and "SYS and SUBSYS with TYPE and NOTYPE — Selecting subtypes for SMF recording" on page 59.

   For example, add the following statements to your SMFPRM*xx* configuration:

   ```
   SYS(TYPE(98))
   WIC
   ```

3. Issue the SET SMF=*xx* command, pointing to an SMFPRM*xx* parmlib member that contains these statements, to activate the configuration.
4. Optionally, issue the following commands to verify your configuration:

   a) Issue the DISPLAY SMF,O command to see which SMF options are in effect.

   b) Issue the DISPLAY SMF,WIC command to see the status of the WIC parameter and whether subtypes are being collected for registered IFAWIC exploiters and their subtypes.

What to do next

Optionally, complete the steps in "Recording workload interaction correlator records to an in-memory resource" on page 158.

Recording workload interaction correlator records to an in-memory resource

Workload interaction correlator records can be recorded to an in-memory resource. Optionally, complete this task to configure the recording of workload interaction correlator records to an in-memory resource.

Before you begin

Complete the steps in "Enabling the WorkloadIntCorr feature of z/OS" on page 157 and "Collecting workload interaction correlator records" on page 158.

Procedure

1. Enable log stream recording, as described in "Setting up and managing SMF recording to logstreams" on page 16.
2. Define an in-memory resource, as described in "Defining in-memory resources" on page 153.

   For example, to create an in-memory resource named IFASMF.WIC, add the following statement to the SMFPRM*xx* parmlib member:

   ```
   INMEM(IFASMF.WIC,RESSIZMAX(2G),TYPE(98))
   ```

   Then, issue the SET SMF=*xx* command to activate it.

3. To see existing in-memory resources, issue the DISPLAY SMF,M command.

What to do next

Complete the steps in "Configuring HIS to write workload interaction correlator records to a z/OS UNIX file" on page 159.

Configuring HIS to write workload interaction correlator records to a z/OS UNIX file

Optionally, complete this task to configure hardware instrumentation services (HIS) to write workload interaction correlator records to a z/OS UNIX file.

Before you begin

Complete the steps in "Recording workload interaction correlator records to an in-memory resource" on page 158.

About this task

Hardware instrumentation services (HIS) has a subcomponent that reads workload interaction correlator SMF records from an in-memory resource and writes them to a file on the z/OS UNIX file system. This function makes workload interaction correlator data available for tools that need to read the data from files, such as IBM z/OS Workload Insights Navigator.

Procedure

1. Define a path in the z/OS UNIX file system that is writable by the *hisproc* address space.

   - For a sysplex, IBM recommends creating a separate zFS for each member and mounting each as a read/write, sysplex-aware zFS with high availability and AUTOMOVE at `/global/wic/`*`sysname`*, where *sysname* represents the system name of each sysplex member. With this recommendation, each sysplex member's HIS procedure (*hisproc*) will regularly write its workload interaction correlator data to its member-specific zFS, which results in each member owning its zFS. Each zFS is recommended to be read/write, sysplex-aware with high availability and AUTOMOVE so that analysis products, such as IBM z/OS Workload Interaction Navigator, running on one sysplex member can analyze workload interaction correlator data and create analysis files for other active and inactive sysplex members.

     For example, if each sysplex member has a zFS allocated in data set OMVS.WIC.*sysname*.ZFS, when each member joins the sysplex, use SYS1.PARMLIB(BPXPRM*xx*) or the MOUNT command to mount the zFS, as follows:

     ```
     MOUNT
     FILESYSTEM('OMVS.WIC.sysname.ZFS')
     TYPE(ZFS) MODE(RDWR) AUTOMOVE(INCLUDE,*) PARM('RWSHARE,HA')
     MOUNTPOINT('/global/wic/sysname')
     ```

   - For systems that are not in a sysplex, IBM recommends mounting a non-sysplex aware read/write zFS at `/global/wic/`*`sysname`*, where *sysname* represents the system name.

     For example, if the system has a zFS allocated in data set OMVS.WIC.*sysname*.ZFS, use SYS1.PARMLIB(BPXPRM*xx*) or the MOUNT command to mount the zFS, as follows:

     ```
     MOUNT
     FILESYSTEM('OMVS.WIC.sysname.ZFS')
     TYPE(ZFS) MODE(RDWR) UNMOUNT PARM('NORWSHARE')
     MOUNTPOINT('/global/wic/sysname')
     ```

   Consider using the &SYSNAME. system symbol in place of *sysname* in the preceding examples.

   For more information, see:

- Statements and parameters for BPXPRMxx in *z/OS MVS Initialization and Tuning Reference*
- Specifying zFS file systems as sysplex-aware and Specifying the high availability option for read/write sysplex-aware file systems in *z/OS File System Administration*
- mount - Logically mount a file system in *z/OS UNIX System Services Command Reference*
- What are system symbols? and Static system symbols in *z/OS MVS Initialization and Tuning Reference*

2. Issue the MODIFY *hisproc*,WIC command to set an in-memory resource from which to read workload interaction correlator records, designated by the INMEM keyword, and the pre-defined z/OS UNIX path to which to write the records, designated by WICPATH.

   For example, the following command reads from an SMF in-memory resource, IFASMF.WIC, and writes to the zFS at `/global/wic/sysname`:

   ```
   MODIFY hisproc,WIC,INMEM=IFASMF.WIC,WICPATH='/global/wic/sysname'
   ```

   where *hisproc* is the name of the procedure that started HIS.

   Consider using the &SYSNAME. system symbol in place of *sysname* in the preceding example. For more information, see What are system symbols? and Static system symbols in *z/OS MVS Initialization and Tuning Reference*.
3. Issue the DISPLAY HIS,WIC command to see the HIS state for the workload interaction correlator.

Chapter 16. SMF record general information and best practices

The following list contains some general information about SMF records.

- To write any SMF-formatted records (except record types 2, 3, and 7) to the SMF data set, specify the ACTIVE parameter. To write record type 17 for temporary data sets, specify REC(ALL).
- The method of entry to a particular SMF record type determines whether installation-exit routine IEFU83, IEFU84, IEFU85, or IEFU86 receives control before control is returned to the caller of the SVC routine. A branch entry by a cross-memory caller causes IEFU85 to receive control. A branch entry by a non-cross-memory caller causes IEFU84 to receive control. An SVC 83 call causes IEFU83 to receive control. The IEFU86 exit receives control before control is returned to the caller in any of the environments that are described by any of the IEFU83, IEFU84, IEFU85 exits.
- Many current SMF records contain variable sections. The user of these records should be aware that the record pointers must be updated by the length of each variable section of the record when the record data is being manipulated. Failure to do the address calculation results in writing over valid data in previously processed sections. Other SMF records, (types 23, 30, 32, and 90), contain offsets that point directly from the record header to the data section.
- Unless otherwise specified, all EBCDIC fields within the SMF records are left-align and right filled with blanks.
- Detailed information about the device type and device class, within a record, can be found in *z/OS MVS Data Areas* in the z/OS Internet library (www.ibm.com/servers/resourcelink/svc00100.nsf/pages/zosInternetLibrary).
- In JES2 and JES3 records, information found in the 'Common Section' and the 'Identification Section' is defined in JESPARMS.
- In a loosely-coupled multiprocessing environment (such as JES2 shared spool or JES3), it is possible for the job START/LOGON time to be greater than the STOP/LOGOFF time because the installation does not synchronize the CPU clocks. The difference occurs when the START/LOGON time is initialized on processor A and the job is then processed on processor B. The STOP/LOGOFF time is recorded from processor B.
- SMF records created by IBM components never exceed 32,756 bytes. If the data required in a record cause the record to exceed that length, the component responsible for creating the record can, instead, create multiple (continuation) records, none of which exceed 32,756 bytes. See "Record type 22 (X'16') — Configuration" on page 250 for an example that uses a continuation section and "Record type 24 (X'18') — JES2 Spool Offload" on page 270 for an example that uses bit mapping to indicate continuation.
- SMF records are written as spanned (VBS) in order to conserve storage space by ensuring that each block of data is as full as possible. If you specify DCB parameters on any of the input or output DD statements for IFASMFDL, you must specify RECFM=VBS.
- You should not specify LRECL=X for reading or writing SMF dump data, because LRECL=X signifies that a single record might be larger than 32,756 bytes, which is not the case for SMF data.
- You can specify LRECL=32760 instead of 32767. You can also specify any block size from 4096 to the maximum allowed for the chosen device.

SMF Standard record types and Extended record types

All SMF records are uniquely identified by a type and an optional subtype value. The type and subtype values reside in the header portion of the SMF record. A record type can reside in the Standard SMF record header or in the Extended SMF record header. Subtype values always reside in the Standard SMF record header.

Standard SMF record types, values 0-255, can be stored in the HDR_SMFRty field of the SMF Standard Record Header. See *Table 10: Standard SMF record header for records without subtypes* in the "Standard and Extended SMF record headers" on page 162 section for details.

Extended or Standard SMF record types, values 0-2047 can be stored in the SMFHDR1_Ext_Rty field in the SMF Extended Record Header. See *Table 12: Extended SMF record header version 1* in the "Standard and Extended SMF record headers" on page 162 section for details.

Generating records with Extended headers

Records with a new type or subtype or both can be designed to contain the SMF Extended record header. The standard header only supports record type values up to 255. The extended header can support type values 0 - 2047. The following rules must be followed for SMF to successfully write a record that contains an extended header:

- Record length at offset 0 must be at least 56 (X'38').
- Bit 1 at offset 4 must be on.
- Bit 2 at offset 4 must be on.
- Record type at offset 5 must be 126 (X'7E').
- Extended header length at offset 24 (X'18') must be 32 (X'20').
- Version at offset 26 (X'1A') must be 1.
- The value at offset 52 (X'34') must be a value 0 - 2047 (X'0' - X'7FF').

If validation fails for any of these rules, SMFWTM or SMFEWTM fails the request to write the record with an extended header.

Standard and Extended SMF record headers

Each record that SMF writes to the SMF data set or log stream contains one of the following formatted headers:

Standard SMF record header
Records with bit 1 of the flag byte at offset 4 set to 0 contain a standard header which has a length of 18 bytes. The format of this header is shown in Table 9 on page 163.

Standard SMF record header with subtypes
Records with bit 1 of the flag byte at offset 4 set to 1 and bit 2 of the same flag byte set to 0 contain a standard SMF record header with subtypes. The length of this header is 24 bytes, and this header is a superset of the standard SMF record header. The format of this header is shown in Table 10 on page 163.

Extended SMF record header
Records with both bits 1 and 2 of the flag byte at offset 4 set to 1 contain an extended SMF record header. The length of this header is 56 bytes, and this header is a superset of the standard SMF record header and the standard SMF record header with subtypes. The format of this header is shown in Table 11 on page 164.

The header contains information about the record, such as: record type, record subtype (if the record includes subtypes), record length, and the time and date the record was written to the data set or log stream. The time in the header record is based on the local time. Record subtypes are used to group related data and control record types. For example, one record might contain three separate subtypes, each reporting different kinds of data. By using those subtypes you can eliminate the need for three separate record numbers.

The header section *must include* the record descriptor word (RDW). The RDW is a 4-byte field that must introduce each SMF record when it is written to the SMF data set or log stream by the SMFWTM macro instruction. The first two bytes of the RDW must contain the length of the logical record (including the four bytes of the RDW). The second two bytes are used for variable blocked spanned records; that is, records that contain more than 32,756 bytes. This field (the second two bytes) is set to zero if the record is *not* spanned. The remainder of the record immediately follows the RDW.

Because the record formats include the RDW, it is not necessary to add four bytes to the offset listed in the record; however, depending on the access method used to read the record from the SMF data set, these fields might not be present in your SMF record. You might have to subtract four bytes from the offsets listed in your record.

Standard SMF record header without subtypes

Table 9 on page 163 shows the header mapping for records without subtypes.

Table 9. Standard SMF record header for records without subtypes

Offsets		Name	Length	Format	Description
00	00	SMFHDR_Len	2	binary	Record length (maximum size of 32,756). This field and the next field (total of four bytes) form the record descriptor word (RDW). The first two bytes (this field) must contain the logical record length including the RDW.
02	02	SMFHDR_Seg	2	binary	Segment descriptor provide by SMF. Initialize with zeros.
04	04	SMFHDR_Flag	1	binary	System indicator: **Bit** **Meaning when set** **0-2** Reserved **3** MVS/SP Version 4 and above. Bits 3, 4, 5, and 6 are on.* **4** MVS/SP Version 3. Bits 4, 5, and 6 are on. **5** MVS/SP Version 2. Bits 5 and 6 are on. **6** VS2. Bit 6 is on. **7** Reserved. *IBM recommends that you use information located elsewhere in this record to determine the MVS product level.
05	05	SMFHDR_Rty	1	binary	Record type (hexadecimal values are 0 - FF).
06	06	SMFHDR_Time	4	binary	Time since midnight, in hundredths of a second, record was moved into the SMF buffer. In record types 2 and 3 this field indicates the time that the record was moved to the dump data set.
10	0A	SMFHDR_Date	4	packed	Date when the record was moved into the SMF buffer, in the form `0`*cyydddF* (where *c* is 0 for 19*xx* and 1 for 20*xx*, *yy* is the current year (0 - 99), *ddd* is the current day (1 - 366), and *F* is the sign). In record types 2 and 3, this field indicates the date that the record was moved into the dump data set.
14	0E	SMFHDR_SID	4	EBCDIC	System identification (from the SID parameter).

Standard SMF record header with subtypes

Table 10 on page 163 shows the header mapping for records with subtypes.

Table 10. Standard SMF record header for records with subtypes

Offsets		Name	Length	Format	Description
00	00	SMFHDR_Len	2	binary	Record length (maximum size of 32,756). This field and the next field (total of four bytes) form the record descriptor word (RDW). The first two bytes (this field) must contain the logical record length including the RDW.
02	02	SMFHDR_Seg	2	binary	Segment descriptor provided by SMF. Initialize with zeros.

Table 10. Standard SMF record header for records with subtypes (continued)

Offsets		Name	Length	Format	Description
04	04	SMFHDR_Flag	1	binary	System indicator **Bit** **Meaning when set** **0** Reserved. **1** Subtypes are valid. **2** Must be off if a standard header is present. See the commentary of SMFxRTY for more information on this bit. **3** MVS/SP Version 4 and above. Bits 3, 4, 5, and 6 are on. (IBM recommends that you use record type 30 to obtain the MVS product level.) **4** MVS/SP Version 3. Bits 4, 5, and 6 are on. **5** MVS/SP Version 2. Bits 5 and 6 are on. **6** VS2. Bit 6 is on. **7** Reserved.
05	05	SMFHDR_Rty	1	binary	Record type (hexadecimal values are 0 - FF). When this field contains the value 126 (hexadecimal 7E), and bits 1 and 2 of the flag byte at offset 4 into the header are on. then version 1 of the Extended SMF Record Header must be present, and the actual record type will reside in SMFHDR1_Ext_Rty.
06	06	SMFHDR_Time	4	binary	Time since midnight, in hundredths of a second, that the record was moved into the SMF buffer. In record types 2 and 3, this field indicates the time that the record was moved into the dump data set.
10	0A	SMFHDR_Date	4	packed	Date when the record was moved into the SMF buffer, in the form `00`*yydddF* or `0`*cyydddF* (where *c* is 0 for 19*xx* and 1 for 20*xx*, *yy* is the current year (0 - 99), *ddd* is the current day (1 - 366), and *F* is the sign). In record types 2 and 3, this field indicates the date that the record was moved to the dump data set.
14	E	SMFHDR_SID	04	EBCDIC	System identification (from the SID parameter).
18	12	SMFHDR_WID	4	EBCDIC	Subsystem identification. This field is a four byte character value set by the SUBSYS=*option* specified in the SMF macros.
22	16	SMFHDR_STP	2	Binary	Values 0-32767 (hexadecimal 0 - 7FFF) See "SYS and SUBSYS with TYPE and NOTYPE — Selecting subtypes for SMF recording" on page 59 for a description of subtype selectivity.

Extended SMF record header version 1

Table 11 on page 164 shows the header mapping for extended records version 1.

Table 11. Extended SMF record header version 1

Offsets		Name	Length	Format	Description
0	0	SMFHDR1_LEN	2	Binary	RDW record length. This value must be at least 56 (hexadecimal 36).
2	2	SMFHDR1_SEG	2	Binary	RDW record segment descriptor.

Table 11. Extended SMF record header version 1 (continued)					
Offsets		Name	Length	Format	Description
4	4	SMFHDR1_FLAG	1	Binary	Flag byte. **Bit** **Meaning when set** **0** Do not use or set. **1** Subtypes are valid. This bit must be on. **2** Extended header is present. This bit must be on. **3 - 7** Do not use or set.
5	5	SMFHDR1_RTY	1	Binary	Record type, must be 126.
6	6	SMFHDR1_TIME	4	Binary	Time since midnight, in hundredths of a second, record was moved into the SMF buffer. In record types 2 and 3 this field indicates the time that the record was moved to the dump data set.
10	A	SMFHDR1_DATE	4	Binary	Date when the record was moved into the SMF buffer, in the form 0cyydddF (where c is 0 for 19xx and 1 for 20xx, yy is the current year (0 - 99), ddd is the current day (1 - 366), and F is the sign). In record types 2 and 3, this field indicates the date that the record was moved into the dump data set.
14	E	SMFHDR1_SID	4	EBCDIC	System identification.
18	12	SMFHDR1_WID	4	EBCDIC	Subsystem identification.
22	16	SMFHDR1_STP	2	Binary	Record subtype , values 0 - 32767 (hexadecimal 0 - 7FFF).
24	18	SMFHDR1_Ext_Len	2	Binary	Length of the remainder of this section, must be 32 (hexadecimal 20).
26	1A	SMFHDR1_VERSION	1	Binary	Extended header version, must be 1.
27	1B	SMFHDR1_FLAGS	1	Binary	Flag byte **Bit** **Meaning when set** **0** The IEFU86 exit was called for this record. Set by IBM. **1 - 7** Reserved. Set to 0.
28	1C	SMFHDR1_STCKE	16	Binary	Time when the record was written, in STCKE format. Set by IBM.
44	2C	SMFHDR1_TZO	8	Binary	Time zone offset, taken from CVTLDTO. Set by IBM.
52	34	SMFHDR1_EXT_RTY	2	Binary	Extended Record type, values 0 - 2047 (hexadecimal values 0 - 7FF).
54	36	*	2	Binary	Reserved. Set to 0.

Best practices for designing SMF records

Consider the following list of guidelines when designing SMF records:

1. Never compromise compatibility with existing records or fields.
2. Never change the meaning, format, or length of any existing field. If the meaning, format or length do change, add a new field.
3. Add a new field to the end of a section rather than in front of an existing field within the section.
4. Always use the standard SMF header fields.

5. Use a standard SMF subtype field even if only the subtype is present.
6. Use record types 0-127 and 1152-2047 for IBM records; Use record types 128-1151 for applications and independent software vendor (ISV) products.
7. Use the triplet convention, as seen in the SMF type 30 record, for including variable sections (such as: offset to section, number of sections, length of sections). Include the length of the section containing the triplets or the number of triplets.
8. If you report service units, be sure to include both the speed constant and the service definition coefficients in the record. This ensures they can be properly interpreted.
9. Use the most precise time format available for date and time fields and provide the GMT offset with leap seconds. Ensure you document the format you use.
10. Left justify and fill with blanks any EBCDIC and ASCII fields and ensure you document the format. If EBCDIC or ASCII text is mixed with binary data in a single field, ensure the format is documented.
11. Use the system identifier (SID) or SYSNAME along with the SYSPLEX name to identify a system. Ensure you document how you are identifying the system.
12. Consider adding a release indicator to allow programs to identify whether certain changes are present.
13. Avoid cumulative fields whenever possible. Instead, use interval fields to allow the application to perform any necessary accumulation. If you need cumulative fields, also provide interval fields.
14. Ensure interval values do not become negative because of a change to the operating environment during an interval. When the accumulated counter wraps, document the maximum and consider including a bit to indicate the wrap.
15. If a field value is determined not valid for any reason (such as a wrapped accumulator, or a value not obtained at the time the record is being built), use an indicator bit to indicate that the field is unreliable.
16. To generate a record that contains an Extended SMF record header, see the section "Generating records with Extended headers" on page 162. Do not change the format of the header for a record with an existing type and subtype. Such a change to an existing record would be incompatible for programs that read and consume that record.

Chapter 17. SMF records

The following sections describe each SMF record in detail.

Record type 0 (X'00') — IPL

Record type 0 is written after every SMF initialization. It includes the virtual and central storage sizes and some of the SMF options in effect. See record type 90 (subtype 9) for information about the IPL of SMF.

Record environment

The following conditions exist for the generation of this record:

Macro
SMFEWTM(1), BRANCH=YES (record exit: IEFU84)

Record mapping

Header/self-defining section

This section contains the common SMF record header fields and, if applicable, the triplet fields (offset/length/number) that locate the other sections on the record.

Offsets		Name	Length	Format	Description
0	0	SMF0LEN	2	binary	Record length. This field and the next field (total of four bytes) form the RDW (record descriptor word). See "Standard and Extended SMF record headers" on page 162 for a detailed description.
2	2	SMF0SEG	2	binary	Segment descriptor (see record length field).
4	4	SMF0FLG	1	binary	System indicator: **Bit** **Meaning when set** **0-2** Reserved **3-6** Version indicators* **7** Reserved. *See "Standard and Extended SMF record headers" on page 162 for a detailed description.
5	5	SMF0RTY	1	binary	Record type 0 (X'00')
6	6	SMF0TME	4	binary	Time since midnight, in hundredths of a second, that the record was moved into the SMF buffer.
10	A	SMF0DTE	4	packed	Date when the record was moved into the SMF buffer, in the form 0*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for a detailed description.
14	E	SMF0SID	4	EBCDIC	System identification (from the SID parameter).

Offsets		Name	Length	Format	Description
18	12	SMF0JWT	4	binary	Limit, in minutes, of continuous wait for the job (taken from JWT parameter). Continuous wait time is defined as time spent waiting while the application program is in control. For example, for data sets allocated dynamically (while the application program is running, for example) either or both of the following count toward a job's continuous wait time: • The time required to recall a data set from HSM Migration Levels 1 or 2 • The time required to mount a tape If a data set was allocated statically (for a DD statement, for example) these activities will not be counted towards the job's continuous wait time.
22	16	SMF0BUF	4	binary	This field contains meaningless information.
26	1A	SMF0VST	4	binary	Number of 1K bytes in virtual storage.
30	1E	SMF0OPT	1	binary	SMF options: **Bit** **Meaning when set** **0** Reserved **1** Reserved **2** Reserved. **3** Data set accounting. Record types selected. This bit is on when one of the following record types is selected: 14, 15, 17, 18, 62, 63, 64, 67 or 68. (See "TYPE and NOTYPE — Selecting and directing SMF records" on page 59.) **4** Volume accounting. Record types 10 or 69 selected. (See "TYPE and NOTYPE — Selecting and directing SMF records" on page 59.) **5** Reserved. **6** Type 17 records will be written for temporary data sets (REC(ALL)). **7** Reserved.
31	1F	SMF0RST	4	binary	Number of 1K bytes in central storage.
35	23	SMF0RSV	1		Reserved.
36	24	SMF0OSL	8	EBCDIC	MVS product name.
44	2C	SMF0SYN	8	EBCDIC	System name (from the SYSNAME parameter in the IEASYSxx parmlib member).
52	34	SMF0SYP	8	EBCDIC	Sysplex name (from the SYSPLEX parameter in the COUPLExx parmlib member).
60	3C	SMF0TZ	4	binary	Difference in time between local time and Greenwich mean time in binary units of 1.048576 seconds. The value of SMF0TZ is copied from the CVTTZ field. For more information about the CVTTZ field, see the CVT mapping macro in *z/OS MVS Data Areas* in the z/OS Internet library (www.ibm.com/servers/resourcelink/svc00100.nsf/pages/zosInternetLibrary).
64	40	SMF0MSWT	4	binary	Started task wait time limit (SMFPRMxx SWT(*hhmm*) value) converted to minutes.

Offsets		Name	Length	Format	Description
68	44	SMF0MTWT	4	binary	TSO wait time limit (SMFPRMxx TWT(*hhmm*) value) converted to minutes.
72	48	SMF0TBUF	2	binary	The number of megabytes specified by the SMFTBUFF IEASYSxx parmlib option. If the SMFTBUFF parameter value is incorrectly specified or SMFTBUFF is not specified, this value will be zero, and the default buffer size of 5 megabytes was used during IPL SMF initialization processing.

Record type 2 (X'02') — Dump header

The SMF dump program writes record type 2 to the dump data set. It indicates the beginning of a dump of the SMF data set from a direct access device (usually to a tape). There are three variations of this record. If bit 1 at offset 4 is ON, then subtypes are supported; if the bit is OFF, the record consists of the standard SMF record header only.

Record environment

The following conditions exist for the generation of this record:

Macro
None

Record mapping

Header/self-defining section

This section contains the common SMF record header fields and, if applicable, the triplet fields (offset/length/number) that locate the other sections on the record.

Offsets		Name	Length	Format	Description
0	0	SMF2LEN	2	binary	Record length. This field and the next field (total of four bytes) form the RDW (record descriptor word). See "Standard and Extended SMF record headers" on page 162 for a detailed description.
2	2	SMF2SEG	2	binary	Segment descriptor (see record length field).
4	4	SMF2FLG	1	binary	System indicator: **Bit** **Meaning when set** **0-2** Reserved **3-6** Version indicators* **7** Reserved. *See "Standard and Extended SMF record headers" on page 162 for a detailed description.
5	5	SMF2RTY	1	binary	Record type 2 (X'02').
6	6	SMF2TME	4	binary	Time since midnight, in hundredths of a second, when the record was moved into the dump data set.
10	A	SMF2DTE	4	packed	Date when the record was moved into the dump date set, in the form 0*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for a detailed description.
14	E	SMF2SID	4	EBCDIC	System identification (from the SID parameter).

Subtype 1

This is a signature record that represents a signature group and is consumed for signature verification by the IFASMFDL and IFASMFDP utilities.

Offsets		Name	Length	Format	Description
0	0	SMF2GLEN	2	binary	Record length. This field and the next field (total of 4 bytes) form the record descriptor word (RDW). See "Standard and Extended SMF record headers" on page 162 for a detailed description.
2	2	SMF2GSEG	2	binary	Segment descriptor (see record length field).
4	4	SMF2GFLG	1	binary	System indicator: **Bit** **Meaning when set** **0** Reserved. **1** Subtypes are valid. **2-7** Reserved.
5	5	SMF2GRTY	1	binary	Record type 2 (`X'02'`).
6	6	SMF2GTME	4	binary	Time since midnight, in hundredths of a second, of the last record in the group.
10	A	SMF2GDTE	4	packed	Date of the last record in the group, in the form `0`*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for a detailed description.
14	E	SMF2GSID	4	EBCDIC	System identification: DUMY
18	12	SMF2GWID	4	EBCDIC	Subsystem identification.
22	16	SMF2GSTP	2	binary	Subtype 1 (`X'0001'`).
24	18	SMF2GRSID	4	EBCDIC	The group's SID.
28	1C	SMF2GFLG2	1	binary	Group indicators: **Bit** **Meaning when set** **0** First group written. **1** Group's subtype is valid. **2** Reserved. **3** This record was generated on a system where the fix for APAR OA55526 was applied. **4** This record contains a self-defining section. **5-7** Reserved.
29	1D	SMF2GRTYPE	1	binary	The record type for this group.
30	1E	SMF2GSTYPE	2	binary	The record subtype for this group.
32	20	SMF2GFTME	4	binary	Time since midnight, in hundredths of a second, of the first record in the group.
36	24	SMF2GFDTE	4	EBCDIC	Date of the first record in the group, in the form `0`*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for a detailed description.
40	28	SMF2GCNT	4	binary	The number of records in this signature group.

Offsets		Name	Length	Format	Description
44	2C	SMF2GHASHMETH	1	binary	A bit array indicating the hash method used for this group. **Bit** **Meaning when set** **0** SHA1 **1** SHA256 **2** SHA384 **3** SHA512 **4-7** Reserved
45	2D	SMF2GSIGTYPE	1	binary	A bit array indicating the signature type used for this group. **Bit** **Meaning when set** **0** RSA **1** ECDSA **2-7** Reserved
46	2E	SMF2GTOKENNAME	32	EBCDIC	The saved CKA_ID of the PKCS#11 token name used to generate this signature.
78	4E	*	2	–	Reserved space for future expansion.
80	50	SMF2GSIGLEN	4	binary	The digital signature length for this signature group
84	54	SMF2GSIG	varies	EBCDIC	The digital signature for this signature group. It is the result of the hash and sign operation (using the hash method and signature type specified in this record) on the concatenation of the following: 1. Running hashsum of all this group's records (hash each entire record padded out to a 128-byte boundary with zeros) 2. Running hashsum of all the previous group's records (hash each entire record padded out to a 128-byte boundary with zeros) The length of this signature is contained in SMF2GSIGLEN.

Subtype 1 - Self-defining section

This section contains the triplet fields (offset, length, and number) that locate other sections in the record. This triplet information should be checked prior to accessing a section of the record. The "number" triplet field is the primary indication of the existence of the section. This section is an extension of the header and physically follows it in the record. It is located at the offset of SMF2GSIG (84 or X'54') plus the length of the digital signature, found in SMF2GSIGLEN. The self-defining section is present only when bit 4 in the SMF2GFLG2 field in the header is on.

Offsets		Name	Length	Format	Description
0	0	SMF2GSDSLEN	2	binary	Length of the self-defining section.
2	2	*	2	binary	Reserved.
4	4	SMF2GSDSASignOffset	4	binary	Offset to start of ARECSIGN section, including the record descriptor word (RDW).
8	8	SMF2GSDSASignLen	2	binary	Length of ARECSIGN section.
10	A	SMF2GSDSASignNum	2	binary	Number of ARECSIGN sections.

Subtype 1 - ARECSIGN section

This section contains the alternate signature information. This section is present only when ARECSIGN is in effect at the time the record is generated.

Triplet information: This section is located using the following triplet fields which are located in the self-defining section.

Offset:
SMF2GDSDASignOffset

Length:
SMG2GSDSASignLen

Number:
SMF2GSDSASignNum. This field contains 0 if no ARECSIGN section is present, or non-zero if at least one ARECSIGN section is present.

Offsets		Name	Length	Format	Description
0	0	SMF2GASignHashMeth	1	binary	A bit array indicating the alternate signature hash method for this group. **Bit** **Meaning when set** **0 - 2** Reserved **3** SHA512 **4 - 7** Reserved
1	1	SMF2GASignSigType	1	binary	A bit array indicating the alternate signature type used for this group. **Bit** **Meaning when set** **0 - 1** Reserved **2** LI2 **3 - 7** Reserved
2	2	SMF2GASignTokenName	32	EBCDIC	The saved CKA_ID of the PKCS#11 token name used to generate this signature.
34	22	*	2	binary	Reserved.
36	24	SMF2GASignSigLen	4	binary	The length of the alternate digital signature for this signature group.
40	28	SMF2GASignSig	varies	EBCDIC	The digital signature for this signature group. The length of this field is in SMF2GASignSigLen.

Subtype 2

This is a signature record that represents a signature interval and is consumed for signature verification by the IFASMFDL and IFASMFDP utilities.

Offsets		Name	Length	Format	Description
0	0	SMF2ILEN	2	binary	Record length. This field and the next field (total of 4 bytes) form the record descriptor word (RDW). See "Standard and Extended SMF record headers" on page 162 for a detailed description.
2	2	SMF2ISEG	2	binary	Segment descriptor (see record length field).

Offsets		Name	Length	Format	Description
4	4	SMF2IFLG	1	binary	System indicator: **Bit** **Meaning when set** **0** Reserved. **1** Subtypes are valid. **2-7** Reserved.
5	5	SMF2IRTY	1	binary	Record type 2 (X'02').
6	6	SMF2ITME	4	binary	Time since midnight, in hundredths of a second, of the interval.
10	A	SMF2IDTE	4	packed	Date of the interval, in the form `0`*cyydddF*. See “Standard and Extended SMF record headers” on page 162 for a detailed description.
14	E	SMF2ISID	4	EBCDIC	System identification: `DUMY`
18	12	SMF2IWID	4	EBCDIC	Subsystem identification.
22	16	SMF2ISTP	2	binary	Subtype 2 (X'0002').
24	18	SMF2IRSID	4	EBCDIC	The interval's SID.
28	1C	SMF2IFLG2	1	binary	Group indicators: **Bit** **Meaning when set** **0** First interval written. **1** Interval's subtype is valid. **2** This interval is the result of a HALT. **3** This interval contains new cryptography options. **4** Reserved. **6** This record was generated on a system where the fix for APAR OA55526 was applied. **7** This record contains a self-defining section.
29	1D	SMF2IRTYPE	1	binary	The record type for this interval.
30	1E	SMF2ISTYPE	2	binary	The record subtype for this interval.
32	20	SMF2IFTME	4	binary	Time since midnight, in hundredths of a second, of the first record in the interval.
36	24	SMF2IFDTE	4	EBCDIC	Date of the first record in the interval, in the form `0`*cyydddF*. See “Standard and Extended SMF record headers” on page 162 for a detailed description.
40	28	SMF2ILTME	4	binary	Time since midnight, in hundredths of a second, of the last record in the interval.
44	2C	SMF2ILDTE	4	EBCDIC	Date of the last record in the interval, in the form `0`*cyydddF*. See “Standard and Extended SMF record headers” on page 162 for a detailed description.
48	30	SMF2INTME	4	binary	Time since midnight, in hundredths of a second, of the next interval.

Offsets		Name	Length	Format	Description
52	34	SMF2INDTE	4	EBCDIC	Date of the next interval, in the form 0*cyydddF*. See “Standard and Extended SMF record headers” on page 162 for a detailed description.
56	38	SMF2ICNT	4	binary	The number of records in this signature interval.
60	3C	SMF2IHASHMETH	1	binary	A bit array indicating the hash method used for this group. **Bit** **Meaning when set** **0** SHA1 **1** SHA256 **2** SHA384 **3** SHA512 **4-7** Reserved
61	3D	SMF2ISIGTYPE	1	binary	A bit array indicating the signature type used for this group. **Bit** **Meaning when set** **0** RSA **1** ECDSA **2-7** Reserved
62	3E	SMF2ITOKENNAME	32	EBCDIC	The saved CKA_ID of the PKCS#11 token name used to generate this signature.
94	5E	*	2	–	Reserved space for future expansion.
96	60	SMF2ISIGLEN	4	binary	The digital signature length for this signature interval.
100	64	SMF2ISIG	varies	EBCDIC	The digital signature for this signature interval. It is the result of the hash and sign operation (using the hash method and signature type specified in this record) on the concatenation of the following: 1. Running hashsum of all this group's records (hash each entire record padded out to a 128-byte boundary with zeros). 2. Hash of the previous interval record's data, from the beginning of the record up to, but not including, the SMF2ISIGLEN field. 3. Hash of this interval record's data, from the beginning of the record up to, but not including, the SMF2ISIGLEN field. The length of this signature is contained in SMF2ISIGLEN.

Subtype 2 - Self-defining section

This section contains the triplet fields (offset, length, and number) that locate other sections in the record. This triplet information should be checked prior to accessing a section of the record. The "number" triplet field is the primary indication of the existence of the section. This section is an extension of the header and physically follows it in the record. It is located at the offset of SMF2ISIG (100 or X'64') plus the length of the digital signature in SMF2ISIGLEN. The self-defining section is present only when bit 7 in the SMF2IFLG2 field in the header is on.

Offsets		Name	Length	Format	Description
0	0	SMF2ISDSLEN	2	binary	Length of the self-defining section.
2	2	*	2	binary	Reserved.
4	4	SMF2ISDSASignOffset	4	binary	Offset to start of ARECSIGN section, including the record descriptor word (RDW).
8	8	SMF2ISDSASignLen	2	binary	Length of ARECSIGN section.
10	A	SMF2ISDSASignNum	2	binary	Number of ARECSIGN sections.

Subtype 2 - ARECSIGN section

This section contains the alternate signature information. This section is present only when ARECSIGN is in effect at the time the record is generated.

Triplet information: This section is located using the following triplet fields which are located in the self-defining section.

Offset:
SMF2ISDSASignOffset

Length:
SMF2ISDSASignLen

Number:
SMF2ISDSASignNum. This field contains 0 if no ARECSIGN section is present, or non-zero if at least one ARECSIGN section is present.

Offsets		Name	Length	Format	Description
0	0	SMF2IASignHashMeth	1	binary	A bit array indicating the alternate signature hash method for this group. **Bit** **Meaning when set** **0 - 2** Reserved **3** SHA512 **4 - 7** Reserved
1	1	SMF2IASignSigType	1	binary	A bit array indicating the alternate signature type used for this group. **Bit** **Meaning when set** **0 - 1** Reserved **2** LI2 **3 - 7** Reserved
2	2	SMF2IASignTokenName	32	EBCDIC	The saved CKA_ID of the PKCS#11 token name used to generate this signature.
34	22	SMF2IASignFlgs	1	binary	Alternate signature indicators. **Bit** **Meaning when set** **0** This interval contains new cryptography options. **1 - 7** Reserved.
35	23	*	1	binary	Reserved.

Offsets		Name	Length	Format	Description
36	24	SMF2IASignSigLen	4	binary	The length of the alternate digital signature for this signature group.
40	28	SMF2IASignSig	varies	EBCDIC	The digital signature for this signature group. The length of this field is in SMF2IASignSigLen.

Record type 3 (X'03') — Dump Trailer

The SMF dump program writes record type 3 to the dump data set. This record consists of the standard SMF record header only. It marks the end of a dump of the SMF data set from a direct access device (usually to a tape).

Record environment

The following conditions exist for the generation of this record:

Macro
None

Record mapping

Header/Self-defining Section

This section contains the common SMF record header fields and, if applicable, the triplet fields (offset/length/number) that locate the other sections on the record.

Offsets		Name	Length	Format	Description
0	0	SMF3LEN	2	binary	Record length. This field and the next field (total of four bytes) form the RDW (record descriptor word). See "Standard and Extended SMF record headers" on page 162 for a detailed description.
2	2	SMF3SEG	2	binary	Segment descriptor (see record length field).
4	4	SMF3FLG	1	binary	System indicator: **Bit** **Meaning when set** **0-2** Reserved **3-6** Version indicators* **7** Reserved. *See "Standard and Extended SMF record headers" on page 162 for a detailed description.
5	5	SMF3RTY	1	binary	Record type 3 (X'03').
6	6	SMF3TME	4	binary	Time since midnight, in hundredths of a second, when the record was moved into the dump data set.
10	A	SMF3DTE	4	packed	Date when the record was moved into the dump data set, in the form 0*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for a detailed description.
14	E	SMF3SID	4	EBCDIC	System identification (from the SID parameter).

Record type 4 (X'04') — Step Termination

Record type 4 is written at the normal or abnormal termination of a job step for a background job, or when a job step is flushed during or after job initiation. It is not written for a job step that follows a CANCEL operator command.

Note: IBM recommends that you use record type 30 rather than record types 4, 5, 20, 34, 35, and 40. Use of record type 4 may cause you to miss key workload indicators.

This record identifies the job step by the job log identification, step name, number of the step within the job, user identification, program name and performance group number. The job name, time, and date that the reader recognized the JOB card (for this job) constitute the job log identification. If accounting numbers (which can be alphameric) were specified in the EXEC statement, they are included.

This record also contains operating information such as:

- The job step start and end times
- Step CPU time
- Step service
- Step termination status
- Number of records in DD DATA and DD* data sets (processed by the step)
- Device allocation start time
- Problem program start time
- Storage protect key.

It contains the number of page-ins, page-outs, swap-ins, and swap-outs for both VIO and non-VIO data sets.

Record type 4 has an entry for each non-spooled data set that was defined by a DD statement. Each entry lists the device class, unit type, channel address, unit address, and EXCP count for the data set. Data sets are usually recorded in the order of the step DD statements; they are not identified by name. (An installation written IEFUJV exit routine can record this order as each statement is validated). Dynamic allocation or deallocation can affect the order. For data sets that are dynamically unallocated, the data set entry information is in record type 40 — not record type 4.

When the TIOT size is greater than 32K (more than 1635 DD statements), device data is not collected for the type 4 record. The data is available in the type 30 record.

The record contains information on service and transaction active timer. For information on service and transaction time, see *z/OS MVS Initialization and Tuning Guide*. For more information on EXCP count and CPU time, see Chapter 10, “EXCP count,” on page 119 and Chapter 11, “CPU time,” on page 121.

Record environment

The following conditions exist for the generation of this record:

Macro
SMFEWTM(1), BRANCH=YES (record exit: IEFU84)

Record mapping

Header/Self-defining Section

This section contains the common SMF record header fields and, if applicable, the triplet fields (offset/length/number) that locate the other sections on the record.

Offsets		Name	Length	Format	Description
0	0	SMF4LEN	2	binary	Record length. This field and the next field (total of four bytes) form the RDW (record descriptor word). See “Standard and Extended SMF record headers” on page 162 for a detailed description.
2	2	SMF4SEG	2	binary	Segment descriptor (see record length field).

Offsets		Name	Length	Format	Description
4	4	SMF4FLG	1	binary	System indicator: **Bit** **Meaning when set** **0-2** Reserved **3-6** Version indicators (see "Standard and Extended SMF record headers" on page 162 for details.) **7** Reserved.
5	5	SMF4RTY	1	binary	Record type 4 (X'04').
6	6	SMF4TME	4	binary	Time since midnight, in hundredths of a second, that the record is passed to the SMF writer. This is the time when the step terminated.
10	A	SMF4DTE	4	packed	Date when the record is passed to the SMF writer, in the form 0*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for a detailed description. This is the date when the step terminated.
14	E	SMF4SID	4	EBCDIC	System identification (from the SID parameter).
18	12	SMF4JBN	8	EBCDIC	Job name. The job name, time, and date that the reader recognized the JOB card (for this job) constitute the job log identification, or transaction name (for APPC output).
26	1A	SMF4RST	4	binary	Time since midnight, in hundredths of a second, that the reader recognized the JOB card (for this job).
30	1E	SMF4RSD	4	packed	Date when the reader recognized the JOB card (for this job), in the form 0*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for a detailed description.
34	22	SMF4UIF	8	EBCDIC	User-defined identification field (taken from common exit parameter area, not from USER=parameter on job statement).
42	2A	SMF4STN	1	binary	Step number (first step=1, and so on).
43	2B	SMF4SIT	4	binary	Time since midnight, in hundredths of a second, that the initiator selected this step.
47	2F	SMF4STID	4	packed	Date when the initiator selected this step, in the form 0*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for a detailed description.
51	33	SMF4NCI	4	binary	Number of card-image records in DD DATA and DD* data sets read by the reader for the step.
55	37	SMF4SCC	2	binary	Step completion code: X'0ccc' indicates system ABEND in the job step where *ccc* is the system ABEND code. (See *z/OS MVS System Codes*.) X'8ccc' indicates user ABEND in the job step where *ccc* is the user ABEND code. X'nnnn' indicates normal completion where *nnnn* is the contents of the two low-order bytes in register 15 at termination. X'0000' indicates either 1. The job step was flushed (not processed) because of an error during allocation or in a preceding job step, or 2. normal job completion with a return code of zero. Use this field in conjunction with the step termination indicator field (offset 87).
57	39	SMF4PRTY	1	binary	Address space dispatching priority (taken from DPRTY= parameter on EXEC card or the default APG value). For more information see *z/OS MVS Initialization and Tuning Guide*.

Offsets		Name	Length	Format	Description
58	3A	SMF4PGMN	8	EBCDIC	Program name (taken from PGM= parameter on EXEC card). If a backward reference was used, then this field contains *.DD.
66	42	SMF4STMN	8	EBCDIC	Step name (taken from name on EXEC card).
74	4A	SMF4RSV5	2	binary	Reserved. SMF4RSH0, formerly a two-byte field at this offset, has been increased to four bytes and moved to offset 82.
76	4C	SMF4SYST	2	binary	Largest amount of storage used from top of private area, in 1K units. This storage area includes the LSQA and SWA (subpools 229, 230, 236, 237, 249, and 253-255). If ADDRSPC=REAL is specified, this field equals the amount of storage used that was not from the contiguous central storage reserved for the program. See offsets 82 and 102. If storage was not allocated (job step was flushed), these fields equal zero.
78	4E	SMF4HOST	2	binary	Largest amount of storage from bottom of private area, in 1K units. This storage area includes subpools 0-127, 129–132, 244, 251 and 252. If ADDRSPC=REAL is specified, this field equals the amount of contiguous central storage that was used. See offsets 82 and 102.
80	50	SMF4RV1	2		Reserved.
82	52	SMF4RSH0	4	binary	Region size established, in 1K units taken from the REGION= parameter in the JCL, and rounded up to a 4K boundary. If ADDRSPC=REAL is specified, this field equals the amount of contiguous central storage reserved for the program. If the region requested was greater than 16 megabytes, the region established resides above 16 megabytes, and this field will contain a minimum value of 32 megabytes.
86	56	SMF4SPK	1	binary	Storage protect key, in the form *xxxx*0000 (where *xxxx* is the key).
87	57	SMF4STI	1	binary	Step termination indicator **Bit** **Meaning when set** **0** Reserved **1** Canceled by exit IEFUJV **2** Canceled by exit IEFUJI **3** Canceled by exit IEFUSI **4** Canceled by exit IEFACTRT **5** Step is to be restarted **6** If 0, normal completion. If 1, ABEND. If step completion code (offset 55) equals 0322 or 0522, IEFUTL allowed the abend to occur. If step completion code equals 0722, IEFUSO allowed the abend to occur. **7** If 0, normal completion. If 1, step was flushed.
88	58	SMF4RV2	2		Reserved.
90	5A	SMF4AST	4	binary	Device allocation start time, in hundredths of a second.
94	5E	SMF4PPST	4	binary	Problem program start time, in hundredths of a second.
98	62	SMF4RV3	1	binary	Reserved.
99	63	SMF4SRBT	3	binary	Step CPU time under SRBs, in hundredths of a second. This field includes the CPU time for various supervisory routines that are dispatched from SRBs: locking routines, page resolution, swap control, cross-memory communications (WAIT, POST, I/O POST), and TQE scheduling.

Offsets		Name	Length	Format	Description
102	66	SMF4RIN	2	binary	Record indicator **Bit** **Meaning when set** **0-3** Reserved **4** Field SMF4SETM is not valid. An overflow condition occurs when the length of the value for the step CPU time under TCBs is greater than 3 bytes. In this case, the step CPU time under TCBs is not recorded in the type 4 record (SMF4SETM); The value is available in the type 30 record (SMF30CPT). If your installation uses an accounting program that does not use the type 30 record to gather step CPU time, you must update that program. Only the type 30 record should be considered valid. **5** Device data not recorded. When the TIOT size is greater than 32K (more than 1635 DD statements), device data is not collected for the type 4 record. The data is available in the type 30 record. **6** EXCP count might be wrong. For more information on EXCP count, see Chapter 10, “EXCP count,” on page 119. **7** If 0, storage is virtual. If 1, storage is central (real). **8-15** Reserved.
104	68	SMF4RLCT	2	binary	Offset from the beginning of the record (SMF4FLG) header to the relocate section. The displacement depends upon the size of the accounting fields and the number of devices.
106	6A	SMF4LENN	2	binary	Length of device entry portion of record. Equals: (8 times the number of devices) + 2

Device Data Section

For each device assigned to each non-spooled data set, there is an eight-byte entry with the following format:

Note: When the TIOT size is greater than 32K (more than 1635 DD statements), device data is not collected for the type 4 record. The data is available in the type 30 record.

Offsets		Name	Length	Format	Description
0	0	SMF4EXPS	8	structure	Data set access information. **Note:** Virtual I/O devices are identified by the following: **Device Class** 0 **Unit Type** 0 **Device Number** X'7FFF' It is important to understand the following: Allocation messages for VIO data sets will show VIO ALLOCATED TO ddname. SMF records will show VIO unit addresses as X'7FFF'. The actual in-storage UCB built for VIO will show address X'3FFF'. For example, the messages: • IEF237I X'3FFF' ALLOCATED TO ddname • IEF237I X'7FFF' ALLOCATED TO ddname indicate that ddname is not allocated to a Virtual I/O device, but is instead allocated to a real device whose unit address is X'3FFF' or X'7FFF' respectively.
0	0	SMF4DEVC	0	binary	Device class.
1	1	SMF4UTYP	1	binary	Unit type.
2	2	SMF4CUAD	2	binary	Device number.
4	4	SMF4EXCP	4	binary	EXCP count (see offset 102).

Accounting section

After the device entries are the following fields:

Offsets		Name	Length	Format	Description
0	0	SMF4LNTH	1	binary	Length of accounting section, excluding this field.
1	1	SMF4SETM	3	binary	Step CPU time under TCBs, in hundredths of a second. This field includes the CPU time for all tasks that are dispatched from TCBs below the level of RCT. CPU time is not expected to be constant between different runs of the same job step. For more information on CPU time, see Chapter 11, “CPU time,” on page 121.
4	4	SMF4NAF	1	binary	Number of accounting fields.
5	5	SMF4ACTF	variable	EBCDIC	Accounting fields. Each entry for an accounting field contains the length of the field (one byte, binary) followed by the field (EBCDIC). A zero indicates an omitted field.

Relocate Section

Offsets		Name	Length	Format	Description
0	0	SMF4PGIN	4	binary	Number of non-VIO, non-swap page-ins for this step. This field includes page-ins that are required through page faults, specific page requests, and page fixes. It does not include page reclaims, page-ins for VIO data sets, pages that are swapped in, and page-ins for the common area.
4	4	SMF4PGOT	4	binary	Number of non-VIO, non-swap page-ins for this step. This field includes page-outs required through page requests, including those pages stolen by the paging supervisor through infrequent use. It does not include page-outs for VIO data sets, pages that are swapped out, and page-outs for the common area.
8	8	SMF4NSW	4	binary	Number of address space swap sequences. (A swap sequence consists of an address space swap-out and swap-in.)

Offsets		Name	Length	Format	Description
12	C	SMF4PSI	4	binary	Number of pages swapped in. This field includes: LSQA, fixed pages, and those pages that the real storage manager determined to be active when the address space was swapped in. It does not include page reclaims nor pages found in storage during the swap-in process (such as pages brought in from SRBs started after completion of swap-in Stage 1 processing).
16	10	SMF4PSO	4	binary	Number of pages swapped out. This field includes: LSQA, private area fixed pages, and private area non-fixed changed pages.
20	14	SMF4VPI	4	binary	Number of VIO page-ins for this step. This field includes page-ins resulting from page faults or specific page requests on a VIO window. It does not include VIO swap-ins or page-ins for the common area.
24	18	SMF4VPO	4	binary	Number of VIO page-outs for this step. This field includes page-outs resulting from specific page requests on a VIO window, and also those pages stolen by the paging supervisor through infrequent use. It does not include VIO swap-outs or page-outs for the common area.
28	1C	SMF4SST	4	binary	Step service, in service units. This field equals: total job service minus the accumulated job service before this step's initialization.
32	20	SMF4ACT (SMF4TAT)	4	binary	Step transaction active time, in 1024-microsecond units equal: total job transaction active time minus the accumulated transaction active time before this step's initialization.
36	24	SMF4PGNO	2	binary	Step performance group number (taken from PERFORM= parameter on JOB or EXEC card or the RESET operator command).
38	26	SMF4TRAN	4	binary	Step transaction residency time in 1024-microsecond units. That is the time the transaction was in central storage.
42	2A	SMF4CPM	4	binary	Number of attempts to read data from an ESO hiperspace that were not satisfied because the data has been deleted.
46	2E	SMF4RCLM	4	binary	Number of VIO reclaims for this step.
50	32	SMF4CPGN	4	binary	Number of common area page-ins for this step (LPA+CSA).
54	36	SMF4HSPI	4	binary	Number of hiperspace page-ins from auxiliary to processor storage.
58	3A	SMF4PGST	4	binary	Number of pages stolen from the storage for this step.
62	3E	SMF4PSEC	8	binary	Number of page seconds for this step, in page millisecond units. Equals: the number of pages used by this step times the processing time it held that number of pages.
70	46	SMF4LPAI	4	binary	Number of link pack area page-ins for the step.
74	4A	SMF4HSPO	4	binary	Number of hiperspace page-outs from processor to auxiliary storage.
78	4E	SMF4CPUS	4	binary	Step CPU service, in service units.
82	52	SMF4IOCS	4	binary	Step I/O service, in service units.
86	56	SMF4MSOS	4	binary	Step main storage service, in service units.
90	5A	SMF4SRBS	4	binary	Step SRB service, in service units.
94	5E	SMF4RSV1	8		Reserved.

Record type 5 (X'05') — Job Termination

Record type 5 is written at the normal or abnormal termination of a background job.

Note: IBM recommends that you use record type 30 rather than record types 4, 5, 20, 34, 35, and 40. Use of record type 5 may cause you to miss key workload indicators.

This record identifies the job by job log identification, user identification, priority, input class, and programmer's name. If accounting numbers (which can be alphameric) were specified in the JOB statement, they are included. The job name, time, and date that the reader recognized the Job card (for this job) constitute the job log identification. If the job that is terminating is ‘JES2’ or ‘JES3’ then these might be set to zero.

This record also contains operating information such as:

- The job step start and end times
- Number of steps in the job
- Number of records in DD DATA and DD* data sets (processed by the job)
- Job termination status
- Device class
- Unit type
- Storage protect key
- Job service and job CPU time (the job CPU time equals the sum of the job step times).

When a step in a multi-step job terminates abnormally, the subsequent steps, whether processed or flushed, do not propagate the step abend code for processing by this record. The code appears in the step termination record (type 4). Offset 55, can contain X'nnnn' or X'0000' (the job termination indicator (offset 65, bit 6) is set to 1 if an abend occurred in the job).

For more information on service, transaction active time, and performance group number see *z/OS MVS Initialization and Tuning Guide*. For more information on EXCP count and CPU time, see Chapter 10, "EXCP count," on page 119 and Chapter 11, "CPU time," on page 121 respectively.

Record environment

The following conditions exist for the generation of this record:

Macro
SMFEWTM(1), BRANCH=YES (record exit: IEFU84)

Record mapping

Header/Self-defining Section

This section contains the common SMF record header fields and, if applicable, the triplet fields (offset/length/number) that locate the other sections on the record.

Offsets		Name	Length	Format	Description
0	0	SMF5LEN	2	binary	Record length. This field and the next field (total of four bytes) form the RDW (record descriptor word). See "Standard and Extended SMF record headers" on page 162 for a detailed description.
2	2	SMF5SEG	2	binary	Segment descriptor (see record length field).
4	4	SMF5FLG	1	binary	System indicator: **Bit** **Meaning when set** **0-2** Reserved. **3-6** Version indicators (see "Standard and Extended SMF record headers" on page 162 for details). **7** Reserved.
5	5	SMF5RTY	1	binary	Record type 5 (X'05').
6	6	SMF5TME	4	binary	Time since midnight, in hundredths of a second, that the record was moved into the SMF buffer.
10	A	SMF5DTE	4	packed	Date when the record is passed to the SMF writer, in the form 0*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for a detailed description. This is the date that the job terminated.

Offsets		Name	Length	Format	Description
14	E	SMF5SID	4	EBCDIC	System identification (from the SID parameter).
18	12	SMF5JBN	8	EBCDIC	Job name. The job name, time, and date that the reader recognized the JOB card (for this job) constitute the job log identification, or transaction name (for APPC output).
26	1A	SMF5RST	4	binary	Time since midnight, in hundredths of a second, that the reader recognized the JOB card (for this job).
30	1E	SMF5RSD	4	packed	Date when the reader recognized the JOB card (for this job), in the form 0*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for a detailed description.
34	22	SMF5UIF	8	EBCDIC	User-defined identification field (taken from common exit parameter area, not from USER=parameter on job statement).
42	2A	SMF5NST	1	binary	Number of steps in the job.
43	2B	SMF5JIT	4	binary	Time since midnight, in hundredths of a second, that the initiator selected the job.
47	2F	SMF5JID	4	packed	Date when the initiator selected the job, in the form 0*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for a detailed description.
51	33	SMF5NCI	4	binary	Number of card-image records in DD DATA and DD* data sets read by the reader for the job.
55	37	SMF5JCC	2	binary	Job completion code: X'0ccc' indicates system ABEND in the last job step where *ccc* is the system ABEND code (see *z/OS MVS System Codes*). X'8ccc' indicates user ABEND in the last job step where *ccc* is the user ABEND code. X'nnnn' indicates normal completion where *nnnn* is the contents of the two low-order bytes in register 15 at termination. X'0000' indicates either: (see note) 1. The last job step was flushed (not processed) because of an error during allocation or in a preceding job step, or 2. normal job completion with a return code of 0. **Note:** When a step in a multi-step job terminates abnormally, the subsequent steps, whether executed or flushed, do not propagate the step abend code for processing this record. The code appears in the job termination record (type 4). In this case, the field - SMF5JCC, can contain X'nnnn'. If an abend occurred in the job, the job termination indicator (bit 6 in the SMF5JBTI field) is set to 1. Use this field in conjunction with the job termination indicator field, SMFJBTI.
57	39	SMF5JPTY	1	binary	Job selection priority. This field normally equals the user-assigned priority of zero to 13, but if the job fails while being scheduled, this field equals 14 (taken from the PRTY parameter on the JOB card). If no value is specified for the PRTY parameter on the JOB card, this field contains: • For JES3, the default priority specified on the JES3 STANDARDS initialization card • For JES2, a zero. Note that JES2 does not use the priority value reported in this field.
58	3A	SMF5RSTT	4	binary	Time since midnight, in hundredths of a second, that the reader recognized the end of the job.
62	3E	SMF5RSTD	4	packed	Date when the reader recognized the end of the job, in the form 0*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for a detailed description.

Offsets		Name	Length	Format	Description
66	42	SMF5JBTI	1	binary	**Bit** **Meaning when set** **0** Reserved. **1** Canceled by exit IEFUJV. **2** Canceled by exit IEFUJI. **3** Canceled by exit IEFUSI. **4** Canceled by exit IEFACTRT (step exit only). **5** Reserved. **6** If 0, normal completion (if 1, then ABEND). **7** Reserved.
67	43	SMF5MCI	1		Reserved.
68	44	SMF5TRAN	4	binary	Job transaction residency time, in 1024-microsecond units. That is the total amount of time the transaction was in central storage.
72	48	SMF5CKRE	1		Reserved.
73	49	SMF5RDCL	1	binary	Reader device class. (This field is not filled in for jobs submitted by way of an internal reader.)
74	4A	SMF5RUTY	1	binary	Reader unit type. (This field is not filled in for jobs submitted by way of an internal reader.)
75	4B	SMF5JICL	1	EBCDIC	Job input class (taken from JOB card; default equals ‘A’).
76	4C	SMF5SPK	1	binary	Storage protect key, in the form *xxxx*0000 where *xxxx* is the key.
77	4D	SMF5SRBT	3	binary	Job CPU time under SRBs, in hundredths of a second. This field includes the CPU time for various supervisory routines that are dispatched from SRBs: locking routines, page resolution, swap control, cross-memory communications (WAIT, POST, I/0 POST), and TQE scheduling.
80	50	SMF5TJS	4	binary	Job service, in service units.
84	54	SMF5TTAT	4	binary	Job transaction active time, in 1024-microsecond units.
88	58	SMF5RV2	4		Reserved.
92	5C	SMF5PGNO	2	binary	Reserved.
94	5E	SMF5RV3	2		Reserved.
96	60	SMF5TLEN	1	binary	Length of rest of the fixed portion of the record.
97	61	SMF5PRGN	20	EBCDIC	Programmer's name.
117	75	SMF5JCPU	3	binary	Reserved.
120	78	SMF5ACTF	1	binary	Number of accounting fields.
121	79	SMF5JSAF	variable	EBCDIC	Accounting fields. Each entry for an accounting field contains the length of the field (one byte, binary) followed by the field (EBCDIC). A zero indicates an omitted field.

Relocate Section

Offsets		Name	Length	Format	Description
0	0	SMF5CPUS	4	binary	Job CPU service, in service units.

Offsets		Name	Length	Format	Description
4	4	SMF5IOCS	4	binary	Job I/O service in service units.
8	8	SMF5MSOS	4	binary	Job main storage service, in service units.
12	C	SMF5SRBS	4	binary	Job SRB service, in service units.
16	10	SMF5RSV1	8		Reserved.

Record type 6 (X'06') — External Writer

The external writer writes record type 6 when processing is completed for the job output element (JOE). If a printer is running under the control of a functional subsystem (FSS), record type 6 is written for each data set printed on that printer.

This record identifies the output writer by SYSOUT class and form number, and identifies the job according to job log identification, JES2-assigned job number, and user identification. The job name, time, and date that the reader recognized the JOB card for this job constitute job log identification. It contains information on the output writer activity such as the number of data sets processed, and the FCB and universal character set identification for the printer.

The external writer does not fill every field in the common section. Unfilled fields are left with zeroes.

Any post-processor accounting routine that scans a type 6 record can determine the writer of the record from field SMF6SBS and check field SMF6PAD1 to determine the optional sections that are present in the record. When scanning the record for data, the accounting routine obtains the length for each extension section at run time when it moves from one section to the next. The length is a two-byte field at the beginning of each section.

It is possible that records with truncated job numbers will be generated (refer to SMF6JNM for details). This erroneous output will cause problems with customer's accounting programs as well as other report programs such as Tivoli Decision Support for z/OS. A change may be required in the testing of the record level indicator.

If a SYSOUT data set, such as one that is held, is deleted before printing, a record type 6 will not be written.

If an external writer or user-supplied writer is used, SMF produces an incomplete record type 6. SMF produces this incomplete record only when the external writer directs output to a printer or punch. If the external writer directs output to a tape or disk, then SMF does not produce this record. The incomplete record type 6 differs from the JES2 record type as follows:

- Its length is 88 bytes (offsets 88 and 92 are not produced)
- The following fields are zero:
  - The number of logical records (offset 51)
  - I/O status indicators (offset 55)
  - Subsystem generating identification (offset 62)
  - Data set control indicators (offset 66)
  - JES2 logical output device name (offset 72).

Record mapping

Header/Self-defining Section for External Writer

This section contains the common SMF record headers fields and the triplet fields (offset/length/number), if applicable, that locate the other sections on the record.

Offsets		Name	Length	Format	Description
0	0	SMF6LEN	2	binary	Record length. This field and the next field (total of four bytes) form the RDW (record descriptor word). See "Standard and Extended SMF record headers" on page 162 for a detailed description.
2	2	SMF6SEG	2	binary	Segment descriptor (see record length field).
4	4	SMF6FLG	1	binary	System indicator: **Bit** **Meaning when set** **0-2** Reserved. **3-6** Version indicators (See "Standard and Extended SMF record headers" on page 162 for details.). **7** Reserved.
5	5	SMF6RTY	1	binary	Record type 6 (X'06').
6	6	SMF6TME	4	binary	Time since midnight, in hundredths of a second, that the record was moved into the SMF buffer.
10	A	SMF6DTE	4	packed	Date when the record was moved into the SMF buffer, in the form 0*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for details.
14	E	SMF6SID	4	EBCDIC	System identification (from the SID parameter).
18	12	SMF6JBN	8	EBCDIC	Job name (taken from job's RESQ). The job name, time, and date that the reader recognized the JOB card (for this job) log identification, or transaction name (for APPC output).
26	1A	SMF6RST	4	binary	Time since midnight, in hundredths of a second, that the reader recognized the JOB card (for this job).
30	1E	SMF6RSD	4	packed	Date that the reader recognized the JOB card for this job, in the form 0*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for a detailed description.
34	22	SMF6UIF	8	EBCDIC	User identification (taken from common exit parameter area not from USER= parameter on job statement).
42	2A	SMF6OWC	1	EBCDIC	SYSOUT class (this field is blank for non-SYSOUT data sets).
43	2B	SMF6WST	4	binary	Start time since midnight, in hundredths of a second, of print/punch processor including remote device working on the data in this record.
47	2F	SMF6WSD	4	packed	Start date of print/punch processor including remote device working on the data in this record, in the form 0*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for a detailed description.
51	33	SMF6NLR	4	binary	Number of logical records written by the writer, by form number and class (this field includes JOBLOG information and data set copies). For an example, a data set of 1000 lines with two copies will show 2000 in this field.
55	37	SMF6IOE	1	binary	Zero or X'04' if the system detects an error while processing the input data set.
56	38	SMF6NDS	1	binary	Number of data sets processed by the writer and included in this record. If multiple copies are produced, each copy is counted. (This field includes JOBLOG information.)
57	39	SMF6FMN	4	EBCDIC	Form number as defined in the FORM= parameter of the DD statement.

Offsets		Name	Length	Format	Description
61	3D	SMF6PAD1	1	binary	Section indicator **Bit** **Meaning when set** **0** Reserved. **1** Common section present. **2** Reserved. **3** Enhanced SYSOUT support section present. **4-7** Reserved.
62	3E	SMF6SBS	2	binary	Subsystem identification (X'0000' indicates external writer).

I/O Data Section for External Writer

Offsets		Name	Length	Format	Description
0	0	SMF6LN1	2	binary	Length of this section, including this field.
2	2	SMF6DCI	1	binary	X'0000' indicates external writer.
3	3	SMF6INDC	1	binary	Record level indicator **Value** **Release- Support** **0** Reserved. **1** MVS/XA SP2.2.0 and before- restructured SMF type 6 record. **2** Reserved **3** MVS/ESA SP3.1.0- greater than 10K job support. **4-7** Reserved. This field definition changes with each new version of the SMF type 6 record.
4	4	SMF6JNM	4	EBCDIC	When SMF6INDC contains an X'1', this field contains a four-digit EBCDIC job number. When SMF6INDC contains an X'3' or greater, the job number has more than four digits, and this field contains zeros. The correct job number is then found in SMF6JBID.
8	8	SMF6OUT	8	EBCDIC	X'0000' external writer.
16	10	SMF6FCB	4	EBCDIC	FCB image identification (printer only).
20	14	SMF6UCS	4	EBCDIC	UCS image identification (printer only).

Common Section for External Writer

Offsets		Name	Length	Format	Description
0	0	SMF6LN3	2	binary	Length of the common section, including this field.
2	2	SMF6ROUT	4	binary	Output route code (this field is always set to zero). The route code is specified on the /*OUTPUT or DD statement.
6	6	SMF6EFMN	8	EBCDIC	Output form number. This field is set regardless of the number of characters in the forms field (SMF6FMN). The form number is specified on the FORM= parameter of the DD statement.

Offsets		Name	Length	Format	Description
14	E		16		Reserved.
30	1E	SMF6JBID	8	EBCDIC	Job ID, or transaction ID (for APPC output).
The following fields (up to and including SMF6OTOK) are only present if SMF6INDC is equal to or greater than X'04':					
38	26	SMF6STNM	8	EBCDIC	This field is not filled in for an output writer.
46	2E	SMF6PRNM	8	EBCDIC	This field is not filled in for an output writer.
54	36	SMF6DDNM	8	EBCDIC	This field is not filled in for an output writer.
62	3E	SMF6USID	8	EBCDIC	The user ID associated with the job/session that created the data set, or the user ID associated with the transaction ID (for APPC output).
70	46	SMF6SECS	8	EBCDIC	The security label of the created data set, or data set level seclabel.
78	4E	SMF6PRMD	8	EBCDIC	The processing mode of the data set.
86	56	SMF6DSNM	53	EBCDIC	The name of the data set being printed.
139	8B		3		Reserved.
142	8E	SMF6OTOK	20	EBCDIC	Reserved.

Enhanced SYSOUT Support (ESS) Section for External Writer

This section contains the output descriptor (if any) for first offloaded data set in this record.

Offsets		Name	Length	Format	Description
64	40	SMF6LN5	2	binary	Length of ESS section (including this field).
66	42	SMF6SGID	4	binary	Segment identifier. Contains 0 when the file is not segmented.
70	46	SMF6IND	1	binary	Section indicator **Bit** **Meaning when set** **0** Error obtaining scheduler JCL facility (SJF) information. Scheduler work block text unit (SWBTU) data area is not present. **1-7** Reserved.
71	47	SMF6RSV	1		Reserved.
72	48	SMF6JDVT	8	EBCDIC	JCL definition table (JDT) name in JCL definition vector table (JDTV).
80	50	SMF6TUL	2	binary	Text unit (SWBTU) data area length.
82	52	SMF6TU	VAR	binary	Text unit (SWBTU) data area. The data area can be processed using the SWBTUREQ macro and is mapped by MVS macro IEFSJPFX.

Record type 6 (X'06') — JES2 Output Writer

The JES2 writer writes record type 6 when processing is completed for a job output element (JOE), or when there is a change in certain information (indicated by "*") describing SYSOUT data sets processed in the same JOE. Record 6 is written for SYSOUT data sets that are printed or routed to a remote worstation. It is not written for held then deleted SYSOUT data sets. If a printer is running under the control of a functional subsystem (FSS), record type 6 is written for each data set printed on that printer. This record is written for spin data sets. JES2 can be induced to not write this record on a job class basis.

This record identifies the output writer by SYSOUT class and form number, and identifies the job according to job log identification, JES2-assigned job number, and user identification. It contains information on the output writer activity such as the number of logical records processed, number of data sets processed, writer start and end times, input/output status indicators data set control indicators, and JES2 logical output device name.

The JES2 writer does not fill every field in the common section. Unfilled fields are left with zeroes.

Any post-processor accounting routine that scans a type 6 record can determine the writer of the record from field SMF6SBS and check field SMF6PAD1 to determine the optional sections that are present in the record. When scanning the record for data, the accounting routine obtains the length for each extension section at run time when it moves from one section to the next. The length is a two-byte field at the beginning of each section.

This record also provides information on the activity of the 3800 (non-impact) printing subsystem.

Record mapping

Header/Self-defining Section for JES2 Output Writer

This section contains the common SMF record headers fields and the triplet fields (offset/length/number), if applicable, that locate the other sections on the record.

Offsets		Name	Length	Format	Description
0	0	SMF6LEN	2	binary	Record length. This field and the next field (total of four bytes) form the RDW (record descriptor word). See "Standard and Extended SMF record headers" on page 162 for a detailed description.
2	2	SMF6SEG	2	binary	Segment descriptor (see record length field).
4	4	SMF6FLG	1	binary	System indicator: **Bit** **Meaning when set** **0-2** Reserved **3-6** Version indicators (see "Standard and Extended SMF record headers" on page 162 for details) **7** Reserved.
5	5	SMF6RTY	1	binary	Record type 6 (X'06').
6	6	SMF6TME	4	binary	Time since midnight, in hundredths of a second, that the record was moved into the SMF buffer.
10	A	SMF6DTE	4	packed	Date when the record was moved into the SMF buffer, in the form 0*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for a detailed description.
14	E	SMF6SID	4	EBCDIC	System identification (from the SID parameter).
18	12	SMF6JBN	8	EBCDIC	Job name (taken from job's RESQ). The job name, time, and date that the reader recognized the JOB card (for this job) log identification, or transaction name (for APPC output).
26	1A	SMF6RST	4	binary	Time from midnight, in hundredths of a second, that the reader recognized the JOB card (for this job).
30	1E	SMF6RSD	4	packed	Date when the reader recognized the JOB card for this job, in the form 0*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for a detailed description.
34	22	SMF6UIF	8	EBCDIC	User-defined identification field (taken from common exit parameter area, not from USER=parameter on job statement).
42	2A	SMF6OWC	1	EBCDIC	*SYSOUT class (this field is blank for non-SYSOUT data sets).
43	2B	SMF6WST	4	binary	Start time from midnight, in hundredths of a second, of print/punch processor including remote device that is working on the data in this record.
47	2F	SMF6WSD	4	packed	Start date of print/punch processor including remote device that is working on the data in this record, in the form 0*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for a detailed description.

Offsets		Name	Length	Format	Description
51	33	SMF6NLR	4	binary	Number of logical records written by the writer, by form number and class (this field includes JOBLOG information and data set copies). For an example, a data set of 1000 lines with two copies will show 2000 in this field.
55	37	SMF6IOE	1	binary	I/O status indicators **Bit** **Meaning when set** **0-4** Reserved **5*** Data buffer read error **6** Reserved **7*** Control buffer read error. *A change in this field will cause a new record type 6.
56	38	SMF6NDS	1	binary	Number of data sets processed by the writer and included in this record. If multiple copies are produced, each copy is counted. (This field includes JOBLOG information.)
57	39	SMF6FMN	4	EBCDIC	Output form number as defined in the FORM= parameter of the DD statement. If the source field contains four or fewer characters, SMF6FMN will be set. Otherwise, this field contains blanks and the contents of the source field appear only in SMF6EFMN, described under the JES2 Common Section later in this record.
61	3D	SMF6PAD1	1	binary	Section indicator **Bit** **Meaning when set** **0** 3800 printing subsystem section present **1** Common section present **2** Reserved **3** Enhanced SYSOUT support section present **4-7** Reserved.
62	3E	SMF6SBS	2	binary	Subsystem identification — X'0002' signifies JES2.

I/O data section for JES2 output writer

This section contains the remainder of the record information.

Offsets		Name	Length	Format	Description
0	0	SMF6LN1	2	binary	Length of this section, including this field.

Offsets		Name	Length	Format	Description
2	2	SMF6DCI	1	binary	Data set control indicators **Bit** **Meaning when set** **0** Reserved **1** Record represents spin data sets **2*** Operator ended this data group **3*** Operator interrupted this data group **4*** Operator restarted this data group **5*** Record represents continuation of interrupted data group **6*** Operator overrode programmed carriage control (printer only) **7*** Punch output was interpreted (3525 only). *A change in this field will cause a new record type 6
3	3	SMF6INDC	1	binary	Record level indicator **Value** **Release — Support** **0** Reserved **1** MVS/XA JES2 SP2.2.0 and before — restructured SMF type 6 record. **2** Reserved **3** MVS/ESA JES2 SP3.1.1 — greater than 10K job support. **4** MVS/ESA JES2 SP3.1.3 — security support. **5** MVS/ESA JES2 SP4.1.0 **6-7** Reserved. This field definition changes with each new version of the SMF type 6 record.
4	4	SMF6JNM	4	EBCDIC	When SMF6INDC contains a X'1', this field contains a 4-digit EBCDIC job number. When SMF6INDC contains a X'3' or greater, and the job number has more than 4 digits, this field contains zeroes. If the job number is greater than or equal to 999, this field contains the job number. For an APPC transaction, this field contains zeroes. The correct job number or APPC transaction is found in SMF6JBID.
8	8	SMF6OUT	8	EBCDIC	JES2 logical output device name defined in JESPARMS.
16	10	SMF6FCB	4	EBCDIC	FCB image identification (for printer only). A change in this field will cause a new record type 6.
20	14	SMF6UCS	4	EBCDIC	UCS image identification (for printer only). A change in this field will cause a new record type 6.

Offsets		Name	Length	Format	Description
24	28	SMF6PGE	4	binary	Approximate page count (printer only). For a printer controlled by JES2, the count is updated: • On a new page* definition, if LINECT=0 is specified on the JOBPARM JECL statement, in the accounting field of the JOB statement, on the OUTPUT JECL statement, or on the OUTPUT JCL statement. • After the number of lines specified in LINECT or on a new page* definition. *New page: The NEWPAGE parameter on the PRINTDEF or PRT(nnnn) JES2 Initialization statement determines the method of counting pages. If NEWPAGE=ALL or NEWPAGE=DEFAULT, then skip to any channel will be counted as a page. If NEWPAGE=1, then only skip to channel 1 will be counted as a page. For a printer controlled by an FSS, the count is affected by one or more of the following: • A PAGEDEF statement • A FORMDEF statement • The presence of page mode data.
28	1C	SMF6RTE	2	binary	Output route code defined in JESPARMS. The route code is specified on the /*OUTPUT or DD statement. The form number is specified on the FORM parameter of the DD statement. This field is defined as follows: `X'0100'` indicates local routine; `X'`*nnrr*`'` (where *nn* is the node number and *rr* is the remote device within the node) indicates remote routing; and `X'00`*nn*`'` indicates local routing. If more than 255 remotes are specified (in JESPARMS) for the system, this field is set to zero.

3800 (non-impact) printing subsystem section for JES2 output writer

This section contains information on the activity of the 3800 (non-impact) printing subsystem.

Offsets		Name	Length	Format	Description
64	40	SMF6LN2	2	binary	Length of 3800 printing subsystem section including this field.
66	42	SMF6CPS	8	binary	Number of copies in each copy group. Each byte represents one copy group, and the sum of the 8 bytes is the total number of copies printed. A change in this field will cause a new record type 6 record.
74	4A	SMF6CHR	16	EBCDIC	Names of the character arrangement tables that define the characters used in printing. Each name is 4 bytes long, with a maximum of 4 names. A change in this field will cause a new record type 6.
90	5A	SMF6MID	4	EBCDIC	Names of the copy modification module used to modify the data. A change in this field will cause a new record type 6.
94	5E	SMF6FLI	4	EBCDIC	Name of the forms overlay printed on the copies. A change in this field will cause a new record type 6.
98	62	SMF6FLC	1	binary	Number of copies on which the forms overlay is printed A change in this field will cause a new record type 6.

Offsets		Name	Length	Format	Description
99	63	SMF6BID	1	binary	Options indicator **Bit** **Meaning when set** **0*** Output was burst into sheets by the Burster-Trimmer-Stacker **1*** DCB subparameter OPTCD=J was specified. Each output data line contained a table reference character that selected the character arrangement table used when printing that line. **2-7** Reserved. *A change in this field will cause a new record type 6.

JES2 Common Section for JES2 Output Writer

This section contains the general output information including the user ID associated with the job or session.

Offsets		Name	Length	Format	Description
64	40	SMF6LN3	2	binary	Length of common section (including this field).
66	42	SMF6ROUT	4	binary	Output route code This field is defined as follows: X'00010000' indicates local routing; X'nnnnrrrr' (where *nnnn* is the node number and *rrrr* is the remote device within that node) indicates remote routine; and X'0000nnnn' indicates special local routing. This field is always set regardless of the number of remotes specified by the system. The node and remote devices are defined in JESPARMS. See *z/OS JES2 Initialization and Tuning Guide* for more information.
70	46	SMF6EFMN	8	EBCDIC	Output form number. This field is set regardless of the number of characters in the forms field (SMF6FMN).
78	4E		16		Reserved.
94	5E	SMF6JBID	8	EBCDIC	Job name, transaction ID (for APPC output), or TSO/E userid.
The following fields (up to and including SMF6OTOK) are only present if SMF6INDC is equal to or greater than X'04':					
102	66	SMF6STNM	8	EBCDIC	This field is not filled in for an output writer.
110	6E	SMF6PRNM	8	EBCDIC	This field is not filled in for an output writer.
118	76	SMF6DDNM	8	EBCDIC	This field is not filled in for an output writer.
126	7E	SMF6USID	8	EBCDIC	The user ID associated with the job/session that created the data set, or the user ID associated with the transaction ID (for APPC output).
134	86	SMF6SECS	8	EBCDIC	The security label of the created data set, or the data set level seclabel.
142	8E	SMF6PRMD	8	EBCDIC	The processing mode of the data set.
150	96	SMF6DSNM	53	EBCDIC	The name of the data set being printed.
203	CB		3		Reserved.
206	CE	SMF6OTOK	20	EBCDIC	Output security token: The identifier JES assigns to those SYSOUT data sets that share common printing attributes and security information. Data sets thus grouped are then printed sequentially. If your installation also produces job header and trailer pages, these data sets appear between those job header and trailer pages as a job.

Enhanced SYSOUT Support (ESS) Section for JES2 Output Writer

This section contains the output descriptor (if any) for first offloaded data set in this record.

Offsets		Name	Length	Format	Description
64	40	SMF6LN5	2	binary	Length of ESS section (including this field).
66	42	SMF6SGID	4	binary	Segment identifier. Contains 0 when the file is not segmented.
66	42	SMF6BNOF	2	binary	Offset to bin section.
66	42	SMF6RES	2	binary	Reserved - redefines SMF6BNOF.
70	46	SMF6IND	1	binary	Section indicator **Bit** **Meaning when set** **0** Error obtaining scheduler JCL facility (SJF) information. Scheduler work block text unit (SWBTU) data area is not present. **1-7** Reserved.
71	47	SMF6RSV	1		Reserved.
72	48	SMF6JDVT	8	EBCDIC	JCL definition table (JDT) name in JCL definition vector table (JDTV).
80	50	SMF6TUL	2	binary	Text unit (SWBTU) data area length.
82	52	SMF6TU	VAR	binary	Text unit (SWBTU) data area. The data area can be processed using the SWBTUREQ macro and is mapped by MVS macro IEFSJPFX.

Record type 6 (X'06') — JES3 Output Writer

The JES3 output writer writes record type 6 for each data set processed by JES3 output service. One type 6 record is written for each data set section within an output scheduler element (OSE). If you issue the *RESTART command to restart a data set, one type 6 record is written when the data set is restarted and another type 6 record is written when the data set completes. If a printer is running under the control of a functional subsystem (FSS), record type 6 is written on the processor which has the FSS address space that processed the data set. The FSS writes the record if it processes the data set (JES3 does not).

This record identifies the output writer by SYSOUT class and form number, and identifies the job according to job log identification, JES3-assigned job number, and user identification. It contains information on the output writer activity such as:

- The number of logical records processed
- Number of data sets processed
- Output service start time and date
- I/O status indicators
- Data set control indicators
- JES3 logical output device name
- Output activity.

The JES3 writer does not fill every field in the common section. Unfilled fields are left with zeroes.

Any post-processor accounting routine that scans a type 6 record can determine the writer of the record from field SMF6SBS and check field SMF6PAD1 to determine the optional sections that are present in the record. When scanning the record for data, the accounting routine obtains the length for each extension section at run time when it moves from one section to the next. The length is a two-byte field at the beginning of each section.

It is possible that records with truncated job numbers will be generated (refer to SMF6JNM for details). This erroneous output will cause problems with customer's accounting programs as well as other report programs such as Tivoli Decision Support for z/OS. A change may be required in the testing of the record level indicator.

This record provides information on the activity of the 3800 (non-impact) printing subsystem.

Record environment

The following conditions exist for the generation of this record:

Macro
SMFEWTM, BRANCH=NO (record exit: IEFU83)

Storage Residency
31-bit

Record mapping

Header/Self-defining Section for JES3 Output Writer

This section contains the common SMF record headers fields and the triplet fields (offset/length/number), if applicable, that locate the other sections on the record.

Offsets		Name	Length	Format	Description
0	0	SMF6LEN	2	binary	Record length. This field and the next field (total of four bytes) form the RDW (record descriptor word). See “Standard and Extended SMF record headers” on page 162 for a detailed description.
2	2	SMF6SEG	2	binary	Segment descriptor (see record length field).
4	4	SMF6FLG	1	binary	System indicator: **Bit** **Meaning when set** **0-2** Reserved **3-6** Version indicators* **7** Reserved. *See “Standard and Extended SMF record headers” on page 162 for a detailed description.
5	5	SMF6RTY	1	binary	Record type 6 (X'06').
6	6	SMF6TME	4	binary	Time since midnight, in hundredths of a second, that the record was moved into the SMF buffer.
10	A	SMF6DTE	4	packed	Date that the record was moved into the SMF buffer, in the form 0*cyydddF*. See “Standard and Extended SMF record headers” on page 162 for a detailed description.
14	E	SMF6SID	4	EBCDIC	System identification (from the SID parameter).
18	12	SMF6JBN	8	EBCDIC	Job name (taken from job's RESQ). The job name, time, and date that the reader recognized the JOB card (for this job) constitutes the log identification, or transaction name (for APPC output).
26	1A	SMF6RST	4	binary	Time since midnight, in hundredths of a second, that the reader recognized the JOB card (for this job).
30	1E	SMF6RSD	4	packed	Date that the reader recognized the JOB card for this job, in the form 0*cyydddF*. See “Standard and Extended SMF record headers” on page 162 for a detailed description.
34	22	SMF6UIF	8	EBCDIC	User-defined identification field (taken from common exit parameter area, not from USER=parameter on job statement.)
42	2A	SMF6OWC	1	EBCDIC	SYSOUT class (this field is blank for non-SYSOUT data sets).
43	2B	SMF6WST	4	binary	Start time since midnight, in hundredths of a second, of output service working on the data in this record. This field is filled in at JES3 LOGIN time for the writer job.
47	2F	SMF6WSD	4	packed	Start date of output service working on the data in this record, in the form 0*cyydddF*. See “Standard and Extended SMF record headers” on page 162 for a detailed description. This field is filled in at JES3 LOGIN time for the writer job.

Offsets		Name	Length	Format	Description
51	33	SMF6NLR	4	binary	Number of logical records written by the writer. This field is filled in when a data set is completed or restarted. The count is a cumulative count which includes repeats and restarts. It does not include records skipped due to forward repositioning of the writer.
55	37	SMF6IOE	1	binary	I/O status indicators **Bit** **Meaning when set** **0-4** Reserved **5** Data buffer read error **6** Reserved **7** Control buffer read error.
56	38	SMF6NDS	1	binary	Number of data sets processed by the writer and included in this record. If multiple copies are produced, each copy is counted. (This field is filled in when data set is completed or restarted; it does not include restarts.)
57	39	SMF6FMN	4	EBCDIC	Form number — If the source field contains four or fewer characters, SMF6FMN will be set. Otherwise, this field contains blanks and the contents of the source field appears only in SMF6EFMN.
61	3D	SMF6PAD1	1	binary	Section indicator **Bit** **Meaning when set** **0** 3800 printing subsystem section present **1** Common section present **2** Reserved **3** Enhanced SYSOUT support section present **4-7** Reserved.
62	3E	SMF6SBS	2	binary	Subsystem identification — X'0005' signifies JES3.

I/O Data Section for JES3 Output Writer

Offsets		Name	Length	Format	Description
00	00	SMF6LN1	2	binary	Length of this section, including this field.

Offsets		Name	Length	Format	Description
02	02	SMF6DCI	1	binary	Data set control indicators. (These bits are set when a data set is completed or restarted.) **Bit** **Meaning when set** **0** Reserved **1** Record represents spin data sets **2** Operator ended this data group **3** Operator restarted data set with destination **4** Operator restarted this data group **5** Received operator restarted data set **6** Operator started with single space **7** Punch output was interpreted.
03	03	SMF6INDC	1	binary	Record level indicator **Value** **Release — Support** **0** Reserved **1** MVS/XA JES3 SP2.2.1 and before — restructured SMF type 6 record **2** Reserved **3** MVS/ESA JES3 SP3.1.1 — greater than 10K job support **4** MVS/ESA JES3 SP3.1.3 — security support **5-7** Reserved. This field definition changes with each new version of the SMF type 6 record.
04	04	SMF6JNM	4	EBCDIC	When SMF6INDC contains a X'1', this field contains a four-digit EBCDIC job number. When SMF6INDC contains a X'3' or greater, the job number has more than four digits, and this field contains zeroes. The correct job number is then found in SMF6JBID.
08	08	SMF6OUT	8	EBCDIC	JES3 logical output device name.
16	10	SMF6FCB	4	EBCDIC	FCB image identification (printer only).
20	14	SMF6UCS	4	EBCDIC	UCS image identification (printer only).
24	18	SMF6PGE	4	binary	For printer, approximate page count (A skip to carriage control channel one is counted as a page.) For punch, the number of cards punched. This field is filled in when a data set is completed or restarted. The count is a cumulative count which includes repeats and restarts. It does not include pages skipped due to forward repositioning of the writer.

Offsets		Name	Length	Format	Description
28	1C	SMF6DFE	2	binary	Data format error indicators. (These bits are set when a data set is completed or restarted.) **Bit** **Meaning when set** **0-5** Reserved **6** Some first character control data bad, default used **7** Bad record length (truncate or pad) **8-15** Reserved.
30	1E	SMF6OPR	2	binary	Output priority.
32	20	SMF6GRP	8	EBCDIC	JES3 logical output device group name.
40	28	SMF6RSVJ	8		Reserved for JES3.
48	30	SMF6RSVU	4		Reserved for user.

3800 (non-impact) Printing Subsystem Section for JES3 Output Writer

Offsets		Name	Length	Format	Description
0	0	SMF6LN2	2	binary	Length of 3800 printing subsystem section, including this field.
2	2	SMF6CPS	8	binary	Number of copies printed in each copy group. Each byte represents one copy group, and the sum of the 8 bytes is the total number of copies printed.
10	A	SMF6CHR	16	EBCDIC	Names of the character arrangement tables that define the characters used in printing. Each name is 4 bytes long, with a maximum of 4 names.
26	1A	SMF6MID	4	EBCDIC	Name of the copy modification module used to modify the data.
30	1E	SMF6FLI	4	EBCDIC	Name of the forms overlay printed on the copies.
34	22	SMF6FLC	1	binary	Number of copies on which the forms overlay is printed.
35	23	SMF6BID	1	binary	Options indicator **Bit** **Meaning when set** **0** Output was burst into sheets by the Burster-Trimmer-Stacker. **1** DCB subparameter OPTCD=J was specified. Each output data line contained a table reference character that selected the character arrangement table used when printing that line. **2-7** Reserved.

JES3 Common Section for JES3 Output Writer

Offsets		Name	Length	Format	Description
0	0	SMF6LN3	2	binary	Length of common section (including this field).
2	2	SMF6ROUT	4		Reserved.
6	6	SMF6EFMN	8	EBCDIC	Output form number. This field is set regardless of the number of characters in the forms field (SMF6FMN).
14	E		16		Reserved.

Offsets		Name	Length	Format	Description
30	1E	SMF6JBID	8	EBCDIC	Job ID, or transaction ID (for APPC output).
The following fields (up to and including SMF6OTOK) are only present if SMF6INDC is equal to or greater than X'04':					
38	26	SMF6STNM	8	EBCDIC	This field is not filled in for an output writer.
46	2E	SMF6PRNM	8	EBCDIC	This field is not filled in for an output writer.
54	36	SMF6DDNM	8	EBCDIC	This field is not filled in for an output writer.
62	3E	SMF6USID	8	EBCDIC	The user ID associated with the job/session that created the data set, or the user ID associated with the transaction ID (for APPC output).
70	46	SMF6SECS	8	EBCDIC	The security label of the created data set, or data set level seclabel.
78	4E	SMF6PRMD	8	EBCDIC	The processing mode of the data set.
86	56	SMF6DSNM	53	EBCDIC	The name of the data set being printed.
139	8B		3		Reserved.
142	8E	SMF6OTOK	20	EBCDIC	Reserved.

Enhanced SYSOUT Support (ESS) Section for JES3 Output Writer

This section contains the output descriptor (if any) for first offloaded data set in this record.

Offsets		Name	Length	Format	Description
00	00	SMF6LN5	2	binary	Length of ESS section (including this field).
02	02	SMF6SGID	4	binary	Segment identifier. Contains 0 when the file is not segmented.
06	06	SMF6IND	1	binary	Section indicator **Bit** **Meaning when set** **0** Error obtaining scheduler JCL facility (SJF) information. Scheduler work block text unit (SWBTU) data area is not present. **1-7** Reserved.
07	07	SMF6RSV	1		Reserved.
08	08	SMF6JDVT	8	EBCDIC	JCL definition table (JDT) name in JCL definition vector table (JDTV).
16	10	SMF6TUL	2	binary	Text unit (SWBTU) data area length.
18	12	SMF6TU	VAR	binary	Text unit (SWBTU) data area. The data area can be processed using the SWBTUREQ macro and is mapped by MVS macro IEFSJPFX.

Record type 6 (X'06') — Print Services Facility (PSF)

PSF writes record type 6 whenever data set processing is complete, that is, whenever the JES subsystem that PSF is running under is informed that the user data set is to be released. This type 6 record includes any auxiliary data sets.

For example, a job that includes a job header, data set header, two user data sets, and a job trailer produces two type 6 records. The first record contains data for the job header, the data set header, the first user data set, and any associated message data set. The second record contains data for the second user data set, any associated message data set, and the job trailer.

This record identifies the output writer by SYSOUT class and form number, and subsystem identification. It identifies the job according to job log identification, JES-assigned job number, and user identification. It contains information on the output writer activity such as:

- The number of logical records processed
- Writer start time
- I/O status indicators
- Logical output device name.

Also covered is information about the number of resources, such as:

- Fonts
- Overlays
- Page segments
- PAGEDEFS
- FORMDEFS.

This record provides information in separate sections on the activity of the non-impact printing subsystem, and information on the activity of the all-points-addressable (APA) printing subsystem.

Any post-processor accounting routine that scans a type 6 record can determine the writer of the record from field SMF6SBS and check field SMF6PAD1 to determine the optional sections that are present in the record. When scanning the record for data, the accounting routine obtains the length for each extension section at run time when it moves from one section to the next. The length is a two-byte field at the beginning of each section.

It is possible that records with truncated job numbers will be generated (refer to SMF6JNM for details). This erroneous output will cause problems with customer's accounting programs as well as other report programs such as Tivoli Decision Support for z/OS. A change may be required in the testing of the record level indicator.

Record environment

The following conditions exist for the generation of this record:

Macro
SMFWTM (record exit: IEFU83)

Mode
Task

Storage Residency
24-bit

Record mapping

Header/self-defining section for PSF

This section contains the common SMF record headers fields and the triplet fields (offset/length/number), if applicable, that locate the other sections on the record.

Offsets		Name	Length	Format	Description
0	0	SMF6LEN	2	binary	Record length. This field and the next field (total of four bytes) form the RDW (record descriptor word). See “Standard and Extended SMF record headers” on page 162 for details.
2	2	SMF6SEG	2	binary	Segment descriptor (see record length field).

Offsets		Name	Length	Format	Description
4	4	SMF6FLG	1	binary	System indicator: **Bit** **Meaning when set** **0-2** Reserved **3-6** Version indicators (see "Standard and Extended SMF record headers" on page 162 for details) **7** Reserved.
5	5	SMF6RTY	1	binary	Record type 6 (X'06')
6	6	SMF6TME	4	binary	Time since midnight, in hundredths of a second, that the record was moved into the SMF buffer. Before the SVC 83, PSF fills in this field via SVC 11 for use with PSF exit 5.
10	A	SMF6DTE	4	packed	Date when the record was moved into the SMF buffer, in the form 0*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for details. Before the SVC 83, PSF fills in this field via SVC 11 for use with PSF exit 5.
14	E	SMF6SID	4	EBCDIC	System identification (from the SID parameter).
18	12	SMF6JBN	8	EBCDIC	Job name (taken from job's RESQ). The job name, time, and date that the reader recognized the JOB card (for this job) log identification, or transaction name (for APPC output).
26	1A	SMF6RST	4	binary	Time, in hundredths of a second, that the reader recognized the JOB card (for this job).
30	1E	SMF6RSD	4	packed	Date that the reader recognized the JOB card for this job, in the form 0*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for details.
34	22	SMF6UIF	8	EBCDIC	User-defined identification field (taken from common exit parameter area, not from USER=parameter on job statement).
42	2A	SMF6OWC	1	EBCDIC	SYSOUT class (this field is blank for non-SYSOUT data sets).
43	2B	SMF6WST	4	binary	Start time, in hundredths of a second, of output service working on the data in this record. This field is filled in at JES3 LOGIN time for the writer job. **Note:** The timestamps should not be used to determine printer utilization.
47	2F	SMF6WSD	4	packed	Start date of output service working on the data in this record, in the form 0*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for a detailed description. This field is filled in at JES3 LOGIN time for the writer job. **Note:** The timestamps should not be used to determine printer utilization.
51	33	SMF6NLR	4	binary	Number of logical records written by the writer. (This field is filled in when a data set is completed or restarted; it includes repeats and restarts). This field is non-cumulative across interrupts.

Offsets		Name	Length	Format	Description
55	37	SMF6IOE	1	binary	I/O status indicators **Bit** **Meaning when set** **0-4** Reserved **5** Data buffer read error **6** Reserved **7** Control buffer read error.
56	38	SMF6NDS	1	binary	Number of data sets processed by the writer and included in this record. If multiple copies are produced, each copy is counted.
57	39	SMF6FMN	4	EBCDIC	Form number — only the first four bytes appear in this field. This value is taken from the last SETUP message or from the FORMS parameter of the OUTPUT statement for the user data set.
61	3D	SMF6PAD1	1	binary	Section indicator **Bit** **Meaning when set** **0** Non-impact printing subsystem section present **1** Common section present. **2** All-points-addressable (APA) printing subsystem section present **3** Enhanced SYSOUT support section present **4** File Transfer section present **5-7** Reserved.
62	3E	SMF6SBS	2	binary	Subsystem identification — X'0007' signifies PSF.

I/O Data Section for PSF

Offsets		Name	Length	Format	Description
0	0	SMF6LN1	2	binary	Length of this section, including this field.

Offsets		Name	Length	Format	Description
2	2	SMF6DCI	1	binary	Data set control indicators. (These bits are set when a data set is completed or restarted.) **Bit** **Meaning when set** **0** Reserved **1** Record represents spin data sets **2** Operator ended this data group **3** Operator restarted data set with destination **4** Operator restarted this data group **5** Received operator restarted data set **6** Operator started with single space **7** Reserved.
3	3	SMF6INDC	1	binary	Record level indicator. Bits 0-3 are reserved. Bits 4-7 have a value as follows: **Value** **Release — Support** **1** PSF/MVS release 1.1 — restructured SMF type 6 record **2** Reserved **3** MVS/ESA JES2 SP3.1.1 — greater than 10K job support **4** MVS/ESA JES2 SP3.1.3 and above — security support **5** MVS/ESA JES2 SP4.1.0 **6** PSF/MVS Release 3.1.0. This field definition changes with each new version of the SMF type 6 record.
4	4	SMF6JNM	4	EBCDIC	When SMF6INDC contains a X'1', this field contains a four-digit EBCDIC job number. When SMF6INDC contains a X'3' or greater, the job number has more than four digits, and this field contains zeroes. The correct job number is then found in SMF6JBID.
8	8	SMF6OUT	8	EBCDIC	For SNA-attached printers, the VTAM logical unit name. For channel-attached printers, the printer device name.
16	10	SMF6FCB	4		Reserved.
20	14	SMF6UCS	4		Reserved.
24	18	SMF6PGE	4	binary	Approximate physical page count, including duplicates and separators. This field is not incremented in the following cases: • When blank pages are sent through the printer after a job because of an NPRO request. • When a blank page is generated because PSF is not generating header and trailer pages, but mark forms is active.

Non-impact Printing Subsystem Section for PSF

This section contains information about the number of copies and the types of fonts used.

Note: This field is non-cumulative across interrupts.

Offsets		Name	Length	Format	Description
0	0	SMF6LN2	2	binary	Length of non-impact printing subsystem section, including this field.
2	2	SMF6CPS	8	binary	Number of copies specified in the COPIES parameter of the OUTPUT statement for the user data set. Each byte represents one copy group. These values can be changed by operator commands.
10	A	SMF6CHR	16	EBCDIC	Names of the fonts that define the characters used in printing as specified in the JCL. Each name is 4 bytes long, with a maximum of 4 names.
26	1A	SMF6MID	4		Reserved.
30	1E	SMF6FLI	4	EBCDIC	Name of the forms overlay printed on the copies, taken from the data set JCL.
34	22	SMF6FLC	1	binary	Number of copies on which the forms overlay is printed, taken from the data set JCL.
35	23	SMF6BID	1	binary	Device indicator **Bit** **Meaning when set** **0** Output was burst into sheets by the Burster-Trimmer-Stacker. **1** DCB subparameter OPTCD=J was specified. Each output data line contained a table reference character that selected the font used when printing that line. **2** Cut-sheet printer. This field is valid only when SMF6SBS equals X'0007', and SMFINDC is equal to or greater than X'02'. **3-7** Reserved.

Common Section for PSF

This section contains the general output information including the user ID associated with the job or session.

Offsets		Name	Length	Format	Description
0	0	SMF6LN3	2	binary	Length of the common section, including this field.
2	2	SMF6ROUT	4		Output route code. This field is defined as follows: • X'00010000' indicates local routing. • X'nnnnrrrr' (where nnnn is the node number and rrrr is the remote device within that node) indicates remote routine • X'0000nnnn' indicates special local routing. This field is always set regardless of the number of remote specified by this system. The node and remote devices are defined in JESPARMS.
6	6	SMF6EFMN	8	EBCDIC	Output form number. SMF6EFMN is derived from the last setup message, the JES initialization statements, or from the FORMS parameter of the OUTPUT statement.
14	E		16		Reserved.
30	1E	SMF6JBID	8	EBCDIC	Job ID, or Transaction ID (for APPC output).
The following fields (up to and including SMF6OTOK) are only present if SMF6INDC is equal to or greater than X'04':					
38	26	SMF6STNM	8	EBCDIC	This field is not filled in for an output writer.

Offsets		Name	Length	Format	Description
46	2E	SMF6PRNM	8	EBCDIC	This field is not filled in for an output writer.
54	36	SMF6DDNM	8	EBCDIC	This field is not filled in for an output writer.
62	3E	SMF6USID	8	EBCDIC	The user ID associated with the job/session that created the data set, or the user ID associated with the transaction ID (for APPC output).
70	46	SMF6SECS	8	EBCDIC	The security label of the created data set, or data set level seclabel.
78	4E	SMF6PRMD	8	EBCDIC	The processing mode of the data set.
86	56	SMF6DSNM	53	EBCDIC	The name of the data set being printed.
139	8B		3		Reserved.
142	8E	SMF6OTOK	20	EBCDIC	Output security token: the identifier JES assigned to those SYSOUT data sets that share common printing attributes and security information. Data sets thus grouped are then printed sequentially. If your installation also produces job header and trailer pages, these data sets appear between those job header and trailer pages as a job.

All-points-addressable printing subsystem section for PSF

This section contains meaningful data fields only if the all-points-addressable printing subsystem is running under the control of print services facility (PSF), that is, SMF6SBS equals X'0007'.

Offsets		Name	Length	Format	Description
0	0	SMF6LN4	2	binary	Length of the section (including this field).
2	2	SMF6BNOF	2	binary	Offset to the Multi-Bins Header Section from start of APA section.
4	4	SMF6FONT	4	binary	Number of fonts mapped with an MCF.
8	8	SMF6LFNT	4	binary	Number of fonts loaded.
12	C	SMF6OVLY	4	binary	Number of overlays mapped with an MMO.
16	10	SMF6LOLY	4	binary	Number of overlays loaded.
20	14	SMF6PGSG	4	binary	Number of page segments mapped with an MPS.
24	18	SMF6LPSG	4	binary	Number of page segments loaded.
28	1C	SMF6IMPS	4	binary	Number of sides of sheets of paper printed (number of logical impressions), including duplicates and separators. This field is non-cumulative across interrupts and is valid only when SMFINDC is equal to or greater than X'02'. This field is not incremented in the following cases: • When blank pages are sent through the printer after a job because of an NPRO request. • When a blank page is generated because PSF is not generating header and trailer pages, but mark forms is active.
32	20	SMF6FEET	4	binary	Number of feet of paper printed for the document (zero for printers that do not report paper size). This field is non-cumulative across interrupts. This field is not incremented in the following cases: • When blank pages are sent through the printer after a job because of an NPRO request. • When a blank page is generated because PSF is not generating header and trailer pages, but mark forms is active.
36	24	SMF6PGDF	4	binary	Number of PAGEDEFS used.
40	28	SMF6FMDF	4	binary	Number of FORMDEFS used.

Offsets		Name	Length	Format	Description
44	2C	SMF6BIN	1	binary	Bin indicators. This field is valid only when SMF6INDC is equal to or greater than X'02' and for printers that support bin selection. **Bit** **Meaning when set** **0** Bin 1 used for any part of the data set **1** Bin 2 used for any part of the data set **2** Bin 3 used for any part of the data set **3** Bin 4 used for any part of the data set **4-7** Reserved.
45	2D	SMF6PGOP	1	binary	Duplex indicators. This field is valid only when SMF6INDC is equal to or greater than X'02'. **Bit** **Meaning when set** **0** Standard duplex was used for any part of the data set. **1** Tumble duplex was used for any part of the data set. System security indicators. Valid only when SMF6INDC is equal to or greater than X'04'. **2** Keyword SYSAREA=YES **3** Keyword DPAGELBL=YES **4** Print operation was successful **5** Keyword SPAGELBL=YES **6** Error occurred processing the security overlay **7** Image generator overrun error occurred.
46	2E	SMF6FLG3	1	binary	Flags **Bit** **Meaning when set** **0** Security label integrity is guaranteed. Valid only when SMF6INDC is equal to or greater than X'04' **1** The job header page was printed **2** The job trailer page was printed **3** Data page labelling was suppressed **4** User printable area was suppressed.
47	2F		1		Reserved.
48	30	SMF6NSOL	4	binary	Number of security overlays used while printing the data set. Valid only when SMF6INDC is equal to or greater than X'04'.
52	34	SMF6NSFO	4	binary	Number of security fonts used while printing the data set. Valid only when SMF6INDC is equal to or greater than X'04'.

Offsets		Name	Length	Format	Description
56	38	SMF6NPS	4	binary	Number of security page segments used while printing the data set. Valid only when SMF6INDC is equal to or greater than X'04'.
60	3C	SMF6FDNM	8	EBCDIC	FORMDEF name used to print the data set.
68	44	SMF6PDNM	8	EBCDIC	PAGEDEF name used to print the data set.
76	4C	SMF6PTDV	8	EBCDIC	PRINTDEV name used to print the data set.
84	54	SMF6SETU	8	EBCDIC	COMSETUP name used to print the data set.
92	5C		24		Reserved.
116	74	SMF6LPGE	4	binary	Number of logical pages processed. (The accumulative number of logical pages per side.) This field is non-accumulative across interrupts. This field is not incremented in the following case: • When blank pages are sent through the printer after a job because of an NPRO request. • When a blank page is generated because PSF is not generating header and trailer pages, but forms marking is active.

Multi-Bins Header Section for PSF

Offsets		Name	Length	Format	Description
0	0	SMF6BNLN	2	binary	Length bins section including FLD.
2	2	SMF6BNUM	2	binary	Number of counters entries.

Multi-Bins Counter Section for PSF

Offsets		Name	Length	Format	Description
0	0	SMF6BNNO	1	binary	Bin number.
1	1	SMF6BNCT	3	binary	Bin counter. This field is not incremented in the following cases: • When blank pages are sent through the printer after a job because of an NPRO request. • When a blank page is generated because PSF is not generating header and trailer pages, but mark forms is active.
4	4	SMF6BNLE	2	binary	Paper length in millimeters.
6	6	SMF6BNWI	2	binary	Paper width in millimeters.

Enhanced SYSOUT Support (ESS) Section for PSF

This section contains the output descriptor (if any) for the first offloaded data set in this record.

Offsets		Name	Length	Format	Description
0	0	SMF6LN5	2	binary	Length of ESS section (including this field).
2	2	SMF6SGID	4	binary	Segment identifier. Contains 0 when the file is not segmented.
6	6	SMF6IND	1	binary	Section indicator **Bit** **Meaning when set** **0** Error obtaining scheduler JCL facility (SJF) information. Scheduler work block text unit (SWBTU) data area is not present. **1-7** Reserved.
7	7	SMF6RSV	1		Reserved.

Offsets		Name	Length	Format	Description
8	8	SMF6JDVT	8	EBCDIC	JCL definition table (JDT) name in JCL definition vector table (JDTV).
16	10	SMF6TUL	2	binary	Text unit (SWBTU) data area length.
18	12	SMF6TU	VAR	binary	Text unit (SWBTU) data area. The data area can be processed using the SWBTUREQ macro and is mapped by MVS macro IEFSJPFX.

File Transfer Section for PSF

Offsets		Name	Length	Format	Description
0	0	SMF6LN6	2	binary	Length of File Transfer section (including this field).
2	2	SMF6BYTE	4	binary	Total bytes sent.
6	6	SMF6IPV4	4	binary	Target IPv4 address.
10	A	SMF6FTL	1	binary	Level indicator for file transfer section.
11	B		11	char	Reserved.
22	16	SMF6PQLN	2	binary	Length of print queue name.
24	18	SMF6PRTQ	variable	EBCDIC	Print queue name.
48	30	SMF6BYTD	8	binary	Total bytes sent when > 4 gigabytes.
56	38	SMF6IPV6	16	binary	Target IPv6 IP address.

Record type 6 (X'06') — IP PrintWay

IP PrintWay writes record type 6 before deleting a data set from the JES spool or before releasing the data set back to the system (JES).

If IP PrintWay has attempted to transmit the data set to the target system, the file-transfer section contains the number of bytes IP PrintWay transmitted or attempted to transmit. If IP PrintWay attempted to transmit the data set more than once, the file-transfer section contains the total number of bytes in all transmission attempts, including the number of bytes in the successful transmission, if any.

If IP PrintWay restarts a data set that IP PrintWay had previously released back to the system, two SMF records may be written for the same data set. IP PrintWay writes one SMF record when it releases the data set back to the system and writes another when it deletes the data set from the JES spool. When IP PrintWay writes a record for a data set that it restarted, that record contains only the number of bytes transmitted, if any, after IP PrintWay restarted the data set. The calculation of records read (SMF6NLR) and pages printed (SMF6PGE) is handled like that of bytes transmitted.

If IP PrintWay basic mode resubmits a data set to Print Interface for filtering, IP PrintWay basic mode writes two SMF type-6 records for the data set, one record when IP PrintWay sends the data set to Print Interface, and another record when it sends the data set to the printer. You can use the IP PrintWay SMF exit to suppress the first SMF record written.

Determining the writer of the IP PrintWay record type 6: Any post-processor accounting routine that scans a type 6 record can determine the writer of the record from field SMF6SBS and check field SMF6PAD1 to determine the optional sections that are present in the record. When scanning the record for data, the accounting routine obtains the length for each extension section at run time when it moves from one section to the next. The length is a two-byte field at the beginning of each section.

Distinguishing between IP PrintWay basic and extended modes: To ascertain whether type 6 records were written by IP PrintWay basic mode or IP PrintWay extended mode, use the following flag field:

- IP PrintWay basic mode: SMF6INDC is set to 1
- IP PrintWay extended mode: SMF6INDC is set to 7

For additional information about this record, see *z/OS Infoprint Server Operation and Administration*.

Record environment

The following conditions exist for the generation of this record:

Macro
SMFWTM (record exit: IEFU83)

Mode
Task

Storage Residency
31-bit

Record mapping

Header/self-defining section for IP PrintWay

This section contains the common SMF record headers fields and the triplet fields (offset/length/number), if applicable, that locate the other sections on the record.

Offsets		Name	Length	Format	Description
0	0	SMF6LEN	2	binary	Record length. This field and the next field (total of four bytes) form the RDW (record descriptor word). See "Standard and Extended SMF record headers" on page 162 for details.
2	2	SMF6SET	2	binary	Segment descriptor (see record length field).
4	4	SMF6FLG	1	binary	System Indicator: **Bit** **Meaning when set** **0-2** Reserved **3-6** Version indicators (see "Standard and Extended SMF record headers" on page 162 for details) **7** Reserved.
5	5	SMF6RTY	1	binary	Record type 6 (X'06')
6	6	SMF6TME	4	binary	Time since midnight, in hundredths of a second, that the record was moved into the SMF buffer.
10	A	SMF6DTE	4	packed	Date when the record was moved into the SMF buffer, in the form 0cyydddF. See "Standard and Extended SMF record headers" on page 162 for details.
14	E	SMF6SID	4	EBCDIC	System identification (from the SID parameter).
18	12	SMF6JBN	8	EBCDIC	Job name (taken from job's RESQ). The job name, time, and date that the reader recognized the JBO card (for this job) log identification, or transaction name (for APPC output).
26	1A	SMF6RST	4	binary	Time, in hundredths of a second, that the reader recognized the JOB card (for this job).
30	1E	SMF6RSD	4	packed	Date that the reader reconciled the JOB card for this job, in the form 0cyydddF. See "Standard and Extended SMF record headers" on page 162 for details.
34	22	SMF6UIF	8	EBCDIC	User identification (taken from common exit parameter area not from USER=parameter on job statement).
42	2A	SMF6OWC	1	EBCDIC	SYSOUT class (this field is blank for non-SYSOUT data sets).

Offsets		Name	Length	Format	Description
43	2B	SMF6WST	4	binary	Start time, in hundredths of a second, of output service working on the data in this record. This field is filled in at JES3 LOGIN time for the writer job. **Note:** The timestamps should not be used to determine printer utilization.
47	2F	SMF6WSD	4	packed	Start date of output service working on the data in this record, in the form 0cyydddF. See "Standard and Extended SMF record headers" on page 162 for details. This field is filled in at JES3 LOGIN time for the writer job. **Note:** The timestamps should not be used to determine printer utilization.
51	33	SMF6NLR	4	binary	Number of logical records read by the writer. This field contains a value established like the byte count described in the introduction.
55	37	SMF6IOE	1	binary	I/O status indicators **Bit** **Meaning when set** **0-4** Reserved **5** Data buffer read error **6** Reserved. **7** Control buffer read error
56	38	SMF6NDS	1	binary	Number of copies of the data set requested.
57	39	SMF6FMN	4	EBCDIC	Form number — only the first four bytes appear in this field. This value is taken from the last SETUP message or from the FORMS parameter of the OUTPUT statement for the user data set.
61	3D	SMF6PAD1	1	binary	Section indicator **Bit** **Meaning when set** **0** Reserved **1** Common section present **2** Reserved. **3** Enhanced SYSOUT support section present **4** File Transfer section present **5-7** Reserved
62	3E	SMF6SBS	2	binary	Subsystem identification -- X'0009' signifies IP PrintWay.

I/O Data Section for IP PrintWay

Offsets		Name	Length	Format	Description
0	0	SMF6LN1	2	binary	Length of this section, including this field.

Offsets		Name	Length	Format	Description
2	2	SMF6DCI	1	binary	Data set control indicators (These bits are set when a data set is completed or restarted). **Bit** **Meaning when set** **0** Transmission attempted **1** Transmission successful **2** Reserved. **3** Data set released to the system with checkpoint **4** Data set restarted using checkpoint information. **5-7** Reserved
3	3	SMF6INDC	1	binary	Record level indicator **Bit** **Meaning when set** **0-3** Reserved **4–7** Have a value as follows: **Value** **Release — Support** **1** IP PrintWay basic mode **2-6** Reserved **7** IP PrintWay extended mode - z/OS V1R5 and above This field definition changes with each new version of the SMF type 6 record.
4	4	SMF6JNM	4	EBCDIC	This field contains zeroes. The correct job number is found in SMF6JBID.
8	8	SMF6OUT	8	EBCDIC	Printer name.
16	10	SMF6FCB	4		Reserved.
20	14	SMF6UCS	4		Reserved.
24	18	SMF6PGE	4		For IP PrintWay extended mode, the total number of pages that printed successfully. When the printer prints on both sides of a sheet of paper (duplex printing), most printers count each side as one page. If no pages printed, or if no page count is available, this field contains X'00'. For IP PrintWay basic mode, this field contains X'00' Tips: 1. IP PrintWay fills in the page count only when it uses the direct sockets protocol to send data to the printer and the "Record pages printed for accounting" option is selected in the Printer Inventory. 2. If the document did not finish printing, this field contains the number of pages that printed before the error. Field SMF6DCI contains X'00'.

Common Section for IP PrintWay

This section contains the general output information including the user ID associated with the job or session.

Offsets		Name	Length	Format	Description
0	0	SMF6LN3	2	binary	Length of the common section, including this field.
2	2	SMF6ROUT	4		Reserved.
6	6	SMF6EFMN	8	EBCDIC	Output form number. SMF6EFMN is derived from the last setup message, the JES initialization statements, or from the FORMS parameter of the OUTPUT statement.
14	E		16		Reserved
30	1E	SMF6JBID	8	EBCDIC	Job ID.
38	26	SMF6STNM	8	EBCDIC	Step name.
46	2E	SMF6PRNM	8	EBCDIC	Proc step name.
54	36	SMF6DDNM	8	EBCDIC	DD name.
62	3E	SMF6USID	8	EBCDIC	The user ID associated with the job/session that created the data set.
70	46	SMF6SECS	8	EBCDIC	Reserved.
78	4E	SMF6PRMD	8	EBCDIC	The processing mode of the data set.
86	56	SMF6DSNM	53	EBCDIC	The name of the data set being printed.
139	8B		3		Reserved.
142	8E	SMF6OTOK	20	EBCDIC	Output security token: assigns to those SYSOUT data sets that share common printing attributes and security information. Data sets thus grouped are then printed sequentially. If your installation also produces job header and trailer pages, these data sets appear between those job header and trailer pages as a job.

Enhanced SYSOUT Support (ESS) Section for IP PrintWay

This section contains the output descriptor (if any) for first offloaded data set in this record:

Offsets		Name	Length	Format	Description
0	0	SMF6LN5	2	binary	Length of ESS section (including this field).
2	2	SMF6SGID	4	binary	Segment identifier.
6	6	SMF6IND	1	binary	Section indicator: **Bit** **Meaning when set** **0** Error obtaining scheduler JCL facility (SJF) information. Scheduler work block text unit (SWBTU) data area is not present. **1-7** Reserved.
7	7	SMF6RSV	1		Reserved.
8	8	SMF6JDVT	8	EBCDIC	JCL definition table (JDT) name in JCL definition vector table (JDTV).
16	10	SMF6TUL	2	binary	Text unit (SWBTU) data area length.
18	12	SMF6TU	VAR	binary	Text unit (SWBTU) data area. The data area can be processed using the SWBTUREQ macro.

File Transfer Section for IP PrintWay

Offsets		Name	Length	Format	Description
0	0	SMF6LN6	2	binary	Length of File Transfer section (including this field).
2	2	SMF6BYTE	4	binary	Total number of bytes transmitted, described in the section introduction.

Offsets		Name	Length	Format	Description
6	6	SMF6IP1	1	binary	1st segment of IP address of target address. If these records are written in IP PrintWay extended mode, these fields contain 0. IP PrintWay basic mode fills in the IP address only when it uses the LPR or direct sockets protocols to send data to the printer.
7	7	SMF6IP2	1	binary	2nd segment of IP address of target address. If these records are written in IP PrintWay extended mode, these fields contain 0. IP PrintWay basic mode fills in the IP address only when it uses the LPR or direct sockets protocols to send data to the printer.
8	8	SMF6IP3	1	binary	3rd segment of IP address of target address. If these records are written in IP PrintWay extended mode, these fields contain 0. IP PrintWay basic mode fills in the IP address only when it uses the LPR or direct sockets protocols to send data to the printer.
9	9	SMF6IP4	1	binary	4th segment of IP address of target address. If these records are written in IP PrintWay extended mode, these fields contain 0. IP PrintWay basic mode fills in the IP address only when it uses the LPR or direct sockets protocols to send data to the printer.
10	A	SMF6FTL	1	binary	File transfer level indicator **Value** **Meaning** **0** IP PrintWay basic mode wrote the record. **1** IP PrintWay extended mode wrote the record. Fields SMF6ACTL and SMF6ACCT are not present. **3** IP PrintWay extended mode wrote the record. Fields SMF6ACTL and SMF6ACCT are present.
11	B		11		Reserved.
22	16	SMF6PQLN	2	binary	Length of the Print Queue Name field. When IP PrintWay basic mode writes the record, SMF6PQLN contains the length of the SMF6PRTQ field. When IP PrintWay extended mode writes the record, SMF6PQLN contains the length of the meaningful portion of SMF6PRTQ.
24	18	SMF6PRTQ	24	EBCDIC	Print Queue Name. If IP PrintWay basic mode writes the record, SMF6PRTQ is variable in length, with the length as specified in SMF6PQLN. If IP PrintWay extended mode writes the record, SMF6PRTQ is always 24 bytes in length and the print queue name is padded to the right with blanks. SMF6PQLN can be used to extract the print queue name from SMF6PRTQ.
48	30	SMF6BYTD	8	binary	For IP PrintWay extended mode, the total bytes transmitted (64-bit integer), described in the section introduction. For IP PrintWay basic mode, the SMF6BYTD field is not present.
56	38		16		Reserved
72	48	SMF6URIL	2	binary	For IP PrintWay extended mode, the length of the target device universal resource indicator (URI). For IP PrintWay basic mode, the SMF6URIL field is not present.
74	4A	SMF6URI	variable	EBCDIC	For IP PrintWay extended mode, the target device universal resource indicator (URI). For IP PrintWay basic mode, the SMF6URI field is not present.
329	149	*	3		Reserved
332	14C	SMF6ACTL	2	binary	For IP PrintWay extended mode, the length of the accounting information in the SMF6ACCT field. If this field contains 0, there is no accounting information in SMF6ACCT. This situation can occur if Print Interface or NetSpool dynamically allocated the print job on the JES spool. For IP PrintWay basic mode, this field is not present.

Offsets		Name	Length	Format	Description

334	14E	SMF6ACCT	143	EBCDIC	For IP PrintWay extended mode, accounting information from the JOB JCL statement. The first byte contains the number (in binary) of accounting pairs that follow. Each accounting pair has this format:
					• 1 byte with the length (in binary) of accounting information that follows. If the length is zero, there is no string of accounting information in this accounting pair.
					• A variable length string that contains the accounting information (in EBCDIC).
					For example, if the JOB JCL statement contains:
					`(TSS40000,JROMXB,1234,5,4321,,3,N,254)`
					The SMF SMF6ACCT field contains:
					`‘0908e3e2e2f4f0f0f0f006d1d9d6d4e7c204f1f2f3f401f5 04f4f3f2f10001f301d503f2f5f4’x`
					For IP PrintWay basic mode, this field is not present.

477	1DD	*	3		Reserved

Record type 7 (X'07') — Data Lost

If all SMF buffers become full (either a result of no available output data sets for SMF to write to OR the system generating records at a rate faster than SMF can physically write them), SMF data will be lost. When this condition occurs, record type 7 tracks the number of lost records. It contains a count of the SMF records that were not written and the start and end times of the period when data was lost. (The end time is the time recorded in SMF7TME at offset 6).

Record type 7 is not built until SMF buffers become available again. Data existing in the SMF buffer, prior to data lost, is written to available SMF data sets before record type 7 is written to a data set.

Record environment

The following conditions exist for the generation of this record:

Macro
SMFEWTM(1), BRANCH=YES (record exit: IEFU84)

Record mapping

Header/Self-defining Section

This section contains the common SMF record headers fields and the triplet fields (offset/length/number), if applicable, that locate the other sections on the record.

Offsets		Name	Length	Format	Description
0	0	SMF7LEN	2	binary	Record length. This field and the next field (total of four bytes) form the RDW (record descriptor word). See “Standard and Extended SMF record headers” on page 162 for a detailed description.
2	2	SMF7SEG	2	binary	Segment descriptor (see record length field).

Offsets		Name	Length	Format	Description
4	4	SMF7FLG	1	binary	System indicator: **Bit** **Meaning when set** **0-2** Reserved **3-6** Version indicators (see “Standard and Extended SMF record headers” on page 162 for details) **7** Reserved.
5	5	SMF7RTY	1	binary	Record type 7 (X'07').
6	6	SMF7TME	4	binary	Time since midnight, in hundredths of a second, when the record was built into the SMF buffer.
10	A	SMF7DTE	4	packed	Date when the record was moved into the SMF buffer, in the form 0*cyydddF*. See “Standard and Extended SMF record headers” on page 162 for a detailed description.
14	E	SMF7SID	4	EBCDIC	System identification (from the SID parameter).
18	12	SMF7NRO	2	binary	Number of SMF records lost because no SMF data sets were available for recording. Unsigned, count up to 65,535. This field is marked as invalid, and is set to zero when SMF7NRF is ON. SMF7NROX is the 4 byte equivalent of this field.
20	14	SMF7STM	4	binary	When SMF7DRP is off, this is the time when the buffers condition began. When SMF7DRP is on, this is the time when the DROP record filter became active. This field is in hundredths of a second.
24	18	SMF7STD	4	packed	When SMF7DRP is off, this is the date when the buffers condition began. When SMF7DRP is on, this is the date when the DROP record filter became active. This field is in packed decimal format: 00*yydddF*.
28	1C	SMF7FL1	1	binary	Flag byte: **Bit** **Meaning when set** **0** Bit SMF7NRF indicates that field SMF7NRO has exceeded its 2 byte capacity and is therefore invalid. Use SMF7NROX, which is the 4 byte equivalent of SMF7NRO. **1** Bit SMF7LSD indicates that this record is the result of a log stream becoming full. **2** Bit SMF7DRP indicates that this record is the result of the SMF record flood facility dropping records. **3- 7** Reserved.
29	1D	SMF7RSV1	2		Reserved.
31	1F	SMF7DTYP	1	character	The type of record that was dropped by the filter. This field is zero unless SMF7DRP is ON.
32	20	SMF7NROX	4	binary	Number of SMF records lost because no SMF data sets were available for recording. Unsigned, 4 byte equivalent of SMF7NRO.
36	24	SMF7LSN	26	character	The name of the log stream associated with the data space that experiences the loss. Only filled in when SMF7LSD is ON.
62	3E	SMF7TBLS	8	binary	The number of bytes lost during SMF initialization. This field will be non-zero if the SMF temporary buffer is exhausted and, therefore, records are lost during SMF initialization.

Record type 8 (X'08') — I/O Configuration

Record type 8 is written during IPL when the SMF address space initializes. This record identifies each device that is online at IPL by device class, unit type, and device number.

Record environment

The following conditions exist for the generation of this record:

Macro
SMFEWTM(1), BRANCH=YES (record exit: IEFU84)

Record mapping

Header/Self-defining Section

This section contains the common SMF record header fields and the triplet fields (offset/length/number), if applicable, that locate the other sections on the record.

Offsets		Name	Length	Format	Description
0	0	SMF8LEN	2	binary	Record length. This field and the next field (total of four bytes) form the RDW (record descriptor word). See "Standard and Extended SMF record headers" on page 162 for a detailed description.
2	2	SMF8SEG	2	binary	Segment descriptor (see record length field).
4	4	SMF8FLG	1	binary	System indicator: **Bit** **Meaning when set** **0-2** Reserved **3-6** Version indicators* **7** Reserved. *See "Standard and Extended SMF record headers" on page 162 for a detailed description.
5	5	SMF8RTY	1	binary	Record type 08 (X'08').
6	6	SMF8TME	4	binary	Time since midnight, in hundredths of a second, when the record was moved into the SMF buffer.
10	A	SMF8DTE	4	packed	Date when the record was moved into the SMF buffer, in the form 0*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for a detailed description.
14	E	SMF8SID	4	EBCDIC	System identification (from the SID parameter).
18	12	SMF8LENN	2	binary	Length of rest of record including this field.

Device Data Section

For each device online at IPL, there is a four-byte entry with the following format:

Offsets		Name	Length	Format	Description
0	0	SMF8IODV	4	structure	Device identification. **Note:** Virtual I/O devices are identified by the following: **Device Class** 0 **Unit Type** 0 **Device Number** X'7FFF' It is important to understand the following: Allocation messages for VIO data sets will show VIO ALLOCATED TO ddname. SMF records will show VIO unit addresses as X'7FFF'. The actual in-storage UCB built for VIO will show address X'3FFF'. For example, the messages: • IEF237I X'3FFF' ALLOCATED TO ddname • IEF237I X'7FFF' ALLOCATED TO ddname indicate that ddname is not allocated to a Virtual I/O device, but is instead allocated to a real device whose unit address is X'3FFF' or X'7FFF' respectively.
0	0	SMF8DUT	2	binary	Device class and unit type.
2	2	SMF8CHA	2	binary	Device number.

Record type 9 (X'09') — VARY Device ONLINE

Record type 9 is written when a VARY Device ONLINE command is processed. This record identifies the device being added to the configuration by device class, unit type, and device number.

Record environment

The following conditions exist for the generation of this record:

Macro
SMFWTM (record exit: IEFU83)

Storage Residency
31-bit

Record mapping

Header/Self-defining Section

This section contains the common SMF record headers fields and the triplet fields (offset/length/number), if applicable, that locate the other sections on the record.

Offsets		Name	Length	Format	Description
0	0	SMF9LEN	2	binary	Record length. This field and the next field (total of four bytes) form the RDW (record descriptor word). See “Standard and Extended SMF record headers” on page 162 for a detailed description.
2	2	SMF9SEG	2	binary	Segment descriptor (see record length field).

Offsets		Name	Length	Format	Description
4	4	SMF9FLG	1	binary	System indicator: **Bit** **Meaning when set** **0-2** Reserved **3-6** Version indicators* **7** Reserved. *See "Standard and Extended SMF record headers" on page 162 for a detailed description.
5	5	SMF9RTY	1	binary	Record type 9 (X'09').
6	6	SMF9TME	4	binary	Time since midnight, in hundredths of a second, when the record was built into the SMF buffer.
10	A	SMF9DTE	4	packed	Date when the record was moved into the SMF buffer, in the form 0*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for a detailed description.
14	E	SMF9SID	4	EBCDIC	System identification (from the SID parameter).
18	12	SMF9LENN	2	binary	Length of rest of record including this field.

Data Device Section

For each device varied online, there is an entry with the following format:

Offsets		Name	Length	Format	Description
0	0	SMF9DVAD	8	structure	Device identification. **Note:** Virtual I/O devices are identified by the following: **Device Class** 0 **Unit Type** 0 **Device Number** X'7FFF' It is important to understand the following: Allocation messages for VIO data sets will show VIO ALLOCATED TO ddname. SMF records will show VIO unit addresses as X'7FFF'. The actual in-storage UCB built for VIO will show address X'3FFF'. For example, the messages: • IEF237I X'3FFF' ALLOCATED TO ddname • IEF237I X'7FFF' ALLOCATED TO ddname indicate that ddname is not allocated to a Virtual I/O device, but is instead allocated to a real device whose unit address is X'3FFF' or X'7FFF' respectively.
0	0	SMF9DUT	2	binary	Device class and unit type.
2	2	SMF9CUA	2	binary	Device number.

Offsets		Name	Length	Format	Description
4	4	SMF9VPC	1	binary	Identifies the issuer of the vary path command that causes the specified device to change states **Value** **Meaning** **0** Operator **2** Enterprise Systems Connection Manager Program Product (5688-008) **3-7** Reserved.
5	5	SMF9RSV	3		Reserved.

Record type 10 (X'0A') — Allocation Recovery

Record type 10 is written after a successful device allocation recovery.

This record identifies the device that is made available by device class, unit type, channel address, and unit address. It identifies the job requiring the allocation job log identification and user identification.

Note: This record is produced only when the response to message IEF238D is a device number. This record is not produced for any other responses.

Record environment

The following conditions exist for the generation of each of the subtypes of this record:

Macro
SVC 83 (record exit: IEFU83)

Mode
Task

Storage Residency
24-bit

Record mapping

Header/Self-defining Section

This section contains the common SMF record headers fields the triplet fields (offset/length/number), if applicable, that locate the other sections on the record.

Offsets		Name	Length	Format	Description
0	0	SMF10LEN	2	binary	Record length. This field and the next field (total of four bytes) form the RDW (record descriptor word). See “Standard and Extended SMF record headers” on page 162 for a detailed description.
2	2	SMF10SEG	2	binary	Segment descriptor (see record length field).

Offsets		Name	Length	Format	Description
4	4	SMF10FLG	1	binary	System indicator: **Bit** **Meaning when set** **0-2** Reserved **3-6** Version indicators* **7** Reserved. *See "Standard and Extended SMF record headers" on page 162 for a detailed description.
5	5	SMF10RTY	1	binary	Record type 10 (X'0A').
6	6	SMF10TME	4	binary	Time since midnight, in hundredths of a second, that the record was built into the SMF buffer.
10	A	SMF10DTE	4	packed	Date when the record was moved into the SMF buffer, in the form 0*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for a detailed description.
14	E	SMF10SID	4	EBCDIC	System identification (from the SID parameter).
18	12	SMF10JBN	8	EBCDIC	Job name The job name, time, and date that the reader recognized the JOB card (for this job) constitute the job log identification, or transaction name (for APPC output). **Note:** This field contains blanks if allocation recovery is for a system task.
26	1A	SMF10RST	4	binary	Time since midnight, in hundredths of a second, that the reader recognized the JOB card (for this job). This field equals zero if allocation recovery is for a system task.
30	1E	SMF10RSD	4	packed	Date when the reader recognized the JOB card (for this job), in the form 0*cyydddF*. See Table 9 on page 163 for a detailed description. This field equals zero if allocation recovery is for a system task.
34	22	SMF10UIF	8	EBCDIC	User-defined identification field (taken from common exit parameter area, not from USER=parameter on job statement).
42	2A	SMF10LN	2	binary	Length of rest of record including this field.

Data Definition Section

For each device made available there is an entry with the following format:

Offsets		Name	Length	Format	Description
0	0	SMF10DEV	4	structure	Device identification. **Note:** Virtual I/O devices are identified by the following: **Device Class** 0 **Unit Type** 0 **Device Number** X'7FFF' It is important to understand the following: Allocation messages for VIO data sets will show VIO ALLOCATED TO ddname. SMF records will show VIO unit addresses as X'7FFF'. The actual in-storage UCB built for VIO will show address X'3FFF'. For example, the messages: • IEF237I X'3FFF' ALLOCATED TO ddname • IEF237I X'7FFF' ALLOCATED TO ddname indicate that ddname is not allocated to a Virtual I/O device, but is instead allocated to a real device whose unit address is X'3FFF' or X'7FFF' respectively.
0	0	SMF10DUT	2	binary	Device class and unit type.
2	2	SMF10CUA	2	binary	Device number.

Record type 11 (X'0B') — VARY Device OFFLINE

Record type 11 is written when a VARY device OFFLINE command is processed. This record identifies the device being removed from the configuration by device class, unit type, and device number.

Record environment

The following conditions exist for the generation of this record:

Macro
SMFWTM (record exit: IEFU83)

Mode
Task

Storage Residency
24-bit

Record mapping

Header/Self-defining Section

This section contains the common SMF record headers fields and the triplet fields (offset/length/number), if applicable, that locate the other sections on the record.

Offsets		Name	Length	Format	Description
0	0	SMF11LEN	2	binary	Record length. This field and the next field (total of four bytes) form the RDW (record descriptor word). See “Standard and Extended SMF record headers” on page 162 for a detailed description.
2	2	SMF11SEG	2	binary	Segment descriptor (see record length field).

Offsets		Name	Length	Format	Description
4	4	SMF11FLG	1	binary	System indicator: **Bit** **Meaning when set** **0-2** Reserved **3-6** Version indicators* **7** Reserved. *See "Standard and Extended SMF record headers" on page 162 for a detailed description.
5	5	SMF11RTY	1	binary	Record type 11 (X'0B').
6	6	SMF11TME	4	binary	Time since midnight, in hundredths of a second, that the record was moved into the SMF buffer.
10	A	SMF11DTE	4	packed	Date when the record was moved into the SMF buffer, in the form 0*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for a detailed description.
14	E	SMF11SID	4	EBCDIC	System identification (from the SID parameter).
18	12	SMF11LN	2	binary	Length of the rest of the record (including this field).

Data Definition Section

For each device varied offline, there is an entry with the following format:

Offsets		Name	Length	Format	Description
0	0	SMF11DEV	8	structure	Device identification. **Note:** Virtual I/O devices are identified by the following: **Device Class** 0 **Unit Type** 0 **Device Number** X'7FFF' It is important to understand the following: Allocation messages for VIO data sets will show VIO ALLOCATED TO ddname. SMF records will show VIO unit addresses as X'7FFF'. The actual in-storage UCB built for VIO will show address X'3FFF'. For example, the messages: • IEF237I X'3FFF' ALLOCATED TO ddname • IEF237I X'7FFF' ALLOCATED TO ddname indicate that ddname is not allocated to a Virtual I/O device, but is instead allocated to a real device whose unit address is X'3FFF' or X'7FFF' respectively.
0	0	SMF11DUT	2	binary	Device class and unit type.
2	2	SMF11CUA	2	binary	Device number.

Offsets		Name	Length	Format	Description
4	4	SMF11VPC	1	binary	Identifies the issuer of the vary path command that causes the specified device to change states **Value** **Meaning** **0** Operator **2** Enterprise Systems Connection Manager Program Product (5688-008).
5	5	SMF11RSV	3		Reserved.

Record type 14 (X'0E') — INPUT or RDBACK Data Set Activity

Record type 14 is written for non-VSAM direct access data sets, tape data sets, or VIO data sets. that are defined by DD statements or dynamic allocation and opened for RDBACK or INPUT processing by problem programs. It is written when a data set is closed or processed by EOV. Its length varies, depending upon the number of volumes for the data set.

This record contains information from the TIOT, JFCB, DCB, DEB, and UCB data areas. The job name and the time and date the reader recognized the JOB card for this job constitute the job log identification.

Note:

1. Record type 14 is not written for a data set defined by a DD* or DD DATA statement. Record type 14 is not written for BPAM if only z/OS UNIX directories are allocated. For accounting purposes, the card-image count for these data sets is provided in record type 4.
2. When PDSs are concatenated, the system treats the group as a single data set. A partitioned concatenation can contain a mixture of PDSs, PDSEs, and UNIX directories. That means you get one SMF type 14 record for the open of the concatenated group rather than one for each data set. See Concatenating PDSs in *z/OS DFSMS Using Data Sets* for more information.
3. If a data set is closed multiple times within a single step, a record is written with each close, and the data counts are cumulative. Post processing programs should consider this, otherwise duplicate counts will be processed. An exception to this is the PDSE type 6 section which is only written at close and the counts are not cumulative. Also, the PDSE type 6 section is not written with most IEBCOPY operations.

Macro to Symbolically Address Record Types 14 and 15: There are two ways to map the type 14 and 15 records:

- You can code IFASMFR in the same way as with other record types. This method does not generate a DSECT statement. It generates sections contiguously. This method might be error-prone because an ordinary USING statement will give addressability to later sections that might not exist. For example if you code USING SMF14UCB,R5 to address the UCB section, the assembler will assume that the record has only one UCB section but the actual record might have many UCB sections. If you also incorrectly refer to a subsequent section in the record, the assembler will generate the wrong offset and not give an error. One way to solve that is to use an address range such as USING (SMF14UCB,SMFHBTCH),R5. This use of an address range prevents addressability to SMFHBTCH and to later symbols.
- You can code the IFGSMF14 macro to map types 14 and 15. With this technique you will be less likely to make a coding mistake. Optionally you can code DSECT=NO or DSECT=YES. If you code no options or code DSECT=NO, the mapping is the same as if you used IFASMFR. If you code DSECT=YES, then IFGSMF14 generates several DSECTs (dummy sections). You can control the names for the DSECTs. The first DSECT name is whatever you code in the label position (normally column 1) of the macro call. If you do not code a label there, the default is IFGSMF. The tables in the next sections show the other DSECT names. Do not code "SMF14" as the label because it will cause definitions of duplicate symbols.

Record mapping

Header/Self-defining Section

This section contains the common SMF record headers fields and the triplet fields (offset/length/number), if applicable, that locate the other sections on the record.

If you coded DSECT=YES when calling the IFGSMF14 macro, then it generates a DSECT statement at this point with the DSECT name specified as the label on the IFGSMF14 macro call or, if no label was specified, the default is IFGSMF. For example, if you did not code a label on the IFGSMF14 macro call, the name of this DSECT will be IFGSMF.

Offsets		Name	Length	Format	Description
0	0	SMF14LEN	2	binary	Record length. This field and the next field (total of four bytes) form the RDW (record descriptor word). See “Standard and Extended SMF record headers” on page 162 for a detailed description.
2	2	SMF14SEG	2	binary	Segment descriptor (see record length field).
4	4	SMF14FLG	1	binary	System indicator: **Bit** **Meaning when set** **0-2** Reserved **3-6** Version indicators (see “Standard and Extended SMF record headers” on page 162 for details) **7** Reserved.
5	5	SMF14RTY	1	binary	Record type 14 (X'0E').
6	6	SMF14TME	4	binary	Time since midnight, in hundredths of a second, that the record was moved into the SMF buffer.
10	A	SMF14DTE	4	packed	Date when the record was moved into the SMF buffer, in the form 0*cyydddF*. See “Standard and Extended SMF record headers” on page 162 for a detailed description.
14	E	SMF14SID	4	EBCDIC	System identification (from the SID parameter).
18	12	SMF14JBN	8	EBCDIC	Job name. The job name, time, and date that the reader recognized the JOB card (for this job) constitute the job log identification, or transaction name (for APPC output).
26	1A	SMF14RST	4	binary	Time since midnight, in hundredths of a second, that the reader recognized the JOB card (for this job).
30	1E	SMF14RSD	4	packed	Date when the reader recognized the JOB card (for this job), in the form 0*cyydddF*. See “Standard and Extended SMF record headers” on page 162 for a detailed description.
34	22	SMF14UID	8	EBCDIC	User-defined identification field (taken from common exit parameter area, not from USER=parameter on job statement).

Offsets		Name	Length	Format	Description
42	2A	SMF14RIN	2	binary	Record and data set indicator **Bit** **Name and Meaning when set** ***First Byte*** **0** Reserved. **1** SMF14EOV. Record written by end of volume (EOV). **2** SMF14DAD. DASD. **3** SMF14TDS. Temporary data set. **4** SMF14DDA. DCBDSORG=DA (the data set organization being used is direct access-BDAM). **5** SMF14IS. DCBDSORG=IS and DCBMACRF not EXCP (the data set organization being used is indexed sequential and the EXCP access method is not being used). **6** SMF14JIS. JFCDSORG=IS (the data set organization being used is indexed sequential). **7** SMF14VIO. Virtual input output (VIO) data set access. ***Second Byte*** **0** SMF14IPD. Partitioned data set directory entries (PDSE) data set. **1** SMF14TRC. The QSAM TRUNC macro has been issued against a PDSE. **2** SMF14NSG. Null segment encountered in a PDSE. **3** SMF14STR. Extended format sequential data set indicator. **4** SMF14HBT. Hiperbatch section present. **5** SMF14XSG. Extended information segment present. **6** SMF14TCL. Task termination closed the DCB. **7** SMF14ABD. Task is terminating (TCBFA is on). **Note:** A data set is considered temporary if: • It has a system-generated name where the first qualifier starts with SYS and the second qualifier starts with T (SYS____.T___.___). or • It is created within a job step and exists only for the duration of that job step.

Section Sizes

This section contains the UCB information associated with this record.

Offsets		Name	Length	Format	Description
44	2C	SMF14SDC	1	binary	Size of DCB/DEB section.

Offsets		Name	Length	Format	Description
45	2D	SMF14NUC	1	binary	Number of UCB sections. There is always one UCB section for each UCB currently processing except for BPAM-concatenated data sets. For BPAM there is one UCB section for each data set in the concatenation except that any z/OS UNIX directories are omitted. For extended format data sets, there is one UCB section for each volume.
46	2E	SMF14SUC	1	binary	Size of each UCB section.
47	2F	SMF14SET	1	binary	Size of ISAM extension section. This field always contains X'0'. See “ISAM Extension Section” on page 231.
48	30	SMF14OPE	4	binary	Time since midnight, in hundredths of a second, when the data set was opened.

TIOT Section

This section contains a portion of the TIOT from the DD entry, the TIOT section is 16 bytes long.

Offsets		Name	Length	Format	Description
52	34	SMFTIOE1	1	binary	Length, in bytes, of the DD entry (including all device entries). This field is mapped by TIOELNGH in the TIOT mapping.
53	35	SMFTIOE2	1	binary	Status indicator. This field indicates the tape label processing to be performed; whether unallocating, rewinding, or unloading tape data sets is required. This field is mapped by TIOESSTA in the TIOT mapping.
54	36	SMFTIOE3	1	binary	Number of devices requested for this data set during allocation. For PDSE data sets, this field will always contain X'1'. This field is mapped by TIOEWTCT in the TIOT mapping.
55	37	SMFTIOE4	1	binary	A data set and device indicator. This field is mapped by TIOELINK in the TIOT mapping.
56	38	SMFTIOE5	8	EBCDIC	Data definition name (DDname). This field is mapped by TIOEDDNM in the TIOT mapping.
64	40	SMFTIOE6	3	binary	Scheduler Work Area (SWA) address of the job file control block (JFCB). This field is mapped by TIOEJFCB in the TIOT mapping.
67	43	SMFTIOE7	1	binary	This field is mapped by TIOESTTC in the TIOT mapping.

JFCB Section

This section contains information concerning the job file control block.

Offsets		Name	Length	Format	Description
68	44	SMFJFCB1 JFCBTSDM JFCBADBF JFCBLTYP JFCBCRDT JFCBXPDT JFCBIND1 JFCBIND2 JFCBCTRI JFCBPQTY JFCBSQTY	176	binary	The job file control block (JFCB), excluding JFCB extensions. Used to find uncataloged data sets. Indicates number of data buffers. Indicates type of label. Indicates file's creation date. Indicates file's expiration date. Indicates bits flag RLSE processing, extension onto a new volume and whether the file is a member of a GDG or a PDS. Indicates DISP= settings. Indicates type of space request. Indicates primary space request size. Indicates secondary space request size.

DCB/DEB Section (tape and DASD)

This section contain portions of the DCB and DEB, including:

Offsets		Name	Length	Format	Description
244	F4	SMFDCBOR	2	binary	Data set organization being used. This field is mapped by DCBDSORG in the DCB mapping.

Offsets		Name	Length	Format	Description
246	F6	SMFDCBRF	1	binary	Record format. This field is mapped by DCBRECFM in the DCB mapping.
247	F7	SMFDCBMF	2	binary	Type of I/O macro instruction and options. This field is mapped by DCBMACRF in the DCB mapping.
249	F9	SMFDCBFL	1	binary	Indicator used by the OPEN, CLOSE, EOV routines such as the type of the last I/O operation. This field is mapped by DCBOFLGS in the DCB mapping.
250	FA	SMFDCBOP	1	binary	Option codes used by access-method interfaces. This field is mapped by DCBOPTCD in the DCB mapping.
251	FB	SMF14RV2	1	binary	Reserved.
252	FC	SMFDEBFL	1	binary	Data set and device status indicator. This field indicates whether a data set is modified, new or old, and shows the status of DASD. This field is mapped by DEBOFLGS in the DEB mapping. For information about DEBOFLGS, see *z/OS DFSMSdfp Diagnosis*.
253	FD	SMFDEBOP	1	binary	Indicator showing both the method of I/O processing and the disposition that is to be performed when an end-of-volume (EOV) condition occurs. This field is mapped by DEBOPATB in the DEB mapping.
254	FE	SMFDEBVL	2	binary	Volume sequence number. For direct access, the sequence number is relative to the first volume of the data set. For tape, the sequence number is relative to the first volume processed. This field is valid only for sequential data sets. This field is mapped by DEBVOLSQ in the DEB mapping.

The following 16 bytes apply to the DCB/DEB Tape extension. If you coded DSECT=YES when calling the IFGSMF14 macro, then it generates a DSECT statement at this point with the DSECT name with "TDDEX" appended to it. For example, if you did not code a label on the IFGSMF14 call, the name of this DSECT will be IFGSMFTDDEX.

Offsets		Name	Length	Format	Description
256	100	SMFDCBBL	4	binary	Block count for each volume. For PDSE data sets, this field will always contain X'0'. This field is mapped by DCBBLKCT in the DCB mapping.
260	104	SMFDSSNO	6	EBCDIC	Data set serial number. For PDSE data sets, this field will always contain X'0'. This field is mapped by UCBFSER in the UCB mapping.
266	10a	SMF14RV3	1		Reserved.
267	10B	SMF14TDA	1	unsigned	Tape DS authorization flags.
268	10c	SMF14OPD	4	packed	Date when the data set was opened, in the form 0cyyddF.

The following 16 bytes apply to the DCB/DEB DASD extension:

Offsets		Name	Length	Format	Description
256	100	SMF14NTU	4	binary	Relative track and record of the last user block in the form of TTR0, if a basic format data set. Relative track and record of the last user block in the form of TTTR, if a large format data set. For extended data sets, this field will accumulate the number of tracks used across all the volumes (TTTT).
260	104	SMF14NTR	4	binary	Number of tracks released by the DADSM routine. For PDSE data sets, this field will always contain X'0'.
264	108	SMF14NER	1	binary	Number of extents released by the DADSM routine. For PDSE data sets, this field will always contain X'0'.

Offsets		Name	Length	Format	Description
265	109	SMF14EDI	1	binary	Enhanced Data Integrity (EDI) flag indicator. **Bit** **Meaning when set** **0** Data set name found in EDI exclusion table. **1** Data set being opened for output but is currently open for output. **2** Data set being opened for input but is currently open for output and the data set is not excluded from EDI processing.. **3** Application requested EDI processing be bypassed and the data set is not excluded from EDI processing.. **4–7** Reserved.
266	10A	SMF14FG1	1		Flag byte. **Bit** **Meaning when set** **0** Large format data set. SMF14NTU is in TTTR format. **1** EAV BAM detected one or more EXCP or XDAP issuances-DEB2XEXCP flag is on. **2–7** Reserved.
267	10B	SMF14RV4	1		Reserved.
268	10C	SMF14OPD	4	packed	Date when the data set was opened, in the form 0cyyddF.

UCB Section

This section contains a portion of the UCB (see fields SMF14NUC and SMF14SUC). If you coded DSECT=YES when calling the IFGSMF14 macro, then it generates a DSECT statement at this point with the DSECT name with "UCB" appended to it. For example, if you did not code a label on the IFGSMF14 call, the name of this DSECT will be IFGSMFUCB.

Offsets		Name	Length	Format	Description
0	0	SMFUCBDV	2	binary	Device number. If this field contains X'7FFF', this could be a virtual I/O (VIO) data set. If bit 7 of field SMF14RIN is set to one, this is a VIO data set. Virtual I/O devices are identified by the following: **Device Class** 0 **Unit Type** 0 **Device Number** X'7FFF' It is important to understand the following: • Allocation messages for VIO data sets will show VIO ALLOCATED TO ddname. • SMF records will show VIO unit addresses as X'7FFF'. • The actual in-storage UCB built for VIO will show address X'3FFF'. For example, the following messages indicate that ddname is not allocated to a Virtual I/O device, but is instead allocated to a real device whose unit address is X'3FFF' or X'7FFF' respectively: • IEF237I X'3FFF' ALLOCATED TO ddname • IEF237I X'7FFF' ALLOCATED TO ddname
2	2	SMFSRTEV	6	EBCDIC	Volume serial number.
8	8	SMFUCBTY	4	binary	Unit type. This field is mapped by UCBTYP in the UCB mapping.
12	C	SMFSRTES	1	binary	DASD volume status indicator. This field indicates whether this DASD volume is a private, public, storage, or control volume. For PDSE data sets, this field will always contain X'0'. This field is mapped by UCBSTAB in the UCB mapping.
13	D	SMF14NEX	1	binary	Number of extents.
14	E	SMF14RV5	2		Reserved.
16	10	SMFEXCP	4	binary	EXCP count for entire step. Note that if a data set is opened and closed twice during a single step, the count in the second type 14 record is the sum of all EXCPs for both uses of the data set. (The EXCP count in the last type 14 record for the step is equal to the corresponding entry for the data set in record type 4). For more information about EXCP count, see Chapter 10, “EXCP count,” on page 119. For PDSE data sets, the number of pages that were read or written. For compressed data sets the number of physical blocks (see SMF14CIS for physical block size) that were read or written.

For each UCB tape extension, there is a four-byte entry with the following format:

Offsets		Name	Length	Format	Description
0	0	SMFSRTEF	2	binary	Data set sequence count.
2	2	SMFSRTEQ	2	binary	Data set sequence number.

The following four bytes apply to the UCB section if DASD (see SMFUCBTY):

Offsets		Name	Length	Format	Description
0	0	SMF14NTA	4	binary	Number of tracks allocated on the device. For PDSE data sets, this field will always contain X'0'.

Hiperbatch Section

This section describes the DASD information acquired from Hiperbatch. These fields are only valid for data sets accessed using Hiperbatch (see SMF14RIN).

If you coded DSECT=YES when calling the IFGSMF14 macro, then it generates a DSECT statement at this point with the DSECT name with "HBTCH" appended to it. For example, if you did not code a label on the IFGSMF14 call, the name of this DSECT will be IFGSMFHBTCH.

Offsets		Name	Length	Format	Description
0	0	SMFIOREQ	4	binary	Number of requests for I/O issued by the access method for this data set for which Hiperbatch attempted to find the requested data in its buffers (see SMFCHITS and SMFPHIOS).
4	4	SMFCHITS	4	binary	Number of requests for I/O issued by the access method for this data set satisfied by moving data from Hiperbatch buffers.
8	8	SMFNMWTS	4	binary	Number of times Hiperbatch temporarily suspended this requester because another user was already reading some or all of the requested data.
12	C	SMFPHIOS	4	binary	Number of requests for I/O issued by the access method for this data set satisfied by performing DASD I/O. Note that the sum of SMFPHIOS and SMFCHITS should equal SMFIOREQ.
16	10	SMFCIOS	4	binary	Number of DASD I/Os (as recorded in SMFPHIOS) for which Hiperbatch copied the data into its buffers.

ISAM Extension Section

As of z/OS V1R7 the system no longer produces the ISAM segment. The value in SMF14SET, length of the ISAM segment, is always 0 because you cannot open an ISAM data set.

If you coded DSECT=YES when calling the IFGSMF14 macro, then it generates a DSECT statement at this point with the DSECT name with "ISAMX" appended to it. For example, if you did not code a label on the IFGSMF14 call, the name of this DSECT will be IFGSMFISAMX.

Offsets		Name	Length	Format	Description
0	0	SMF14RV6	2		Reserved.
2	2	SMFDCBMA	1	binary	Extension of I/O macro instruction (DCBMACRF) for ISAM. This field is mapped by DCBMACCT in the DCB mapping.
3	3	SMFDCBNL	1	binary	Number of index levels. This field is mapped by DCBNLVET in the DCB mapping.
4	4	SMFDCBR3	4	binary	For each use of the data set, number of read or write accesses to an overflow record which is not first in a chain of such records. This field is mapped by DCBRORG3 in the DCB mapping.
8	8	SMFDCBNR	4	binary	Number of logical records in prime data area. This field is mapped by DCBNRECT in the DCB mapping.
12	C	SMFDCBR2	2	binary	Number of tracks (whole or partial remaining in overflow area). This field is mapped by DCBRORG2 in the DCB mapping.
14	E	SMFDCBNO	2	binary	Number of logical records in overflow area. This field is mapped by DCBNOREC in the DCB mapping.
16	10	SMFDCBR1	2	binary	Number of cylinder overflow areas that are full. This field is mapped by DCBRORG1 in the DCB mapping.
18	12	SMF14RV7	1		Reserved.
19	13	SMFDEBNI	1	binary	Number of extents in independent index area. This field is mapped by DEBNIEEQ in the DEB mapping.
20	14	SMFDEBNP	1	binary	Number of extents in prime data area. This field is mapped by DEBNPEEQ in the DEB mapping.
21	15	SMFDEBNO	1	binary	Number of extents in independent overflow area. This field is mapped by DEBNOEEQ in the DEB mapping.
22	16	SMFNCYLS	2	binary	Number of cylinders in independent index area.
24	18	SMFNPCYL	2	binary	Number of cylinders in prime data area.
26	1A	SMFNOCYL	2	binary	Number of cylinders in independent overflow area.

Extended Information Segment

This segment contains a 2 byte segment length, which is the length of all sections that are contained in it. Each section contains its section length, a section type code, and variable information depending upon the section type. If you coded DSECT=YES when calling the IFGSMF14 macro, then it generates a DSECT statement at this point with the DSECT name with "XIS" appended to it. For example, if you did not code a label on the IFGSMF14 call, the name of this DSECT will be IFGSMFXIS.

Extended Information Segment Descriptor

Offsets		Name	Length	Format	Description
0	0	SMF14SXS	2	binary	Size of extended information segment (size of all sections including this length field).

Extended Information Section Descriptor Word

If you coded DSECT=YES when calling the IFGSMF14 macro, then it generates a DSECT statement at this point with the DSECT name with "XIC" appended to it. For example, if you did not code a label on the IFGSMF14 call, the name of this DSECT will be IFGSMFXIC.

Offsets		Name	Length	Format	Description
0	0	SMF14ESL	2	binary	Size of this extended information section (size of variable length fields including this 4 byte section descriptor word).
2	2		1	binary	Reserved.
3	3	SMF14STY	1	binary	Section type code. **Type** **Meaning when set** **1** Compressed format data set section **2** SMS class information section **3** Step Information section **4** ISO/ANSI Version 4 CCSID (coded character set ID) information section **5** Additional data set characteristics section **6** PDSE data set caching statistics **7** Tape encryption data section **8** RAS section **9** DASD data set encryption section

Compressed format data set section (Type 1)

This section describes the information acquired for compressed format data sets. If you coded DSECT=YES when calling the IFGSMF14 macro, then it generates a DSECT statement at this point with the DSECT name with "CSB" appended to it. For example, if you did not code a label on the IFGSMF14 call, the name of this DSECT will be IFGSMFCSB.

Offsets		Name	Length	Format	Description
4	4	SMF14XF1	1	binary	Indicators: **Bit** **Name and meaning when set** **0** SMF14LBD. Compressed format data set size values (SMF14CDS and SMF14UDS) are invalid. **1** SMF14CRJ. Compression of the data set has been rejected. **2** SMF14ZEDCNAC. During output processing, the system determined that the zEDC feature was not available. In this case, some or all data was written non-compressed due to unavailability of the zEDC feature. (If 0, then zEDC used on all compression.) Valid only when SMF14CMPTYPE is SMF14CMPTYPEZEDC. **3** SMF14ZEDCNAD. During input processing, the system determined that the zEDC feature was not available. In this case, it used software decompression to decompress the data. (If 0, then zEDC used on decompression.) Valid only when SMF14CMPTYPE is SMF14CMPTYPEZEDC. **4-7** Reserved.
5	5	SMF14XF2	1	binary	Indicators: **Bit** **Meaning when set** **0-7** Reserved.
6	6	SMF14CDL	8	binary	Number of bytes of compressed data read or written since this open.
14	E	SMF14UDL	8	binary	Number of bytes of data read or written since this open (data length prior to compression).
22	16	SMF14CDS	8	binary	Size of the compressed format data set (number of compressed user data bytes).
30	1E	SMF14UDS	8	binary	Size of the compressed format data set (number of uncompressed user data bytes).
38	26	SMF14CIS	4	binary	Physical block size of extended format data set.
42	2A	SMF14TKL	2	binary	Length of dictionary token, SMF14TKN field (not including the length of this field). Currently equals 36.
44	2C	SMF14TKN	36	binary	Dictionary token for compressed format data set.
80	50	SMF14CMPTYPE	1	binary	Indicators: **Value** **Name and meaning when set** **0** SMF14CMPTYPENA. Not compressed format, or unknown. **1** SMF14CMPTYPEGEN. Generic compression. **2** MF14CMPTYPETLRD. Tailored compression. **3** SMF14CMPTYPEZEDC. zEDC compression.

SMS Class Section (Type 2)

This section describes the management, data and storage classes for SMS managed data sets. If you coded DSECT=YES when calling the IFGSMF14 macro, then it generates a DSECT statement at this point with the DSECT name with "SCI" appended to it. For example, if you did not code a label on the IFGSMF14 call, the name of this DSECT will be IFGSMFSCI.

Offsets		Name	Length	Format	Description
4	4	SMF14MCN	8	EBCDIC	SMS Management class name.
12	C	SMF14DCN	8	EBCDIC	SMS Data class name.
20	14	SMF14SCN	8	EBCDIC	SMS Storage class name (first 8 characters).

Step Information Section (Type 3)

This section describes the step name and the active program name for the data set. If you coded DSECT=YES when calling the IFGSMF14 macro, then it generates a DSECT statement at this point with the DSECT name with "SPI" appended to it. For example, if you did not code a label on the IFGSMF14 call, the name of this DSECT will be IFGSMFSPI.

Offsets		Name	Length	Format	Description
4	4	SMF14SPN	8	EBCDIC	Job step name.
12	C	SMF14PGN	8	EBCDIC	Job step program name.
20	14	SMFJOBID	8	EBCDIC	Job ID (DASD only).
28	1C	SMFPLXID	8	EBCDIC	Sysplex name (DASD only).

ISO/ANSI Version 4 CCSID Information Section (Type 4)

This section describes the CCSID information specified for an ISO/ANSI Version 4 tape data set. If you coded DSECT=YES when calling the IFGSMF14 macro, then it generates a DSECT statement at this point with the DSECT name with "A4I" appended to it. For example, if you did not code a label on the IFGSMF14 call, the name of this DSECT will be IFGSMFA4I.

Offsets		Name	Length	Format	Description
4	4	SMF14CFG	1	binary	Indicators: **Bit** **Name and meaning when set** **0** SMF14IBM. IBM format Version 4 tape **1** SMF14OUT. Opened for OUTPUT not DISP=MOD (see note "1" on page 235) **2** SMF14MOD. Opened for OUTPUT DISP=MOD (see note "1" on page 235) **3** SMF14UDF. User CCSID value is defaulted to CCSID=500 **4** SMF14TDF. Tape CCSID value is defaulted to CCSID=367 **5** SMF14IGN. CCSID value specified on DD statement was ignored **6-7** Reserved.
5	5	SMF14USR	4	binary	CCSID user application expects data records to be in (specified on JOB/EXEC statement or defaulted). (See note "2" on page 235)
9	9	SMF14TPE	4	binary	CCSID of data records on tape (specified on DD statement or in tape label). (See note "2" on page 235)
13	D	SMF14LBL	4	binary	CCSID specified in the tape label of an existing tape when opened for input processing.

Offsets		Name	Length	Format	Description
Note: 1. If opened for input processing, then bit 1 and 2 will both be off. 2. If no CCSID information is specified (in other words SMF14USR and SMF14TPE are 0), then the IBM standard ASCII/EBCDIC (XLATE) was used to process this Version 4 tape.					

Additional data set characteristics section (Type 5)

This section contains information about the additional data set characteristics optionally provided for tape data sets. If you coded DSECT=YES when calling the IFGSMF14 macro, then it generates a DSECT statement at this point with the DSECT name with "ADI" appended to it. For example, if you did not code a label on the IFGSMF14 call, the name of this DSECT will be IFGSMFADI.

Offsets		Name	Length	Format	Description
0	0	SMF14BFG	2	binary	Indicators
0	0	SMF14BFG0	1	binary	Flag byte 1. Indicators: **Bit** **Name and meaning when set** **0** SMF14BLK. Block size is present. **1** SMF14FLGP Flag field is present. **2** SMF14DST Data set version field is present. **3** SMF14ALS Alias name is present. **4-15** Reserved.
1	1	SMF14BFG1	1	binary	Flag byte 2.
2	2	SMF14LBS	8	binary	Block size value.
10	A	SMF14FLGS/ SMF14FLG1	2	binary	Flag byte 1. Indicators: **Bit** **Meaning when set** **0** SMF14UPF. BSAM user PGFIX option flag (DEB2XUPF). **1** SMF14EADSCB. DCBEADSCBOK flag (If on, then EADSCB=OK specified in DCBE. If off, then either there is no DCBE or EADSCB=OK is not specified in the DCBE). **2** SMF14EADSCB. DCBEADSCBOK flag (If on, then EADSCB=OK specified in DCBE. If off, then either there is no DCBE or EADSCB=OK is not specified in the DCBE). **3** SMF14XTIO. DD has XTIOT, not TIOT entry. **4-15** Reserved.
11	B	SMF14FLG2	1	binary	Flag byte 2.

Offsets		Name	Length	Format	Description
12	C	SMF14DSVER	1	binary	Indicates the version of the data set or, in the case of a partitioned concatenation, the first data set in the concatenation, as follows: **Value** **Meaning** **X'00'** The data set is neither a PDSE nor an extended-format data set. **X'01'** The data set is either a PDSE V1 or an extended-format V1. **X'02'** The data set is either a PDSE V2 or an extended-format V2.
13	D	SMF14ALI	44	EBCDIC	Alias data set name.
57	39		9	binary	Reserved.

PDSE Statistics Section (Type6)

This section describes the statistical information acquired for PDSE Data Sets. If you coded DSECT=YES when calling the IFGSMF14 macro, then it generates a DSECT statement at this point with the DSECT name with "PSI" appended to it. For example, if you did not code a label on the IFGSMF14 call, the name of this DSECT will be IFGSMFPSI.

Offsets		Name	Length	Format	Description
0	0	SMF14DRD	4	binary	Directory read request count.
4	4	SMF14DRDH	4	binary	Directory read hit count.
8	8	SMF14MRD	4	binary	Member read request count.
12	C	SMF14MRDH	4	binary	Member read hit count.
16	10	SMF14MCE	4	binary	Member cache eligible count.
20	14	SMF14MST	4	binary	Member cache stolen count.
24	18	SMF14MNC	4	binary	Member cache eligible but not cached count.
28	1C	SMF14MCF	4	binary	Member cache eligible but cache full count.
Note: If concatenation is involved, the counts reflect the total count for all concatenated PDSE data sets.					

Tape Encryption Data Section (Type 7)

This section describes the key labels and encoding mechanisms for the key labels.

If you coded DSECT=YES when calling the IFGSMF14 macro, then it generates a DSECT statement at this point with the DSECT name with "ENC" appended to it. For example, if you did not code a label on the IFGSMF14 call, the name of this DSECT will be IFGSMFENC.

Offsets		Name	Length	Format	Description
0	0	SMF14KL1	64	EBCDIC	Key label 1
64	40	SMF12CD1	1	EBCDIC	Encoding mechanism for key label 1. This field can be 'L' for Label or 'H' for Hash.
65	41	SMF14KL2	64	EBCDIC	Key label 2
129	81	SMF14CD2	1	EBCDIC	Encoding mechanism for key label 2. This field can be 'L' for Label or 'H' for Hash.
130	82	SMF14KET	4	binary	Key exchange time in hundredths seconds. The key exchange (encryption overhead) time is only applicable for SMF record type 15 and only for non-parallel OPEN processing writing file sequence 1 from loadpoint. In all other cases, this field is set to zero.

RAS Section (Type 8)

This section contains RAS (Reliability, Availability, Serviceability) information about this data set. If you coded DSECT=YES when calling the IFGSMF14 macro, it generates a DSECT statement at this point with the DSECT name with "RAS" appended to it. For example, if you did not code a label on the IFGSMF14 call, the name of this DSECT will be IFGSMFRAS.

Offsets		Name	Length	Format	Description
4	4	SMF14RFG0	1	Binary	Indicators: **Bit** **Name and meaning when set** **0** SMF14DCBEREJ. DCBE reject flags present. **1** SMF14PREL. PARTREL flags present. **2 - 7** Reserved.
5	5	SMF14RFG1	1	Binary	**Bit** **Name and meaning when set** **0** SMF14RFG1DBYP. OPEN with DCBE BYPASS_AUTH=YES was specified to bypass authorization checking. When SMF14RFG1JBYP is also ON, bypass authorization checking because JSCBPASS is in effect. **1** SMF14RFG1JBYP. JSCBPASS was specified to bypass authorization checking. **2** SMF14RFG1AUTH. The caller of OPEN was either in supervisor state, in a system key, or APF-authorized. **3** SMF14RFG1BYP. OPEN bypassed SAF authority checking. Refer to SMF14RFG1DBYP and SMF14RFG1JBYP to determine the method that was used to request bypass of SAF authority checking.
6	6	SMF14RFG2	1	Binary	Reserved
7	7	SMF14RFG3	1	Binary	Reserved

Offsets		Name	Length	Format	Description
8	8	SMF14RASDATA0	1	binary	Indicators: **Bit** **Name and meaning when set** **0** SMF14DCBEEXCP. DCBE invalidated because EXCP and no foundation extension present. **1** SMF14DCBEDSORG. DCBE invalidated because DSORG is not PS, PO OR DA. **2** SMF14DCBEFREE. DCBE invalidated because storage is not addressable. **3** SMF14DCBEKEY. DCBE invalidated because DCBE storage is not in key of caller. **4** SMF14DCBEID. DCBE invalidated because the DCBEID is not 'DCBE'. **5** SMF14DCBEMIN. DCBE invalidated because it is not at least the minimum length required (56 bytes) **6** SMF14NODCBE. DCBEHIARC flags set but DCBDCBE is zeros. **7** Reserved.
9	9	SMF14RASDATA1	1	Binary	RAS data: **Bit** **Name and meaning when set** **0** SMF14PRELVIO. Partial release not called by CLOSE because VIO data set. **1** SMF14PRELABD. Partial release not called by CLOSE because task is abending. **2** SMF14PRELINP. Partial release not called by CLOSE because not opened for output **3** SMF14PRELEXCP. Partial release not called by CLOSE because EXCP DCB but no direct access device section present. **4** SMF14PRELNOUT. Partial release not called by CLOSE because even though opened for output, last I/O was not output. **5** SMF14PRELIO. Partial release had an I/O error. **6 - 7** Reserved
10	A		18		Reserved

DASD Data Set Encryption Information (Type 9)

This section describes the DASD data set encryption key label, data set encryption indicator and encryption bypass indicator.

If you coded DSECT=YES when calling the IFGSMF14 macro, then it generates a DSECT statement at this point with the DSECT name with "DEI" appended to it. For example, if you did not code a label on the IFGSMF14 call, the name of this DSECT will be IFGSMFDEI.

Offsets		Name	Length	Format	Description
4	4	SMF14DEF	1	binary	Flag byte. Indicators: **Bit (Name)** **Meaning when set** **0 (SMF14DSENC)** Data set encrypted. **1 (SMF14DSEB)** User requested access method to bypass decryption on reads and the system honored the request. **2 (SMF14DSENCNP)** Blocks do not have prefixes. Set only for basic and large format. **3 - 7** Reserved.
5	5	SMF14DET	2	binary	Encryption type. The first byte is X'01' to signify AES. The second byte is X'00' to signify 256 bits.
7	7	SMF14DKL	64	EBCDIC	DASD data set key labels.
71	47	SMF14FLGS SMF14FLG1	1	binary	Indicators: **Bit** **Meaning when set** **0 (SMF14UPF)** BSAM user PGFIX option flag (DEB2XUPF). **1 (SMF14EADSCB)** DCBEADSCBOK flag (If on, then EADSCB=OK specified in DCBE. If off, then either there is no DCBE or EADSCB=OK is not specified in the DCBE). **2 (SMF14EADSCB)** DCBEADSCBOK flag (If on, then EADSCB=OK specified in DCBE. If off, then either there is no DCBE or EADSCB=OK is not specified in the DCBE). **3 (SMF14XTIO)** DD has XTIOT, not TIOT entry. **4 (SMF14DSENCRYPTOK)** If on, the application program is enabled for basic and large format data set encryption with EXCP. The application coded DSENCRYPT=OK on the DCBE macro. **5 - 15** Reserved.

Record type 15 (X'0F') — OUTPUT, UPDAT, INOUT, or OUTIN Data Set Activity

Record type 15 is written for non-VSAM direct access, or VIO tape data sets that are defined by DD statements or dynamic allocation and opened for OUTPUT, UPDAT, INOUT, or OUTIN processing by problem programs. It is written when a data set is closed or processed by the end-of-volume (EOV). Its length varies, depending upon the number of volumes for the data set.

This record contains information from the TIOT, JFCB, DCB, DEB, and UCB data areas.

Note: Record type 15 is not written for data sets defined as SYSOUT data sets on DD statements. For accounting purposes, the SYSOUT logical record count is provided in record type 6.

The format for this record is the same as the format for record type 14.

Record type 16 (X'10') — DFSORT Statistics

Record type 16 is written to record information about events and operations of the IBM DFSORT licensed program. Depending on the option specified at initialization (and whether DFSORT runs successfully), a short record, full record, or no record is produced. For this record, see SMF Type-16 record in *z/OS DFSORT Installation and Customization*.

Record type 17 (X'11') — Scratch Data Set Status

Record type 17 is written when a non-temporary DASD data set or a temporary DASD data set is scratched. This record contains the data set name, number of volumes, and volume serial numbers. The job name, time, and date that the reader recognized the JOB card (for this job) constitute the job log identification. Its length varies, depending upon the number of volumes for the data set. Refer to record type 65 for information on renaming a VSAM object.

Note: You use the REC parameter, in the SMFPRM*xx* parmlib member, to specify record type 17 is to be collected. REC(ALL) specifies that record type 17 is to be written for both temporary and non-temporary data sets. REC(PERM) specifies that SMF is to write record type 17 only for non-temporary data sets; it is not to be written for temporary data sets (data sets having names that start with SYSyyddd.Thhmmss, either from DSN=&&datasetname or from the absence of any data set name).

Record mapping

Header/Self-defining Section

This section contains the common SMF record headers fields and the triplet fields (offset/length/number), if applicable, that locate the other sections on the record.

Offsets		Name	Length	Format	Description
0	0	SMF17LEN	2	binary	Record length. This field and the next field (total of four bytes) form the RDW (record descriptor word). See "Standard and Extended SMF record headers" on page 162 for a detailed description.
2	2	SMF17SEG	2	binary	Segment descriptor (see record length field).
4	4	SMF17FLG	1	binary	System indicator: **Bit** **Meaning when set** **0-2** Reserved **3-6** Version indicators* **7** Reserved. *See "Standard and Extended SMF record headers" on page 162 for a detailed description.
5	5	SMF17RTY	1	binary	Record type 17 (X'11').
6	6	SMF17TME	4	binary	Time since midnight, in hundredths of a second, when the record was moved into the SMF buffer.
10	A	SMF17DTE	4	packed	Date when the record was moved into the SMF buffer, in the form 0*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for a detailed description.
14	E	SMF17SID	4	EBCDIC	System identification (from the SID parameter).
18	12	SMF17JBN	8	EBCDIC	Job name. The job name, time, and date that the reader recognized the JOB card (for this job) constitute the job log identification, or transaction name (for APPC output).
26	1A	SMF17RST	4	binary	Time since midnight, in hundredths of a second, that the reader recognized the JOB card (for this job).

Offsets		Name	Length	Format	Description
30	1E	SMF17RSD	4	packed	Date when the reader recognized the JOB card (for this job), in the form 0*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for a detailed description.
34	22	SMF17UID	8	EBCDIC	User-defined identification field (taken from common exit parameter area, not from USER=parameter on job statement).
42	2A	SMF17RIN	2		Reserved.
44	2C	SMF17DSN	44	EBCDIC	Data set name.
88	58	SMF17RV1	3		Reserved.
91	5B	SMF17NVL	1	binary	Number of volumes.

Volume Information Section

For each volume there is an eight-byte entry with the following format:

Offsets		Name	Length	Format	Description
0	0	SMF17RV2	2		Reserved.
2	2	SMF17FVL	6	EBCDIC	Volume serial number.

Record type 18 (X'12') — Rename Non-VSAM Data Set Status

Record type 18 is written when a non-VSAM data set defined by a DD statement (either explicitly or implicitly) is renamed. (When a DD statement defines a volume, all the data sets on that volume are implicitly defined.) This record contains the old data set name, new data set name, number of volumes, and volume serial numbers. Its length varies, depending upon the number of volumes for the data set.

Record mapping

Header/Self-defining Section

This section contains the common SMF record headers fields and the triplet fields (offset/length/number), if applicable, that locate the other sections on the record.

Offsets		Name	Length	Format	Description
0	0	SMF18LEN	2	binary	Record length. This field and the next field (total of four bytes) form the RDW (record descriptor word). See "Standard and Extended SMF record headers" on page 162 for a detailed description.
2	2	SMF18SEG	2	binary	Segment descriptor (see record length field).
4	4	SMF18FLG	1	binary	System indicator: **Bit** **Meaning when set** **0-2** Reserved **3-6** Version indicators* **7** Reserved. *See "Standard and Extended SMF record headers" on page 162 for a detailed description.
5	5	SMF18RTY	1	binary	Record type 18 (X'12').
6	6	SMF18TME	4	binary	Time since midnight, in hundredths of a second, when the record was moved into the SMF buffer.

Offsets		Name	Length	Format	Description
10	A	SMF18DTE	4	packed	Date when the record was moved into the SMF buffer, in the form 0*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for a detailed description.
14	E	SMF18SID	4	EBCDIC	System identification (from the SID parameter).
18	12	SMF18JBN	8	EBCDIC	Job name. The job name, time, and date that the reader recognized the JOB card (for this job) constitute the job log identification, or transaction name (for APPC output).
26	1A	SMF18RST	4	binary	Time since midnight, in hundredths of a second, that the reader recognized the JOB card (for this job).
30	1E	SMF18RSD	4	packed	Date when the reader recognized the JOB card (for this job), in the form 0*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for a detailed description.
34	22	SMF18UID	8	EBCDIC	User-defined identification field (taken from common exit parameter area, not from USER=parameter on job statement).
42	2A	SMF18RIN	2		Reserved.
42	2A	SMF18IN1	1	binary	Record indicator byte 1. **Bit** **Meaning when set** **0** Continuation record indicator for a multi-volume data set rename request whereby the volume being processed by rename is not the first volume. This flag is set when the volume serial number in this record is one that had a volume sequence number of more than one and rename is processing each volume individually. Field name SMF18CON.
43	2B	SMF18IN2	1	binary	Record indicator byte 2.
44	2C	SMF18ODS	44	EBCDIC	Old data set name.
88	58	SMF18NDS	44	EBCDIC	New data set name.
132	84	SMF18RV1	3		Reserved.
135	87	SMF18NVL	1	binary	When rename is called one volume at a time, the value will be one for each SMF 18 record. When rename is called with a list, the value will reflect the total number of volumes processed in the list that are recorded in one SMF 18 record. This value designates the number of volume entries that follow.

Volume Information Section

For each volume there is an eight-byte entry with the following format:

Offsets		Name	Length	Format	Description
0	0	SMF18RV2	2		Reserved.
2	2	SMF18FVL	6	EBCDIC	Volume serial number.

Record type 19 (X'13') — Direct Access Volume

Record type 19 is written:

1. For each online device associated with a specific IPL time frame,
2. For each online device associated with a processed HALT EOD or SWITCH SMF command, and
3. When a direct access volume that is defined by DD statement is demounted.

This record contains:

- The volume serial number
- The volume table of contents (VTOC) address
- The owner identification
- The unit type
- The number of unused alternate tracks
- The number of unallocated cylinders and tracks
- The number of cylinders and tracks in the largest free extent
- The number of unallocated extents.
- The previous three fields repeated for track-managed space
- The volume size information

It contains the device number and module identification for devices having movable plugs.

Note:

1. Record type 19 is not produced for DOS volumes used under the operating system.
2. In order to determine the latest status of a shared file, the CPU clocks must be synchronized.

Record mapping

Header/self-defining section

This section contains the common SMF record headers fields and the triplet fields (offset/length/number), if applicable, that locate the other sections on the record.

Offsets		Name	Length	Format	Description
0	0	SMF19LEN	2	binary	Record length. This field and the next field (total of four bytes) form the RDW (record descriptor word). See "Standard and Extended SMF record headers" on page 162 for a detailed description.
2	2	SMF19SEG	2	binary	Segment descriptor (see record length field).
4	4	SMF19FLG	1	binary	System indicator: **Bit** **Meaning when set** **0-2** Reserved **3-6** Version indicators* **7** Reserved. *See "Standard and Extended SMF record headers" on page 162 for a detailed description.
5	5	SMF19RTY	1	binary	Record type 19 (X'13').
6	6	SMF19TME	4	binary	Time since midnight, in hundredths of a second, when the record was moved into the SMF buffer.
10	A	SMF19DTE	4	packed	Date when the record was moved into the SMF buffer, in the form 0*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for a detailed description.
14	E	SMF19SID	4	EBCDIC	System identification (from the SID parameter).
18	12	SMF19RV1	2		Reserved.
20	14	SMF19VOL	6	EBCDIC	Volume serial number.
26	1A	SMF19OID	10	EBCDIC	Owner identification from the VTOC.
36	24	SMF19DEV	4	binary	Device type.

Offsets		Name	Length	Format	Description
40	28	SMF19VTC	5	binary	Volume table of contents (VTOC) address (format of CCHHR).
45	2D	SMF19VTI	1	binary	Volume table of contents (VTOC) indicator **Bit** **Meaning when set** **0** Format 5 data set control blocks (DSCB) missing or erroneous **1-2** Reserved **3** VTOC does not begin on record 1 **4** Accurate Format 5 and 6 data set control blocks (DSCB); bit 0 set to zero **5** Possible VTOC or VTOC index error **6** VTOC error has been fixed; bit 5 set to zero **7** Indexed VTOC.
The next eight 2-byte fields describe free space statistics for the entire volume. When the value for a free space statistic exceeds the field size of two bytes, that field is set to X'FFFF'. When this occurs, use the relocated values in SMF19EVF and SMF19TMF.					
46	2E	SMF19NDS	2	binary	Number of data set control blocks (DSCB) calculated as: number of DSCBs per track times number of tracks in VTOC.
48	30	SMF19DSR	2	binary	Number of data set control blocks (DSCB) — format 0 DSCBs, that is, number of available DSCBs.
50	32	SMF19NAT	2	binary	Number of unused alternate tracks.
52	34	SMF19SPC	2	binary	Number of unallocated cylinders.
54	36		2	binary	Number of unallocated tracks.
56	38	SMF19LEX	2	binary	Number of cylinders in the largest unallocated extent.
58	3A		2	binary	Number of tracks in the largest unallocated extent.
60	3C	SMF19NUE	2	binary	Number of unallocated extents.
62	3E	SMF19FL1	1	binary	SMF flags 1. **Bit** **Meaning when set** **0** SMF19CYM. Returned data is for a volume that has CYL-managed space.
63	3F	SMF19FL2	1	binary	Reserved.
64	40	SMF19CUU	2	binary	Device Number.
66	42	SMF19IND	2	binary	Module identification or drive number indicating physical identity of devices having moveable address plugs. This field is taken from bits 2-7 of sense byte 4 for these devices. (See the component descriptions of these devices for the meaning of sense byte 4.)
Beginning of expanded SMF statistics					
68	44	SMF19RV3	4	EBCDIC	Reserved.
72	48	SMF19SDS	4	binary	Number of DSCBs.
76	4C	SMF19SL0	4	binary	Number of format 0 DSCBs.
80	50	SMF19RV4	4	EBCDIC	Reserved.

Offsets		Name	Length	Format	Description
SMF19EVF: Free space statistics from the entire volume. For volumes with cylinder-managed space (SMF19CYM='1'), these statistics represent space from both the track- and cylinder-managed space on the volume. See SMF19TMF for statistics from the track-managed space on the volume.					
84	54	SMF19EVF	20	EBCDIC	Total vol free space.
84	54	SMF19SUC	4	binary	Number of free cylinders.
88	58	SMF19SUT	4	binary	Number of addl free tracks.
92	5C	SMF19SNC	4	binary	Number of free cylinders in largest free extent.
96	60	SMF19SNT	4	binary	Number of addl free tracks in largest free extent.
100	64	SMF19SNE	4	binary	Number of free extents.
SMF19TMF: Free space statistics from track-managed space for a volume with cylinder-managed space (SMF19CYM='1'). For volumes with no cylinder-managed space (SMF19CYM='0'), these statistics are equivalent to the total volume statistics described in the preceding fields.					
104	68	SMF19TMF	20	EBCDIC	Track-managed free space.
104	68	SMF19BUC	4	binary	Number of free cylinders.
108	6C	SMF19BUT	4	binary	Number of addl free tracks.
112	70	SMF19BNC	4	binary	Number of free cylinders in largest free extent
116	74	SMF19BNT	4	binary	Number of addl free tracks in largest free extent.
120	78	SMF19BNE	4	binary	Number of free extents.
Volume size information					
124	7C	SMF19VLI	8	EBCDIC	Volume size infomation
124	7C	SMF19TRK	4	binary	Total number of tracks on the volume
128	80	SMF19TRM	4	binary	Total number of tracks in the track-managed space when SMF19CYM = '1'. Set to the value of SMF19TRK otherwise. When SMF19CYM ='1' this value is also the first track address where cylinder-managed space begins.
End of expanded SMF statistics					

Record type 20 (X'14') — Job initiation

Reference information:

For information about the RACF Report Writer, see *z/OS Security Server RACF Auditor's Guide*.

Record type 20 is written at job initiation (including TSO/E logon). This record contains the job log identification programmer's name, number of accounting fields on the JOB statement, accounting fields, and RACF-related information. The job name, time, and date the reader recognized the JOB card (for this job) constitute the job log identification. It is used by the RACF Report Writer in combination with record types 30, 80, 81, and 83 to produce RACF reports.

The length of record type 20 includes the length of the JOB statement accounting fields and the relocatable RACF section.

Note: IBM recommends that you use record type 30 rather than record types 4, 5, 20, 34, 35, and 40.

Record environment

The following conditions exist for the generation of this record:

Macro
SMFEWTM(1), BRANCH=YES (record exit: IEFU84)

Record mapping

Header/Self-defining Section

This section contains the common SMF record headers fields and the triplet fields (offset/length/number), if applicable, that locate the other sections on the record.

Offsets		Name	Length	Format	Description
0	0	SMF20LEN	2	binary	Record length. This field and the next field (total of four bytes) form the RDW (record descriptor word). See "Standard and Extended SMF record headers" on page 162 for a detailed description.
2	2	SMF20SEG	2	binary	Segment descriptor (see record length field).
4	4	SMF20FLG	1	binary	System indicator: **Bit** **Meaning when set** **0-2** Reserved **3-6** Version indicators* **7** Reserved. *See "Standard and Extended SMF record headers" on page 162 for a detailed description.
5	5	SMF20RTY	1	binary	Record type 20 (X'14').
6	6	SMF20TME	4	binary	Time since midnight, in hundredths of a second, when the record was moved into the SMF buffer.
10	A	SMF20DTE	4	packed	Date when the record was moved into the SMF buffer, in the form 0*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for a detailed description.
14	E	SMF20SID	4	EBCDIC	System identification (from the SID parameter).
18	12	SMF20JBN	8	EBCDIC	Job name. The job name, time, and date that the reader recognized the JOB card (for this job) constitute the job log identification, or transaction name (for APPC output).
26	1A	SMF20RST	4	binary	Time since midnight, in hundredths of a second, that the reader recognized the JOB card (for this job).
30	1E	SMF20RSD	4	packed	Date when the reader recognized the JOB card for this job, in the form 0*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for a detailed description.
34	22	SMF20UID	8	EBCDIC	User-defined identification field (taken from common exit parameter area, not from USER=parameter on job statement).
42	2A	SMF20RLO	2	binary	Offset to relocatable area. See *z/OS Security Server RACF Macros and Interfaces* for more information about relocatable areas for RACF-owned records.
44	2C	SMF20PGM	20	EBCDIC	Programmer's name.
64	40	SMF20NAF	1	binary	Number of accounting fields.
65	41	SMF20ACT	variable	EBCDIC	Accounting fields. Each entry for an accounting field contains the length of the field (one byte, binary) followed by the field (EBCDIC). A zero indicates an omitted field.

Relocate Section

Offsets		Name	Length	Format	Description
0	0	SMF20FLS	2	binary	Size of relocate section (including this field).
2	2	SMF20GRP	8	EBCDIC	RACF Group ID. If RACF is not active, this field is set to zero.
10	A	SMF20RUD	8	EBCDIC	RACF User ID. If RACF is not active, this field is set to zero.
18	12	SMF20TID	8	EBCDIC	RACF terminal ID. If RACF is not active, or if RACF is active and the user is not a terminal user, then this field is set to zero.

Record type 21 (X'15') — Error Statistics by Volume

Record type 21 is written when a data set on magnetic tape is demounted. This record contains statistics for the entire volume during the period of time that the volume is mounted, regardless of the number of data sets on the volume being accessed (and regardless of the number of CLOSE macro instructions issued).

This record contains the volume serial number, device number, unit type, and tape format. It contains the number of temporary and permanent read and write errors, START Subchannel (SSCH) instruction, noise blocks, erase gaps, and cleaner actions.

Note:

1. The IFHSTATR utility program formats and prints the error-statistics-by-volume (ESV) information in this record.
2. The current record does not describe who requested the amount or who performed the I/O.
3. Record type 21 does not indicate which records are written because of environmental record editing and printing (EREP).
4. If a maximum count is reached, it is no longer increased. A count at its maximum value indicates at least that number because no record is written when the counter is full.
5. A record type 21 is written, in addition to demount time, any time the environmental record editing and printing (EREP) program is run or when EOD is issued. Therefore, more than one type 21 record may be written for each tape that was mounted.

Record mapping

Header/Self-defining Section

This section contains the common SMF record headers fields and the triplet fields (offset/length/number), if applicable, that locate the other sections on the record.

Offsets		Name	Length	Format	Description
0	0	SMF21LEN	2	binary	Record length. This field and the next field (total of four bytes) form the RDW (record descriptor word). See "Standard and Extended SMF record headers" on page 162 for a detailed description.
2	2	SMF21SEG	2	binary	Segment descriptor (see record length field).

Offsets		Name	Length	Format	Description
4	4	SMF21FLG	1	binary	System indicator: **Bit** **Meaning when set** **0-2** Reserved **3-6** Version indicators* **7** Reserved. *See "Standard and Extended SMF record headers" on page 162 for a detailed description.
5	5	SMF21RTY	1	binary	Record type 21 (X'15').
6	6	SMF21TME	4	binary	Time since midnight, in hundredths of a second, when the record was moved into the SMF buffer.
10	A	SMF21DTE	4	packed	Date when the record was moved into the SMF buffer, in the form 0*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for a detailed description.
14	E	SMF21SID	4	EBCDIC	System identification (from the SID parameter).
18	12	SMF21LGH	2	binary	Length of rest of record.
20	14	SMF21VOL	6	EBCDIC	Volume serial number.
26	1A	SMF21CA	2	binary	Device number or device address.
28	1C	SMF21UCB	4	binary	UCBTYP value.
31	1F	SMF21DEV	1	binary	Low order byte of UCB device type. Values less than X'80' represent reel tapes. Values of X'80' or greater represent cartridge tapes.
32	20	SMF21TR	1	binary	Number of temporary read errors (non-buffered log).
33	21	SMF21TW	1	binary	Number of temporary write errors (non-buffered log).
34	22	SMF21SIO	2	binary	Number of start sub-channel (SSCH) instructions.
36	24	SMF21PR	1	binary	Number of permanent read errors.
37	25	SMF21PW	1	binary	Number of permanent write errors.
38	26	SMF21NB	1	binary	Number of noise blocks (non-buffered log).
39	27	SMF21ERG	2	binary	Number of erase gaps.
41	29	SMF21CLN	2	binary	Number of cleaner actions.
44	2C	SMF21BLS	2	binary	Block size of the last data set closed on the tape if the tape was demounted during CLOSE processing, not at a different time. Some programs that use EXCP do not provide a block size. This field is valid only (but still might contain zero) when bit SMF21LB is off.
46	2E	SMF21OFL SMF21OUT SMF21RDB	1	binary	DCBOFLGS. **Bit** **Meaning** **1... ....** Output tape **.1.. ....** Input tape (READ BACKWARD)
47	2F	SMF21TUS	3	packed	Tape unit serial.
50	32	SMF21TRF	2	binary	Temporary read forward errors.
52	34	SMF21TRB	2	binary	Temporary read backward errors.
54	36	SMF21TWF	2	binary	Temporary write errors.

Offsets		Name	Length	Format	Description
56	38	SMF21BR	3	binary	Number of bytes read, in units of 4096. The length of each block is rounded up to a multiple of 4096 before being counted. This count includes volume mount and verify, in addition to task I/O. Provided only for cartridge tape devices. Maximum value is X'FFFFFF'. See also SMF21FL1 (bit flag SMF21NCT) to see if SMF21BRN contains a valid value and should be used instead.
59	3B	SMF21BW	3	binary	Number of bytes written, in units of 4096. The length of each block is rounded up to a multiple of 4096 before being counted. Provided only for cartridge tape devices. Maximum value is X'FFFFFF'. See also SMF21FL1 (bit flag SMF21NCT) to see if SMF21BWN contains a valid value and should be used instead.
62	3E	SMF21FL1	1	binary	General flag bytes. **Bit** **Meaning** **1... ....** Field SMF21NCT, indicating that SMF21BRN and SMF21BWN at 64 and 68 contain valid values..Originally, this bit was only "on" for 3590 devices and handled values beyond X'FFFFFF'. With OA52915, this bit will also be "on" and used for 3490 devices. If this bit is "on", SMF21BRN and SMF21BWN should be used instead of SMF21BR and SMF21BW. **.1.. ....** Field SMF21LS, indicating that field SMF21LST has a valid value. **..1. ....** Field SMF21LB, indicating that SMF21LBS has a valid value. **...1 ....** Field SMF21DBV, indicating that SMF21DBR and SMF21DBW at 80 and 84 contain valid values. **.... 1...** Field SMF21MFV, indicating that SMF21MCR, SMF21MCW, SMF21MDR, and SMF21MDW contain valid values. **.... .xxx** Reserved.
63	3F	SMF21FL2	1	bit string	Reserved.
64	40	SMF21BRN	4	unsigned binary	Number of bytes read, in units of 4096. The length of each block is rounded up to a multiple of 4096 before being counted. Valid only if SMF21NCT is on. If the value is less than X'FFFFFF', it is also in SMF21BR.
68	44	SMF21BWN	4	unsigned binary	Number of bytes written, in units of 4096. The length of each block is rounded up to a multiple of 4096 before being counted. Valid only if SMF21NCT is on. If the value is less than X'FFFFFF', it is also in SMF21BW.
72	48	SMF21LST	4	unsigned binary	Number of I/Os initiated on current volume. Valid only if SMF21LS is on.
76	4C	SMF21LBS	4	unsigned binary	Block size. Valid only if SMF21LB is on.
80	50	SMF21DBR	4	unsigned binary	Number of bytes read by the device, in units of 4096. Valid only if SMF21DBV is on.
84	54	SMF21DBW	4	unsigned binary	Number of bytes written by the device, in units of 4096. Valid only if SMF21DBV is on.
88	58	SMF21MCR	4	unsigned binary	Number of bytes read by the channel, in units of 1M. Valid only if SMF21MFV is on.

Offsets		Name	Length	Format	Description
92	5C	SMF21MCW	4	unsigned binary	Number of bytes written by the channel, in units of 1M. Valid only if SMF21MFV is on.
96	60	SMF21MDR	4	unsigned binary	Number of bytes read by the device, in units of 1M. Valid only if SMF21MFV is on.
100	64	SMF21MDW	4	unsigned binary	Number of bytes written by the device, in units of 1M. Valid only if SMF21MFV is on.

Record type 22 (X'16') — Configuration

Record type 22 is written:

- After every SMF initialization.
- When any of the following operator commands are processed:
  - CONFIG CPU
  - CONFIG CHP
  - CONFIG PFID
  - CONFIG VF
  - CONFIG STOR
  - CONFIG ONLINE,S
  - CONFIG OFFLINE,S.
- When an ACTIVATE command or ACTIVATE function from a Hardware Configuration Definition (HCD) panel results in successful dynamic configuration changes.
- When Asynchronous Operations Manager (AOM) attention-handling code is processing volume state change interrupts or when processing subsystem status change interrupts.
- During pack-change interrupt processing, when the subsystem or originating device status has changed.

This record describes processor, channel path, storage in effect after the IPL or change. Record type 22 contains the current and previous status of the subsystem and originating device. The storage section contains 31-bit central storage addresses.

The length of record type 22 is variable. The maximum length of the type 22 record is 32,756 bytes. If the space required for data is such that the length would exceed the maximum length, one or more additional type 22 records are produced.

Record environment

The following conditions exist for the generation of this record:

Macro
SMFEWTM(1), BRANCH=YES (record exit: IEFU84)

Record mapping

Header/Self-defining Section

This section contains the common SMF record headers fields and a count of the number of other sections on the record.

Offsets		Name	Length	Format	Description
0	0	SMF22LEN	2	binary	Record length. This field and the next field (total of four bytes) form the RDW (record descriptor word). See “Standard and Extended SMF record headers” on page 162 for a detailed description.
2	2	SMF22SEG	2	binary	Segment descriptor (see record length field).

Offsets		Name	Length	Format	Description
4	4	SMF22FLG	1	binary	System indicator: **Bit** **Meaning when set** **0-2** Reserved **3-6** Version indicators (see “Standard and Extended SMF record headers” on page 162 for details) **7** Reserved.
5	5	SMF22RTY	1	binary	Record type 22 (X'16').
6	6	SMF22TME	4	binary	Time since midnight, in hundredths of a second, when the record was moved into the SMF buffer.
10	A	SMF22DTE	4	packed	Date when the record was moved into the SMF buffer, in the form 0*cyydddF*. See “Standard and Extended SMF record headers” on page 162 for details.
14	E	SMF22SID	4	EBCDIC	System identification (from the SID parameter).
18	12	SMF22IND	2	binary	Record creator indicator **Value** **Meaning** **1** IPL **2** VARY ONLINE **3** VARY OFFLINE **7** VARY CHANNEL PATH ONLINE OR OFFLINE **8** 3990 State Change **9** ACTIVATE **99** This record was continued from the previous record, because the previous record was filled. If this is the first record, SMF22IND can not equal 99.
20	14	SMF22ECT	2	binary	Number of sections that are to follow.

CPU Section

The following section contains information about the CPU flags, CPU section identification, model number, and identifier:

Offsets		Name	Length	Format	Description
0	0	SMF22CFG	1	binary	CPU Flags **Bit** **Meaning when set** **0** Vector feature indicator **1** Reserved **2** CPU reconfiguration indicator **3-7** Reserved.

Offsets		Name	Length	Format	Description
1	1	SMF22PID	1	binary	CPU section identification (this field is always 1).
2	2	SMF22CPN	2	binary	CPU model number (taken from CONFIG CPU command).
4	4	SMF22CpuId	2	binary	CPU identifier (taken from CONFIG CPU command or default in PSACPUPA).
5	5	SMF22CPA	1	binary	CPU identifier (Should not be used. Use SMF22CpuId.)

Storage Section

The following section contains the storage flags, storage identifier, and contiguous storage information.

When the storage frame number, reported in SMF22PGL, is larger than a full word (X’FFFFFFFF’), a Storage Element Extension section is generated in place of this section. The Storage Element Extension section is section ID 12, or X’0C’.

Offsets		Name	Length	Format	Description
0	0	SMF22MFL	1	EBCDIC	Storage flags **Bit** **Meaning when set** **0** Central storage frames are interleaved **1** Real storage status could not be obtained. **2-7** Reserved.
1	1	SMF22TID	1	binary	Storage section identification (this field is always 3).
2	2	SMF22PGL	4	binary	Block number of the first online frame reported in this storage element. When the block number exceeds X’FFFFFFFF’, it is reported in the SMF22 Storage Element Extension (ID=X’0C’)
6	6	SMF22NPG	4	binary	The number of online frames reported in this storage element

Channel Path (CHP) Section

The following section contains channel path information.

Offsets		Name	Length	Format	Description
0	0	SMF22RV7	1		Reserved.
1	1	SMF22UID	1	binary	Channel Path section Identification (this field is always 7).
2	2	SMF22PAR	256	EBCDIC	Array of 256 entries to map each unique CHP (channel path).
		SMF22PFG	X'80'		If 1=CHP, CHP is valid for this installation. If 0, SMF22POW=0 and SMF22PON=0
		SMF22POW	X'40'		If 1=CHP, CHP is owned by this system, and SMF22PFG=1; if 0, SMF22PON=0
		SMF22PON	X'20'		If 1=CHP,CHP is ONLINE, SMF22PFG=1, and SMF22POW=1

Reconfigured Channel Path Section

This section contains reconfigured channel path information.

Offsets		Name	Length	Format	Description
0	0	SMF22RV8	1		Reserved.
1	1	SMF22RID	1	binary	Reconfigured Channel Path section identification (this field is always 8).
2	2	SMF22CNT	1	binary	Count of channel path IDs (CHPIDs) in this section.

Offsets		Name	Length	Format	Description
3	3	SMF22CHI	1	EBCDIC	Array of channel path identifiers.

Reconfigured PCIE Function Identifier (PFID) Section

The following section contains reconfigured PCIE function identifier information.

Offsets		Name	Length	Format	Description
0	0		1		Reserved.
1	1	SMF22PCIID	1	binary	Reconfigured PCIE function identifier section identification (this field is always X'0B').
2	2		2		Reserved.
4	4	SMF22PCICNT	2	binary	Count of PCIE function identifiers (PFIDs) in this section.
6	6	SMF22PFID	4	binary	Array of PCIE function identifiers (PFIDs).

Expanded Storage Section

This section contains one contiguous block of online expanded storage.

Offsets		Name	Length	Format	Description
0	0		1		Reserved.
1	1	SMF22XID	1	binary	Expanded storage identification (this field is always 9).
2	2	SMF22XAD	4	binary	Beginning expanded storage frame (E-frame) address in this contiguous block (taken from the CONFIG command). **Note:** Expanded storage is always addressed in frames.
6	6	SMF22XNP	4	binary	Number of 4K expanded storage frames in this contiguous block (taken from the CONFIG command).

Storage Control Section

Offsets		Name	Length	Format	Description
0	0	*	1		Reserved.
1	1	SMF22GID	1	binary	Storage control section identification (this field is always 10, X'0A').
2	2	SMF22SSI	2	binary	3990 subsystem identifier.
4	4	SMF22MDL	1	binary	3990 model identifier.
5	5	SMF22VOL	6	EBCDIC	Originating device volume serial (this field is blank if device is offline).
11	B	SMF22CUA	2	binary	Originating device identification.
13	D	SMF22CCA	1	binary	Originating device channel connection address (CCA).
14	E	SMF22DDC	1	binary	Originating device director-to-device connection (DDC).
15	F	SMF22PDC	1	binary	Originating device previous DDC.

Offsets		Name	Length	Format	Description
16	10	SMF22SCS	1	binary	3990 subsystem caching status: **Bit** **Meaning when set** **0-2** One of the following values: **000** Active. **001** Pending active. **010** Deactivated-subsystem. **100** Deactivated-host. **110** Pending. **111** Pending off failed. **3** Subsystem storage is disabled for maintenance. **4-5** Reserved. **6** IML device is not available. **7** Cache fast write is disabled.
17	11	SMF22PCS	1	binary	Previous subsystem caching status. The bit meanings are the same as SMF22SCS.
18	12	SMF22SNV	1	binary	3990 subsystem NVS status: **Bit** **Meaning when set** **0-1** One of the following values: **00** Active. **01** Deactivated-subsystem. **10** Deactivated-host. **11** Pending. **2** Reserved. **3** Disabled for maintenance. **4** Pending due to error. **5-7** Reserved.
19	13	SMF22PNV	1	binary	Previous subsystem NVS status. The bit meanings are the same as SMF22SNV.

Offsets		Name	Length	Format	Description
20	14	SMF22SDS	2	binary	Device status: **Bit** **Meaning when set** **0-1** Caching status **00** Active. **10** Deactivation pending. **11** Deactivated. **2-3** Fast write status **00** Allowed. **10** Deactivation pending. **11** Deactivated. **4** Primary of duplex pair. **5** Secondary of duplex pair. **6-7** Duplex pair status; for Multi-target PPRC, PPRC pair status for relationship 1 if primary. **00** Available. **01** Pending. **10** Failed duplex, originally on primary. **11** Failed duplex, originally not on primary. **8-9** Pinned data **00** No pinned data exists for device. **01** Pinned data exists for device, fast write not suspended. **10** Reserved. **11** Pinned data exists for device, fast write suspended. **10-15** Low-order 6 bits of CCA value of other device in duplex.
22	16	SMF22PDS	2	binary	Device previous status. The bit meanings are the same as SMF22SDS.
24	18	SMF22ADS	1	binary	Additional device status: **Bit** **Meaning when set** **0-1** Reserved. **2** Data exists in failed MVS for the devices. **3-7** Reserved, and set to zero.

Offsets		Name	Length	Format	Description
25	19	SMF22SMT	1	binary	Multi-target PPRC status: **Bit** **Meaning when set** **0-1** PPRC pair status rel 1: **00** PPRC pair available. **01** PPRC pair pending. **10** Reserved. **11** PPRC suspended. **2-3** PPRC pair status rel 2: **00** PPRC pair available. **01** PPRC pair pending. **10** Reserved. **11** PPRC suspended. **4-5** PPRC pair status rel 3: **00** PPRC pair available. **01** PPRC pair pending. **10** Reserved. **11** PPRC suspended. **6-7** Reserved
26	1A	SMF22PAD	1	binary	Device previous status. The bit meanings are the same as for SMF22ADS.
27	1B	SMF22PMT	1	binary	Previous multi-target PPRC status. The bit meanings are the same as SMF22SMT.

Offsets		Name	Length	Format	Description
28	1C	SMF22CYS	1	binary	State of copy services functions: **Bit** **Meaning when set** **0** XRC active for the device. **1** PPRC active for the device. **2** PPRC primary or secondary volume: **1** Volume is PPRC secondary. **0** Volume is PPRC primary. **3** Volume in XRC suspended or quiesced state. **4** PPRC volume is State Change pending. **5** Concurrent Copy is active. **6** Flash Copy is active. **7** Reserved and set to zero.
29	1D	SMF22PCY	1	binary	State of copy services functions previous (the bit meanings are the same as SMF22CYS).
30	1E	SMF22CYL	4	binary	Device high cylinders.
34	22	SMF22CYP	4	binary	Previous device high cylinders.

Storage Element Extension

The following section contains the storage flags, storage identifier, and contiguous storage information.

This section is generated in place of the Storage Section (ID= 3) when the storage frame number, reported in field SMF22XGL, is larger than a full word (X'FFFFFFFF''). W

Offsets		Name	Length	Format	Description
0	0	SMF22XFL	1	binary	Storage flags **Bit** **Meaning when set** **0** Central storage frames are interleaved **1** Real storage status could not be obtained. **2-7** Reserved.
1	1	SMF22TXD	1	binary	Storage section identification (this field is always 12).
2	2	SMF22XGL	8	binary	Block number of the first online frame reported in this storage element.
10	A	*	4		Reserved
14	E	SMF22XPG	4	binary	The number of online frames reported in this storage element.

I/O Configuration Change Element

The following maps the I/O configuration change element which is only contained in an ACTIVATE record event (SMF22IND=9) for processors that support dynamic I/O. You can perform software-only configuration changes that write type 22 records on processors not supporting dynamic I/O, but the configuration change elements only contain software entries. In that case, the device (except SMF22DVN), physical control unit, and CHPID entries all contain zeros.

The I/O configuration change element consists of a header section, followed by an array containing a variable number of entries. Each entry identifies an I/O component (device, control unit, or CHPID) that has been added, deleted, or modified.

I/O Configuration Change Element Header Section

Offsets		Name	Length	Format	Description
0	0		1		Reserved.
1	1	SMF22OID	1	binary	I/O configuration change element ID (this field is always 11).
2	2	SMF22R#	1	binary	Record number of this record.
3	3	SMF22TR	1	binary	Total number of records for this I/O configuration change. For example, if there are 3 records total, and this record is the first, SMF22R# would contain 1, and SMF22TR would contain 3 (indicating record 1 of 3).
4	4	SMF22OFF	2	binary	Offset of first entry in this record.
6	6	SMF22ELN	2	binary	Length of each entry in the array of I/O configuration change elements.
8	8	SMF22T#E	4	binary	Total number of entries for this I/O configuration change.
12	C	SMF22#E	4	binary	Number of entries in this record.
16	10	SMF22FLS	1	binary	Flags **Bit** **Meaning when set** **0** Requestor of the ACTIVATE specified the SOFT option. This indicates that only software configuration changes are to be made. **1** Requestor of the ACTIVATE specified the FORCE option. **2-7** Reserved.
17	11		1		Reserved.
18	12	SMF22IDN	44	EBCDIC	Name of IODF data set that contains the new I/O configuration definition.
62	3E		4		Reserved.
66	42	SMF22EDT	2	EBCDIC	ID of the eligible device table (EDT) or '**' if the new EDT could not be rebuilt during dynamic activation of the I/O configuration.
68	44	SMF22CFI	8	EBCDIC	Operating system configuration ID for new configuration.
76	4C	SMF22HCT	64	binary	Hardware configuration token that represents the new I/O configuration.
140	8C	SMF22#UA	4	binary	Number of unit control blocks (UCB) added for this I/O configuration change.
144	90	SMF22#UD	4	binary	Number of unit control blocks (UCB) deleted for this I/O configuration change.
148	94	SMF22FNC	1	binary	Activate function requested. See Note "1" on page 262 for possible values of this field.

Offsets		Name	Length	Format	Description
149	95		3		Reserved.

Entry Array in the I/O Configuration Change Element Section

Offsets		Name	Length	Format	Description
0	0	SMF22EHD	4	EBCDIC	Entry header.
0	0	SMF22ETY	1	binary	Entry type. See Note "2" on page 262 for possible values of this field.
1	1	SMF22ERQ	1	binary	Entry request. For the possible values of this field, see Note "3" on page 262, "4" on page 262, "5" on page 263, "6" on page 263, and "7" on page 263 .
2	2	SMF22EFL	1	binary	Entry flags **Bit** **Meaning when set** **0** Hardware change **1** Software change **2** Indicates that this entry was created because an installation-static device is being changed to a dynamic device. This entry represents the delete request (SMF22ERQ=SMF22DDD). There will be another entry that represents the add request. **3** Indicates whether the UCB for the device is connected to a subchannel. Valid only when the entry type is "device" (SMFETY=SMF22DEV) and entry request is "add device" (SMFERQ=SMF22DAD). **4** Indicates that this entry represents a change affecting the current logical channel subsystem (LCSS). **5** Reserved. **6** Indicates that the activating partition will lose access to the device because either the device is deleted from the configuration or the activating partition is to be removed from the candidate list of the device. **7** Indicates that this entry was created because the candidate list of the device was changed. When SMF22ETY=SMF22DEV, SMF22ERQ=SMF22DDD and SMF22ECC is on, one or more partitions were deleted from the device candidate list. When SMF22ETY=SMF22DEV, SMF22ERQ=SMF22DAD and SMF22ECC is on, one or more partitions were added to the device candidate list.
3	3	SMF22ECSS	1	binary	Logical channel subsystem (LCSS) ID
4	4	SMF22ESI	28	EBCDIC	Entry type specific information follows.

Device Entry Section (SMF22ETY=SMF22DEV or SMF22MDEV or SMF22SDEV)

For I/O devices in subchannel set 0, use SMF22ETY=SMF22DEV. For I/O devices in subchannel set 1, use SMF22ETY=SMF22SDEV.

Offsets		Name	Length	Format	Description
0	0	SMF22DVN	2	binary	Device number.

Offsets		Name	Length	Format	Description
2	2	SMF22DCM	1	binary	Mask of channel path IDs (CHPID) contained in SMF22DCH that were added to or deleted from this device. Valid only under one of the following conditions (zero otherwise): **Entry request** **SMF22ERQ value** **Modify to add CHPIDs** SMF22DAH **Modify to remove CHPIDs** SMF22DDH
3	3	SMF22DPM	1	binary	Mask of physical control unit numbers in SMF22DPC that were added to or deleted from this device. Valid only under one of the following conditions (zero otherwise): **Entry request** **SMF22ERQ value** **Modify to add CUs** SMF22DAP **Modify to remove CUs** SMF22DDP
4	4	SMF22DCH	8	EBCDIC	Array of one-byte elements that represent channel path IDs (CHPID) that were added to or deleted from this device. Valid only under one of the following conditions (zero otherwise): **Entry request** **SMF22ERQ value** **Modify to add CHPIDs** SMF22DAH **Modify to remove CHPIDs** SMF22DDH
12	C	SMF22DPC	16	EBCDIC	Array of two-byte elements that represent physical control unit numbers that were added to or deleted from this device. Valid only under one of the following conditions (zero otherwise): **Entry request** **SMF22ERQ value** **Modify to add CUs** SMF22DAP **Modify to remove CUs** SMF22DDP

Optional device expansion entry (SMF22ETY=SMF22DEVE)

This entry will immediately follow an SMF22SDEV entry. It is provided to fully qualify the device with the subchannel set ID when necessary.

Offsets		Name	Length	Format	Description
0	0	SMF22SSID	1	binary	Subchannel set ID
1	1	SMF22DCM	27	char	Reserved.

Physical Control Unit Entry Section (SMF22ETY=SMF22PCU or SMF22MP)

Offsets		Name	Length	Format	Description
0	0	SMF22PCN	2	binary	Physical control unit number.
2	2		1		Reserved.

Offsets		Name	Length	Format	Description
3	3	SMF22PCM	1	binary	Mask of channel path IDs in SMF22PCH that were added to or deleted from this control unit. Valid only under one of the following conditions (zero otherwise): **Entry request** **SMF22ERQ value** **Modify to add CHPIDs** SMF22PAH **Modify to remove CHPIDs** SMF22PDH
4	4	SMF22PCH	8	EBCDIC	Array of 1-byte elements that represent channel path IDs (CHPID) that were added to or deleted from this control unit. Valid only under one of the following conditions (zero otherwise): **Entry request** **SMF22ERQ value** **Modify to add CHPIDs** SMF22PAH **Modify to remove CHPIDs** SMF22PDH
12	C	SMF22PUA	4	EBCDIC	Range of unit addresses that were added to or deleted from this control unit. Valid only under one of the following conditions (zero otherwise): **Entry request** **SMF22ERQ value** **Modify to add unit address** SMF22PAU **range** **Modify to remove unit address** SMF22PDU **range**
16	10		1		Reserved.
17	11	SMF22PUC	1	binary	Count of unit addresses.
18	12		1		Reserved.
19	13	SMF22PSU	1	binary	Starting unit address.
20	14		8		Reserved.

CHPID entry section (SMF22ETY=SMF22CH)

Offsets		Name	Length	Format	Description
0	0	SMF22CCH	1	binary	Channel path ID (CHPID).
1	1		27		Reserved.

Logical Partition Entry Section (SMF22ETY=SMF22LP)

Offsets		Name	Length	Format	Description
0	0	SMF22LP_Name	8	EBCDIC	Logical partition name.
8	8	SMF22LP_MIFID	8	binary	Multiple Image Facility (MIF) identifier.

PCI Function Entry Section (SMF22ETY=SMF22PF)

Offsets		Name	Length	Format	Description
0	0	SMF22PF_PFID	4	binary	PCIe function ID.

Continuation Section

If this record is filled (length exceeds 32,756 bytes), this section is present to indicate the next record is a continuation of this one.

Offsets		Name	Length	Format	Description
0	0	SMF22L99	1	binary	Length of this section.
1	1	SMF22CON	1	binary	Identifies next record as a continuation (this field is always 99).

Note:

1. The following constants identify the function in **SMF22FNC**.

Constant	Value	Description
SMF22ACT	X'01'	Activate function.
SMF22PCU	X'02'	Recover function.

2. The following constants identify the entry type in **SMF22ETY**.

Constant	Value	Description
SMF22DEV | SMF22SDEV | SMF22DEVE	X'01'	Device entry.
SMF22PCU	X'02'	Control unit entry.
SMF22CH	X'03'	Channel path ID (CHPID) entry.
SMF22MDEV	X'04'	Coupling facility device entry.
SMF22MP	X'05'	Coupling facility control unit.
SMF22LP	X'06'	Logical partition entry.
SMF22PF	X'09'	PCIe function

3. The following constants define **SMF22ERQ** when the entry type is “device” (SMF22ETY equals SMF22DEV or SMF22SDEV).

Constant	Value	Description
SMF22DDD	X'01'	Delete device.
SMF22DAD	X'02'	Add device.
SMF22DDH	X'03'	Modify to remove channel path IDs (CHPID).
SMF22DAH	X'04'	Modify to add channel path IDs (CHPID).
SMF22DDP	X'05'	Modify to remove CUs.
SMF22DAP	X'06'	Modify to add CUs.
SMF22DMC	X'07'	Modify subchannel characteristics (illegal status detection, and/or interface timeout).
SMF22DMP	X'08'	Modify preferred path.

4. The following constants define **SMF22ERQ** when the enty type is “control unit” (SMF22ETY equals SMF22PCU).

Constant	Value	Description
SMF22PDP	X'01'	Delete control unit.

Constant	Value	Description
SMF22PAP	X'02'	Add control unit.
SMF22PDH	X'03'	Modify to delete channel path IDs (CHPID).
SMF22PAH	X'04'	Modify to add channel path IDs (CHPID).
SMF22PDU	X'05'	Modify to delete unit address range.
SMF22PAU	X'06'	Modify to add unit address range.
SMF22PNM	X'07'	Modify to change the number of managed CHPIDs.
SMF22PDM	X'08'	Modify to delete a managed CHPID.
SMF22PAS	X'09'	Modify to delete a managed CHPID in order to add a static CHPID.

5. The following constants define **SMF22ERQ** when the entry type is “CHPID” (SMF22ETY equals SMF22CH).

Constant	Value	Description
SMF22CDH	X'01'	Delete channel path ID (CHPID).
SMF22CAH	X'02'	Add channel path ID (CHPID).
SMF22CDI	X'03'	Modify to delete partitions from the channel path candidate list.
SMF22CAI	X'04'	Modify to add partitions to the channel path candidate list.

6. The following constants define **SMF22ERQ** when the entry type is “logical partition” (SMF22ETY equals SMF22LP).

Constant	Value	Description
SMF22LDEL	X'01'	Delete logical partition.
SMF22LADD	X'02'	Add logical partition.

7. The following constants define **SMF22ERQ** when the entry type is “PCIE FUNCTION” (SMF22ETY equals SMF22PF).

Constant	Value	Description
SMF22FDEL	X'01'	Delete PCIe function.
SMF22FADD	X'02'	Add PCIe function.
SMF22FDI	X'03'	Modify to delete access for one or more logical partitions to the specified PCIe function.
SMF22FAI	X'04'	Modify to add access for one or more logical partitions to the specified PCIe function.

Record type 23 (X'17') — SMF Status

Record type 23 is written at the interval specified by the STATUS keyword in SMFPRMxx. It records SMF statistics collected during the reporting interval.

Record environment

The following conditions exist for the generation of this record:

Macro
SMFEWTM(1), BRANCH=YES (record exit: IEFU84)

Record mapping

Header/self-defining section

This section contains the common SMF record headers fields and the triplet fields (offset/length/number), if applicable, that locate the other sections on the record.

Offsets		Name	Length	Format	Description
0	0	SMF23LEN	2	binary	Record length. This field and the next field (total of four bytes) form the RDW (record descriptor word). See "Standard and Extended SMF record headers" on page 162 for a detailed description.
2	2	SMF23SEG	2	binary	Segment descriptor (see record length field).
4	4	SMF23FLG	1	binary	System indicator: **Bit** **Meaning when set** **0-2** Reserved **3-6** Version indicators (See "Standard and Extended SMF record headers" on page 162 for details.) **7** Reserved.
5	5	SMF23RTY	1	binary	Record type 23 (X'17').
6	6	SMF23TME	4	binary	Time since midnight, in hundredths of a second, when the record was moved to the SMF buffer.
10	A	SMF23DTE	4	packed	Date when the record was moved into the SMF buffer, in the form 0*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for a detailed description.
14	E	SMF23SID	4	EBCDIC	System identification (from the SID parameter).
18	12		2		Reserved.
20	14	SMF23POF	4	binary	Offset to product section from start of record, including the record descriptor word (RDW).
24	18	SMF23PLN	2	binary	Length of product section.
26	1A	SMF23PON	2	binary	Number of product sections.
28	1C	SMF23SOF	4	binary	Offset to system section from start of record, including the record descriptor word (RDW).
32	20	SMF23SLN	2	binary	Length of system section.
34	22	SMF23SON	2	binary	Number of system sections.
36	24	SMF23ROF	4	binary	Offset to SMF statistics section from start of record, including the record descriptor word (RDW).
40	28	SMF23RLN	2	binary	Length of SMF statistics section.
42	2A	SMF23RON	2	binary	Number of SMF statistics sections.
44	2C	SMF23LOF	4	binary	Offset to SMF logstream statistics section.
48	30	SMF23LLN	2	binary	Length of SMF logstream statistics section.
50	32	SMF23LON	2	binary	Number of SMF logstream statistics sections.

Offsets		Name	Length	Format	Description
52	34	SMF23NOF	4	binary	Offset to spin lock instrumentation data section from start of record, including the record descriptor word (RDW).
56	38	SMF23NLN	2	binary	Length of spin lock instrumentation data section.
58	3A	SMF23NON	2	binary	Number of spin lock instrumentation data sections.
60	3C	SMF23BOF	4	binary	Offset to bind break instrumentation data section from start of record, including the record descriptor word (RDW).
64	40	SMF23BLN	2	binary	Length of bind break instrumentation data section.
66	42	SMF23BON	2	binary	Number of bind break instrumentation data sections.

Product section

Offsets		Name	Length	Format	Description
0	0	SMF23TID	2	binary	Subtype identification — ‘0’.
2	2	SMF23RVN	2	character	Record version number — ‘02’.
4	4	SMF23PNM	8	EBCDIC	Product name — ‘SMF’.

System section

Offsets		Name	Length	Format	Description
0	0	SMF23INT	6	EBCDIC	Length of measurement interval.
6	6	SMF23FLS	4	EBCDIC	Operating system release level.
10	A	SMF23OSL	8	character	MVS product name (taken from CVTPRODN).
18	12	SMF23TOD	8	binary	Time and date that the interval ended for the STATUS function, in time-of-day (TOD) format, an unsigned 64-bit fixed-point number where bit 51 is equivalent to 1 microsecond. If you requested synchronized interval recording for SMF statistics, a field in other records, similar to this field, contains the same time so you can compare this record with other records generated at the end of the same interval.
26	1A	SMF23SYN	8	EBCDIC	System name (from the SYSNAME parameter in the IEASYSxx parmlib member).
34	22	SMF23SYP	8	EBCDIC	Sysplex name (from the SYSPLEX parameter in the COUPLExx parmlib member).

SMF statistics section

Offsets		Name	Length	Format	Description
0	0	SMF23BFW	4	binary	Number of buffers written.
4	4	SMF23BFQ	4	binary	Maximum number of buffers used at one time.
8	8	SMF23SUS	4		Reserved.
12	C	SMF23RCW	4	binary	Number of records written.
16	10	SMF23BFA	4	binary	Amount of each buffer allocation request.
20	14	SMF23BFT	4	binary	Total amount of buffer storage currently allocated (and recently used).
24	18	SMF23BFH	4	binary	‘High water mark’ of buffer storage allocation.

Offsets		Name	Length	Format	Description
28	1C	SMF23BFM	4	binary	Buffer storage maximum in effect (BUFSIZMAX binary value).
32	20	SMF23BFL	4	binary	Buffer storage usage warning level in effect (BUFUSEWARN binary value).
36	24	SMF23SFG	4	binary	Statistics section flags. **Bit** **Meaning when set** **0** When bit 0 is on, it indicates that a 4-byte field, FIXED(32), is used for the accumulator for SMF23NGR. For example, field wraps at four gigabytes. When bit 0 is off, it indicates that an 8-byte field, FIXED(64), is used for the accumulator for SMF23NGR. **1** When bit 1 is on, it indicates that a 4-byte field, FIXED(32), is used for the accumulator for SMF23PBG. For example, field wraps at four gigabytes. When bit 1 is off, it indicates that an 8-byte field, FIXED(64), is used for the accumulator for SMF23PBG. **2** When bit 2 is on, it indicates that a 4-byte field, FIXED(32), is used for the accumulator for SMF23NFR. For example, field wraps at four gigabytes. When bit 2 is off, it indicates that an 8-byte field, FIXED(64), is used for the accumulator for SMF23NFR. **3** When bit 3 is on, it indicates that a 4-byte field, FIXED(32), is used for the accumulator for SMF23PFX. For example, field wraps at four gigabytes. When bit 3 is off, it indicates that an 8-byte field, FIXED(64), is used for the accumulator for SMF23PFX. **4** When bit 4 is on, it indicates that a 4-byte field, FIXED(32), is used for the accumulator for SMF231RF. For example, field wraps at four gigabytes. When bit 4 is off, it indicates that an 8-byte field, FIXED(64), is used for the accumulator for SMF231RF.

Offsets		Name	Length	Format	Description
36	24	SMF23SFG (continued)	4	binary	Continued: **Bit** **Meaning when set** **5** When bit 5 is on, it indicates that a 4-byte field, FIXED(32), is used for the accumulator for SMF23NRF. For example, field wraps at four gigabytes. When bit 5 is off, it indicates that an 8-byte field, FIXED(64), is used for the accumulator for SMF23NRF. **6** When bit 6 is on, it indicates that 4-byte fields, FIXED(32), are used for the accumulators (one accumulator for each CPU) for SMF23NIO . For example, value decreases from the last interval value, if one of the accumulators wrap at four gigabytes. When bit 6 is off, it indicates that 8-byte fields, FIXED(64), are used for the accumulators (one accumulator for each CPU) for SMF23NIO. **7** When bit 7 is on, it indicates that 4-byte fields, FIXED(32), are used for the accumulators (one accumulator for each CPU) for SMF23TCB. For example, value decreases from the last interval value, if one of the accumulators wrap at four gigabytes. When bit 7 is off, it indicates that 8-byte fields, FIXED(64), are used for the accumulators (one accumulator for each CPU) for SMF23TCB. **8** When bit 8 is on, it indicates that 4-byte fields, FIXED(32), are used for the accumulators (one accumulator for each CPU) for SMF23SRB. For example, value decreases from the last interval value, if one of the accumulators wrap at four gigabytes. When bit 8 is off, it indicates that 8-byte fields, FIXED(64), are used for the accumulators (one accumulator for each CPU) for SMF23SRB. **9–31** Reserved. **Note:** For bits 0–8, all accumulators are never reset for the life of the system.
40	28	SMF23NGR	8	binary	Total number of getmain requests that have been issued. For more details, see the explanation of SMF23SFG bit 0.
48	30	SMF23PBG	8	binary	Total number of pages backed during getmain requests that have been issued. For more details, see the explanation of SMF23SFG bit 1.
56	38	SMF23NFR	8	binary	Total number of fix requests that have been issued for the storage whose address space is below two gigabytes. For more details, see the explanation of SMF23SFG bit 2.
64	40	SMF23PFX	8	binary	Total number of frames that were requested to be fixed for the storage whose address space is below two gigabytes. For more details, see the explanation of SMF23SFG bit 3.
72	48	SMF231RF	8	binary	Total number of first reference faults. For more details, see the explanation of SMF23SFG bit 4.

Offsets		Name	Length	Format	Description
80	50	SMF23NRF	8	binary	Total number of non-first reference faults. For more details, see the explanation of SMF23SFG bit 5.
88	58	SMF23NIO	8	binary	Total number of I/Os for this interval. For more details, see the explanation of SMF23SFG bit 6.
96	60	SMF23TCB	8	binary	Total number of unlocked TCB dispatches. For more details, see the explanation of SMF23SFG bit 7.
104	68	SMF23SRB	8	binary	Total number of SRB dispatches. For more details, see the explanation of SMF23SFG bit 8.
112	70	SMF23NGD	4	binary	Total number of getmain requests that have been issued for this interval. For the cumulative total, see the explanation of SMF23NGR.
116	74	SMF23PBD	4	binary	Total number of pages backed during GETMAIN requests that have been issued for this interval. For the cumulative total, see the explanation of SMF23PBG.
120	78	SMF23NFD	4	binary	Total number of fix requests that have been issued for storage (address space only) below two gigabytes for this interval. For the cumulative total, see the explanation of SMF23NFR.
124	7C	SMF23PFD	4	binary	Total number of frames that were requested to be fixed for storage (address space only) below two gigabytes for this interval. For the cumulative total, see the explanation of SMF23PFX.
128	80	SMF231RD	4	binary	Total number of first reference faults taken for this interval. For the cumulative total, see the explanation of SMF231RF.
132	84	SMF23NRD	4	binary	Total number of non-first reference faults taken for this interval. For the cumulative total, see the explanation of SMF23NRF.
136	88	SMF23NID	8	binary	Total number of I/Os for this interval. For the cumulative total, see the explanation of SMF23NIO.
144	90	SMF23TCD	8	binary	Total number of unlocked TCB dispatches for this interval. For the cumulative total, see the explanation of SMF23TCB.
152	98	SMF23SRD	8	binary	Total number of SRB dispatches for this interval. For the cumulative total, see the explanation of SMF23SRB.
160	A0	SMF23MBU	4	binary	The maximum number of bytes stored in the temporary buffer that is used during SMF initialization.

Logstream statistics section

SMF reports a maximum of 100 logstream statistics sections in each record.

Offsets		Name	Length	Format	Description
0	0	SMF23LSL	2	binary	Length of the logstream name in SMF23LSN.
2	2	SMF23LSN	26	character	Logstream name.
28	1C	SMF23LFA	4	binary	Amount of each buffer allocation.
32	20	SMF23LFT	4	binary	Total amount of buffer storage currently used (in bytes).
36	24	SMF23LFH	4	binary	Binary high water mark of the buffer allocation (in bytes).
40	28	SMF23LFM	4	binary	Buffer storage maximum in effect (DSPSIZMAX value in bytes).

Offsets		Name	Length	Format	Description
44	2C	SMF23LFL	4	binary	Binary buffer warning level in effect (BUFUSEWARN binary value).
48	30	SMF23LFG	4	binary	Various flags: **Bit** **Meaning when set** **0** When on, the buffer warning level in effect was from the global option. **1** When on, the buffer size (DSPSIZMAX) in effect was from the global option. **2** When on, compression is requested for records written to this log stream by SMF configuration. When off, compression is not requested. **3** When on, compression is prepared. This log stream is ready to compress records, or in other words, hardware is capable of using zEDC, and all setup for compression succeeded. When off, hardware is not capable of using zEDC or compression setup failed. See message IFA730I. **4** When on, compression is available. The last use of zEDC was successful, and it indicated zEDC Express features were available to satisfy compression requests. When off, at the last request, zEDC Express features were not available to satisfy compression requests. **5** The current PERMFIX value for this log stream is the global PERMFIX value. In the SMF configuration, a log stream PERMFIX value was not specified.

SMF configuration parameter PERMFIX defines the maximum storage SMF can keep registered to zEDC. The following fields represent amounts of storage registered to zEDC for this log stream.

Offsets		Name	Length	Format	Description
52	34	SMF23PFT	4	binary	Total storage SMF is currently using for zEDC for this log stream. Value does not account for 1MB needed by each log stream using zEDC. Value may be up to 2MB greater than the defined PERMFIX value depending on usage.
56	38	SMF23PFM	4	binary	Max storage SMF can use for zEDC for this log stream. Configuration-defined PERMFIX value.
60	3C	SMF23PFH	4	binary	High water mark of storage SMF has used for zEDC for this log stream connection.
64	40	SMF23CWN	4	binary	Number of log blocks written containing compressed records during this interval.
68	44	SMF23NCN	4	binary	Number of log blocks written containing non-compressed records during this interval.

Offsets		Name	Length	Format	Description
72	48	SMF23BBC	8	binary	zEDC uncompressed bytes total. For logstreams with compressed data, this field contains the total number of uncompressed bytes that zEDC successfully compressed during the interval. For logstreams with no compressed data, this field contains zeros.
80	50	SMF23BAC	8	binary	zEDC compressed bytes total. For logstreams with compressed data, this field contains the total number of compressed bytes that were written to the logstream during the interval. For logstreams with no compressed data, this field contains zeros.
88	58	SMF23LHP	4	binary	High water mark of the percentage of the buffer that is in use.
92	5C	SMF23LCP	4	binary	Current percentage of the buffer that is in use.

Spin lock instrumentation section

Offsets		Name	Length	Format	Description
0	0	SMF23SPN	*	binary	For internal use only.

Bind break instrumentation section

Offsets		Name	Length	Format	Description
0	0	SMF23BND	*	binary	For internal use only.

Record type 24 (X'18') — JES2 Spool Offload

Record type 24 is written whenever a job or SYSOUT data set is transmitted to or received from an offload data set. JES2 writes one type 24 record for each pre-processing job that is transmitted to an offload data set or received back to spool. Because one type 24 record is written for each SYSOUT data set header that is transmitted or received, multiple type 24 records can be expected for each post-processing job.

This record identifies the name, time and date of each job that has been transmitted or received. It includes specific information about jobs in a record subtype. For jobs not yet run, it reports job-related information such as job class and system affinity in both the job selection criteria section and in the system affinity section. For jobs that have already run, it reports information about SYSOUT data sets such as output group id and forms name in the SYSOUT selection criteria section. Record type 24 never contains both the job selection criteria section and the SYSOUT selection criteria section.

This record can be used with the subtype selectivity function. Refer to "SYS and SUBSYS with TYPE and NOTYPE — Selecting subtypes for SMF recording" on page 59 for a description of subtype selectivity.

Record mapping

Header/Self-defining Section

This section contains the common SMF record headers fields and the triplet fields (offset/length/number) that locate the other sections on the record.

This triplet information should be checked prior to accessing a section of the record. All three fields being non-zero mean that the section exists on the record; conversely any of the fields being zero indicates that the section does not exist on the record. The 'number' triplet field is the primary indication of the existence of the field.

Offsets		Name	Length	Format	Description
0	0	SMF24LEN	2	binary	Record length. This field and the next field (total of four bytes) form the RDW (record descriptor word). See “Standard and Extended SMF record headers” on page 162 for a detailed description.
2	2	SMF24SEG	2	binary	Segment descriptor (see record length field).
4	4	SMF24FLG	1	binary	System indicator: **Bit** **Meaning when set** **0-2** Reserved **3-6** Version indicators* **7** Reserved. *See “Standard and Extended SMF record headers” on page 162 for a detailed description.
5	5	SMF24RTY	1	binary	Record type 24 (X'18').
6	6	SMF24TME	4	binary	Time since midnight, in hundredths of a second, that the record was moved into the SMF buffer.
10	A	SMF24DTE	4	packed	Date when the record was moved into the SMF buffer, in the form 0*cyydddF*. See “Standard and Extended SMF record headers” on page 162 for a detailed description.
14	E	SMF24SID	4	EBCDIC	System identification (from the SID parameter).
18	12	SMF24SSI	4	EBCDIC	Subsystem identification.
22	16	SMF24SUB	2	binary	Record subtype **Value** **Meaning** **1** Job transmitted **2** Job received **3** SYSOUT transmitted **4** SYSOUT received.
24	18	SMF24NTR	2	binary	Number of triplets. A triplet is a set of offsets/length/numbers values that define a section of the record.
26	1A	SMF24RSV	2		Reserved.
28	1C	SMF24OPS	4	binary	Offset to product section.
32	20	SMF24LPS	2	binary	Length of product section.
34	22	SMF24NPS	2	binary	Number of product sections.
36	24	SMF24OGN	4	binary	Offset to general sections.
40	28	SMF24LGN	2	binary	Length of general section.
42	2A	SMF24NGN	2	binary	Number of general sections.
44	2C	SMF24OSP	4	binary	Offset to job or SYSOUT selection criteria section.
48	30	SMF24LSP	2	binary	Length of job or SYSOUT selection criteria section.
50	32	SMF24NSP	2	binary	Number of job or SYSOUT selection criteria sections.
52	34	SMF24OSW	4	binary	Offset to enhanced SYSOUT support (ESS) section.
56	38	SMF24LSW	2	binary	Length of enhanced SYSOUT support (ESS) section.

Offsets		Name	Length	Format	Description
58	3A	SMF24NSW	2	binary	Number of enhanced SYSOUT support (ESS) section.
60	3C	SMF24OSA	4	binary	Offset to system affinity section.
64	40	SMF24LSA	2	binary	Length of system affinity section.
66	42	SMF24NSA	2	binary	Number of system affinity sections.

Product Section

Triplet Information

This section is located on the record using the following triplet fields, which are located in the 'Header/ self-defining' section:

Offset
SMF24OPS

Length
SMF24LPS

Number
SMF24NPS

Offsets		Name	Length	Format	Description
0	0	SMF24PVR	2	EBCDIC	Record version number.
2	2	SMF24PNM	8	EBCDIC	Product name 'JES2'.
10	A	SMF24RS2	2		Reserved.

General Section

This section contains the statistics for spool offload devices.

Triplet Information

This section is located on the record using the following triplet fields, which are located in the 'Header/ self-defining' section:

Offset
SMF24OGN

Length
SMF24LGN

Number
SMF24NGN

Offsets		Name	Length	Format	Description
0	0	SMF24GLN	2	binary	Length of general section.
2	2	SMF24BCF	1	binary	Buffer continuation flags **Bit** **Meaning when set** **0** First SMF buffer for job **1** Continuation of SMF buffer **2** Last SMF buffer for job **3-7** Reserved.

Offsets		Name	Length	Format	Description
3	3	SMF24EOJ	1	binary	End of job flags **Bit** **Meaning when set** **0** Completed job offloaded **1** Job completed with skipped data sets **2** Uncompleted job offloaded **3** Job cancelled by operator **4-7** Reserved.
4	4	SMF24JBN	8	EBCDIC	Job name.
12	C	SMF24JID	8	EBCDIC	Original job identification.
20	14	SMF24CJD	8	EBCDIC	Current identification.
28	1C	SMF24SYS	4	EBCDIC	System identification.
32	20	SMF24DSN	44		Offload data set name.
76	4C	SMF24CNT	4	binary	Number of records transmitted or received.
80	50	SMF24TDS	4	binary	Time since midnight, in hundredths of a second, that offload data set was allocated.
84	54	SMF24DDS	4	packed	Date when the offload data set was allocated, in the form 0*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for a detailed description.
88	58	SMF24ORG	8	EBCDIC	Node of origin.
96	60	SMF24TRD	4	binary	Time on reader since midnight, in hundredths of a second.
100	64	SMF24DRD	4	binary	Date on the reader, in the form 0*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for a detailed description.

Job Selection Criteria Section

Triplet Information

This section is located on the record using the following triplet fields, which are located in the 'Header/self-defining' section:

Offset
SMF24OSP

Length
SMF24LSP

Number
SMF24NSP

Offsets		Name	Length	Format	Description
0	0	SMF24LN1	2	binary	Length of job section.

Offsets		Name	Length	Format	Description
2	2	SMF24JFG	1	binary	Job Flags **Bit** **Meaning when set** **0** Held job **1** Affinity = any **2-7** Reserved.
3	3	SMF24JCL	1	EBCDIC	Job class.
4	4	SMF24JND	8	EBCDIC	Node name.
12	C	SMF24JAF	28	EBCDIC	Affinity system identification.

System Affinity Section

Triplet Information

This section is located on the record using the following triplet fields, which are located in the 'Header/self-defining' section:

Offset
SMF24OSA

Length
SMF24LSA

Number
SMF24NSA

Offsets		Name	Length	Format	Description
0	0	SMF24LSA	2	binary	Length of system affinity section.
2	2	SMF24SAN	4	binary	Number of system affinities.
6	6	SMF24LN4	4	binary	Length of system name.
10	A	SMF24SAC	*	binary	Start of system affinity names.

Note: *The length of the SMF24SAC field is variable and depends on the amount of system affinity names.

SYSOUT Selection Criteria Section

Triplet Information

This section is located on the record using the following triplet fields, which are located in the 'Header/self-defining' section:

Offset
SMF24OSP

Length
SMF24LSP

Number
SMF24NSP

Offsets		Name	Length	Format	Description
0	0	SMF24LN2	2	binary	Length of SYSOUT section.

Offsets		Name	Length	Format	Description
2	2	SMF24SFG	1	binary	SYSOUT flags **Bit** **Meaning when set** **0** Held SYSOUT **1** Bursted SYSOUT **2** Held job **3** Incomplete data set **4** Multi-destination data set **5-7** Reserved.
3	3	SMF24SCL	1	EBCDIC	SYSOUT class.
4	4	SMF24SND	8	EBCDIC	Node name.
12	C	SMF24SRN	8	EBCDIC	Remote name.
20	14	SMF24FCB	4	EBCDIC	Forms control buffer (FCB).
24	18	SMF24FOR	8	EBCDIC	Forms overlay name.
32	20	SMF24FLS	4	EBCDIC	Flash cartridge name.
36	24	SMF24PRM	8	EBCDIC	Print data set (PR) mode.
44	2C	SMF24UCS	4	EBCDIC	Universal character set (UCS).
48	30	SMF24WID	8	EBCDIC	Writer.
56	38	SMF24REC	4	binary	Data set record count.
60	3A	SMF24PRY	1	binary	Output selection priority.

Enhanced SYSOUT Support (ESS) Section

This section contains the output descriptor (if any) for first offloaded data set in this record.

Triplet Information

This section is located on the record using the following triplet fields, which are located in the 'Header/self-defining' section:

Offset
SMF24OSW

Length
SMF24LSW

Number
SMF24NSW

Offsets		Name	Length	Format	Description
0	0	SMF24LN3	2	binary	Length of ESS section (including this field).
2	2	SMF24SGT	4	binary	Segment identifier.

Offsets		Name	Length	Format	Description
6	6	SMF24IND	1	binary	Section indicator **Bit** **Meaning when set** **0** Error obtaining scheduler JCL facility (SJF) information. Scheduler work block text unit (SWBTU) data area is not present **1-7** Reserved.
7	7		1		Reserved.
8	8	SMF24JDT	8	EBCDIC	JCL definition table (JDT) name in JCL definition vector table (JDTV).
16	10	SMF24TUL	2	binary	Text unit (SWBTU) data area length.
18	12	SMF24TU	VAR	binary	Text unit (SWBTU) data area. The data area can be processed using the SWBTUREQ macro.

Record type 25 (X'19') — JES3 Device Allocation

Record type 25 is written for each job that completed JES3 converter/interpreter (C/I) processing. One type 25 record is written for each job, whether the job contains DD statements. A separate type 25 record is written for each job that uses a private catalog. A separate type 25 record is written for each main device scheduling (MDS) dynamic unallocation request.

This record contains allocation-related information such as the number of tape and disk volumes fetched and mounted, and the time and date of JES3 device verification. The job name, time, and date that the reader recognized the JOB card (for the job) constitute the job log identification.

Record environment

The following conditions exist for the generation of this record:

Macro
SMFEWTM, BRANCH=NO (record exit: IEFU83)

Storage Residency
31-bit

Record mapping

Header/Self-defining Section

This section contains the common SMF record headers fields and the triplet fields (offset/length/number), if applicable, that locate the other sections on the record.

Offsets		Name	Length	Format	Description
0	0	SMF25LEN	2	binary	Record length. This field and the next field (total of four bytes) form the RDW (record descriptor word). See "Standard and Extended SMF record headers" on page 162 for a detailed description.
2	2	SMF25SEG	2	binary	Segment descriptor (see record length field).

Offsets		Name	Length	Format	Description
4	4	SMF25FLG	1	binary	System indicator: **Bit** **Meaning when set** **0-2** Reserved **3-6** Version indicators* **7** Reserved. *See “Standard and Extended SMF record headers” on page 162 for a detailed description.
5	5	SMF25RTY	1	binary	Record type 25 (X'19').
6	6	SMF25TME	4	binary	Time since midnight, in hundredths of a second, that the record was moved into the SMF buffer.
10	A	SMF25DTE	4	packed	Date when the record was moved into the SMF buffer, in the form 0*cyydddF*. See “Standard and Extended SMF record headers” on page 162 for a detailed description.
14	E	SMF25SID	4	EBCDIC	System identification (from the SID parameter).
18	12	SMF25JBN	8	EBCDIC	Job name. The job name, time, and date that the reader recognized the JOB card (for this job) constitute the job log identification, or transaction name (for APPC output).
26	1A	SMF25RST	4	binary	Time since midnight, in hundredths of a second, that the reader recognized the JOB card (for this job).
30	1E	SMF25RSD	4	packed	Date when the reader recognized the JOB card for this job, in the form 0*cyydddF*. See “Standard and Extended SMF record headers” on page 162 for a detailed description.
34	22	SMF25UIF	8	EBCDIC	User-defined identification field (taken from common exit parameter area, not from USER=parameter on job statement).

Descriptor Section

Offsets		Name	Length	Format	Description
42	2A	SMF25IND	2	binary	Allocation indicators **Bit** **Meaning when set** **0** If zero, allocation by user's DD statements. If 1, dynamic allocation. **1** If zero, non-catalog allocation by JES3. If 1, catalog allocation by JES3. **2** If zero, manual allocation by operator. If 1, automatic allocation by JES3 (see the ALLOCATE= keyword on the JES3 SETPARAM initialization statement in *z/OS JES3 Initialization and Tuning Reference*). **3-15** Reserved.
44	2C	SMF25NTF	4	binary	Number of scratch volumes needed for the job.
48	30	SMF25NDF	4	binary	Number of IAT5110 GET messages for disk volumes issued for the job.

Offsets		Name	Length	Format	Description
52	34	SMF25FST	4	binary	Time since midnight, in hundredths of a second, that the fetch processing ended. That is, the time that the first phase of MDS ended. (During this phase, messages are issued to inform the operator of the volumes required for the job to run.)
56	38	SMF25FSD	4	packed	Date when the fetch processing ended, in the form 0*cyydddF*. See “Standard and Extended SMF record headers” on page 162 for a detailed description.
60	3C	SMF25SST	4	binary	If manual allocation, the time when the *START SETUP operator command was issued. If automatic allocation, this field contains zeroes.
64	40	SMF25SSD	4	packed	If manual allocation, the date when the *START SETUP operator command was issued. If automatic allocation, this field contains zeroes.
68	44	SMF25NTM	4	binary	Number of tape volumes mounted by MDS.
72	48	SMF25NDM	4	binary	Number of disk volumes mounted by MDS.
76	4C	SMF25MST	4	binary	Time since midnight, in hundredths of a second, when all JES3 volume mount messages have been issued. If not mounts were required, this field equals the time of JES3 allocation.
80	50	SMF25MSD	4	packed	Date when all JES3 volume mount messages have been issued, in the form 0*cyydddF*. See “Standard and Extended SMF record headers” on page 162 for a detailed description. If no mounts were required, this field equals the date of JES3 allocation.
84	54	SMF25VVT	4	binary	Time since midnight, in hundredths of a second, of JES3 device verification.
88	58	SMF25VVD	4	packed	Date of JES3 device verification, in the form 0*cyydddF*. See “Standard and Extended SMF record headers” on page 162 for a detailed description.
92	5C	SMF25NMV	4	binary	Number of Mass Storage Volume requests allocated by MDS for the job. **Note:** As of MVS/SP4.1, this field is no longer valid.

Record type 26 (X'1A') — JES2 Job Purge

When all SYSOUT for a job is processed, JES2 invokes exit IEFUJP to allow an installation to decide whether to write record type 26. Then, JES2 writes this record at job purge. This record identifies the job-by-job log identification, JES2-assigned job number, and programmer's name. JES2 can be induced to not write this record on a job class basis.

Record type 26 contains operating information such as:

- Message class
- Job class
- JES2 job selection priority
- JES2 logical input device name
- Output lines
- Output punched cards
- Print/punch route codes
- Start and stop times for:
  - The reader
  - The Converter
  - The Execution processor
  - The output processor.

Record mapping

Header/Self-defining Section

This section contains the common SMF record headers fields and the triplet fields (offset/length/number), if applicable, that locate the other sections on the record.

Offsets		Name	Length	Format	Description
0	0	SMF26LEN	2	binary	Record length. This field and the next field (total of four bytes) form the RDW (record descriptor word). See “Standard and Extended SMF record headers” on page 162 for a detailed description.
2	2	SMF26SEG	2	binary	Segment descriptor (see record length field).
4	4	SMF26FLG	1	binary	System indicator: **Bit** **Meaning when set** **0-2** Reserved **3-6** Version indicators* **7** Reserved. *See “Standard and Extended SMF record headers” on page 162 for a detailed description.
5	5	SMF26RTY	1	binary	Record type 26 (X'1A').
6	6	SMF26TME	4	binary	Time since midnight, in hundredths of a second, that the record was moved into the SMF buffer.
10	A	SMF26DTE	4	packed	Date when the record was moved into the SMF buffer, in the form 0*cyydddF*. See “Standard and Extended SMF record headers” on page 162 for a detailed description.
14	E	SMF26SID	4	EBCDIC	System identification (from the SID parameter).
18	12	SMF26JBN	8	EBCDIC	Job name. The job name, time, and date that the reader recognized the JOB card (for this job) constitute the job log identification, or transaction name (for APPC output).
26	1A	SMF26RST	4	binary	Time since midnight, in hundredths of a second, that the reader recognized the JOB statement (for this job).
30	1E	SMF26RSD	4	packed	Date when the reader recognized the JOB statement (for this job), in the form 0*cyydddF*. See “Standard and Extended SMF record headers” on page 162 for a detailed description.
34	22	SMF26UIF	8	EBCDIC	User-defined identification field (taken from common exit parameter area, not from USER=parameter on job statement).
42	2A	SMF26RSV	4		Reserved.
46	2E	SMF26SBS	2	binary	Subsystem identification — X'0002' signifies JES2.

Offsets		Name	Length	Format	Description
48	30	SMF26IND	2	binary	Entry type indicator **Bit** **Meaning when set** **0** Descriptor section present **1** Events section present **2** Actuals section present **3** JES2 network section present **4** JES2 routing section present **5** Print section present **6** Reserved **7** Triplet section present **8-15** Reserved.

Descriptor Section

Offsets		Name	Length	Format	Description
50	32	SMF26LN1	2	binary	Length of descriptor section, including this field.
52	34	SMF26RV1	2		Reserved.
54	36	SMF26IN2	1	binary	Job information indicator **Bit** **Meaning when set** **0** Background batch job **1** Foreground TSO/E user **2** System task **3** No journal option **4** No output option **5** TYPRUN=SCAN was specified **6** TYPRUN=COPY was specified **7** RESTART = Y was specified.

Offsets		Name	Length	Format	Description
55	37	SMF26INF	1	binary	Job information indicator **Bit** **Meaning when set** **0** /*PRIORITY statement present or keyword 'PRTY =' was specified on JOB statement **1** /*SETUP statement(s) present **2** TYPRUN=HOLD was specified **3** No job log option **4** Execution batching **5** Job was entered on internal reader **6** Job was rerun by JES2 **7** Job was canceled by the operator.
56	38	SMF26JNM	4	EBCDIC	JES2-assigned job number if less than 10,000. If the job number is greater or equal to 10,000, this field is zeroes and the job number is in the SMF26JID field.
60	3C	SMF26JID	8	EBCDIC	8-character job identifier
68	44	SMF26NAM	20	EBCDIC	Programmer's name (taken from JOB statement).
88	58	SMF26MSG	1	EBCDIC	Message class (taken from JOB statement).
89	59	SMF26CLS	1	EBCDIC	Job class (taken from JOB statement).
90	5A	SMF26XPI	1	binary	JES2 job selection priority when the job was initially read.
91	5B	SMF26XPS	1	binary	JES2 job selection priority when the job was selected.
92	5C	SMF26IX2	1	Binary	Job information indicator **Bit** **Meaning when set** **0** Job delayed due to duplicate job name **1** Job purged as a result of spool offload **2** Job went through unspun in its lifetime **3** Job had at least one JOE purged due to PSO/SAPI
93	5D	SMF26OPS	1		Reserved.
94	5E	SMF26LOC	2	binary	Input route code. These fields are defined as follows: X'0100' indicates local routing; X'nnrr' is remote routing; and X'00nn' indicates special local routing. If more than 255 remotes are specified for the system, this field is set to zero. See the Routing Section described later in this record.
96	60	SMF26DEV	8	EBCDIC	JES2 logical input device name as defined in JESPARMS.
104	68	SMF26ACT	4	EBCDIC	Programmer's accounting number. JES2-defined sub-field from the accounting information field in the JOB statement or default values assigned for this job or from /*JOBPARM, JES2 control statement.

Offsets		Name	Length	Format	Description
108	6C	SMF26ROM	4	EBCDIC	Programmer's room number. JES2-defined sub-field from the accounting information field in the JOB statement or default values assigned for this job or from /*JOBPARM, JES2 control statement.
112	70	SMF26XTM	4	binary	Estimated processing time, in seconds. JES2-defined sub-field from the accounting information field in the JOB statement or default values assigned for this job or from /*JOBPARM, JES2 control statement.
116	74	SMF26ELN	4	binary	Estimated output lines. JES2-defined sub-field from the accounting information field in the JOB statement or default values assigned for this job or from /*JOBPARM, JES2 control statement.
120	78	SMF26EPU	4	binary	Estimated output punched cards. JES2-defined sub-field from the accounting information field in the JOB statement or default values assigned for this job or from /*JOBPARM, JES2 control statement.
124	7C	SMF26FRM	4	EBCDIC	Output form number. If the source field contain four or fewer characters, SMF26FRM is set. Otherwise, this field is set to blanks, and the contents of the source field appear only in SMF26EFM, described under the Routing Section later in this record.
128	80	SMF26CYP	2	binary	Job print copy count. JES2-defined sub-field from the accounting information field in the JOB statement or default values assigned for this job or from /*JOBPARM, JES2 control statement.
130	82	SMF26LIN	2	binary	Lines per page. JES2-defined sub-field from the accounting information field in the JOB statement or default values assigned for this job or from /*JOBPARM, JES2 control statement.
132	84	SMF26PRR	2	binary	Job print route code. These fields are defined as follows: X'0100' indicates local routing; X'nnrr' is remote routing; and X'00nn' indicates special local routing. If more than 255 remotes are specified for the system, this field is set to zero. See the Routing Section described later in this record.
134	86	SMF26PUR	2	binary	Job punch route code. These fields are defined as follows: X'0100' indicates local routing; X'nnrr' is remote routing; and X'00nn' indicates special local routing. If more than 255 remotes are specified for the system, this field is set to zero. See the Routing Section described later in this record.
136	88	SMF26PDD	8	EBCDIC	Procedure data definition name (DDNAME) used for JCL conversion.

Events Section

Offsets		Name	Length	Format	Description
50	32	SMF26LN2	2	binary	Length of events section, including this field.
52	34	SMF26RV2	2		Reserved.
54	36	SMF26RPT	4	binary	Reader stop time, in hundredths of a second.
58	3A	SMF26RPD	4	packed	Reader stop date, in the form 0*cyydddF*. See “Standard and Extended SMF record headers” on page 162 for a detailed description.
62	3E	SMF26CST	4	binary	Converter start time since midnight, in hundredths of a second.
66	42	SMF26CSD	4	packed	Converter start date, in the form 0*cyydddF*. See “Standard and Extended SMF record headers” on page 162 for a detailed description.
70	46	SMF26CPT	4	binary	Converter stop time since midnight, in hundredths of a second.
74	4A	SMF26CPD	4	packed	Converter stop date, in the form 0*cyydddF*. See “Standard and Extended SMF record headers” on page 162 for a detailed description.

Offsets		Name	Length	Format	Description
78	4E	SMF26XST	4	binary	Execution processor start time since midnight, in hundredths of a second.
82	52	SMF26XSD	4	packed	Execution processor start date, in the form 0*cyydddF*. See “Standard and Extended SMF record headers” on page 162 for a detailed description.
86	56	SMF26XPT	4	binary	Execution processor stop time since midnight, in hundredths of a second.
90	5A	SMF26XPD	4	packed	Execution processor stop date, in the form 0*cyydddF*. See “Standard and Extended SMF record headers” on page 162 for a detailed description.
94	5E	SMF26OST	4	binary	Output processor start time since midnight, in hundredths of a second.
98	62	SMF26OSD	4	packed	Output processor start date, in the form 0*cyydddF*. See “Standard and Extended SMF record headers” on page 162 for a detailed description.
102	66	SMF26OPT	4	binary	Output processor stop time since midnight, in hundredths of a second.
106	6A	SMF26OPD	4	packed	Output processor stop date, in the form 0*cyydddF*. see “Standard and Extended SMF record headers” on page 162 for a detailed description.

Actuals section

Offsets		Name	Length	Format	Description
50	32	SMF26LN3	2	binary	Length of actuals section, including this field.
52	34	SMF26RV4	2		Reserved.
54	36	SMF26ICD	4	binary	Number of input statements for job. This field includes JCL and SYSIN statements.
58	3A	SMF26XLN	4	binary	Number of output lines generated to spool.
62	3E	SMF26XPU	4	binary	Number of punched cards generated to spool.
66	42	SMF26RID	4	EBCDIC	Input processor system (CPU) identification.
70	46	SMF26CID	4	EBCDIC	Conversion processor system (CPU) identification.
74	4A	SMF26XID	4	EBCDIC	Execution processor system (CPU) identification.
78	4E	SMF26OID	4	EBCDIC	Output processor system (CPU) identification.

Network Section

Offsets		Name	Length	Format	Description
50	32	SMF26LN4	2	binary	Length of network section including this field.
52	34	SMF26RV5	2		Reserved.
54	36	SMF26NID	4	EBCDIC	Job transmitter system identifier.
58	3A	SMF26NST	4	binary	Job transmitter start time since midnight, in hundredths of a second.
62	3E	SMF26NSD	4	packed	Job transmitter start date, in the form 0*cyydddF*. See “Standard and Extended SMF record headers” on page 162 for a detailed description.
66	42	SMF26NPT	4	binary	Job transmitter stop time since midnight, in hundredths of a second.
70	46	SMF26NPD	4	packed	Job transmitter stop date, in the form 0*cyydddF*. See “Standard and Extended SMF record headers” on page 162 for a detailed description.

Offsets		Name	Length	Format	Description
74	4A	SMF26NAC	8	EBCDIC	Network accounting number.
82	52	SMF26NJB	8	EBCDIC	Original job identification.
90	5A	SMF26NDV	8	EBCDIC	Job transmitter device name.
98	62	SMF26NON	8	EBCDIC	Original node name.
106	6A	SMF26NXN	8	EBCDIC	Processing node name.
114	72	SMF26NNM	8	EBCDIC	Next node name.
122	7A	SMF26NLN	8	EBCDIC	Last node name.
130	82	SMF26SUI	8	EBCDIC	Submitting userid.
138	8A	SMF26NN	8	EBCDIC	Job end execution notify node.
146	92	SMF26NU	8	EBCDIC	Job end execution notify userid.

Routing Section

Offsets		Name	Length	Format	Description
50	32	SMF26LN5	2	binary	Length of routing section (including this field).
52	34	SMF26INR	4	binary	Input route code. These fields are defined as follows: X'00010000' indicated local routing; X'nnrrnnnn' indicates remote routing; and X'0000nnnn' indicates special local routing. This field is always set regardless of the number of remotes specified for the system.
56	38	SMF26PRD	4	binary	Default print route code. These fields are defined as follows: X'00010000' indicated local routing; X'nnrrnnnn' indicates remote routing; and X'0000nnnn' indicates special local routing. This field is always set regardless of the number of remotes specified for the system.
60	3C	SMF26PUD	4	binary	Default punch route code. These fields are defined as follows: X'00010000' indicated local routing; X'nnrrnnnn' indicates remote routing; and X'0000nnnn' indicates special local routing. This field is always set regardless of the number of remotes specified for the system.

Print Section

Offsets		Name	Length	Format	Description
50	32	SMF26LN6	2	binary	Length of print section including this field.
52	34	SMF26EBT	4	binary	Estimated SYSOUT byte count.
56	38	SMF26XBT	4	binary	Actual SYSOUT byte count.
60	3C	SMF26EPG	4	binary	Estimated page count.
64	40	SMF26XPG	4	binary	Actual page count. For page mode data sets, JES2 updates the page count when it encounters a “begin page” indicator in the date stream header.
68	44	SMF26EFM	8	EBCDIC	Output form number. This field is set regardless of the number of characters in the forms field.

Triplet Section

Offsets		Name	Length	Format	Description
50	32	SMF26LN7	2	binary	Length of triplet section.
52	34	SMF26OAG	4		Offset of accounting section.
56	38	SMF26LAG	2	binary	Length of accounting section (including length of field SMF26LN8).

Offsets		Name	Length	Format	Description
58	3A	SMF26NAG	2	binary	Number of accounting sections.
60	3C	SMF26OWL	4		Offset of Workload Management section.
64	40	SMF26LWL	2	binary	Length of Workload Management section.
66	42	SMF26NWL	2	binary	Number of Workload Management sections.
68	44	SMF26OJC	4	binary	Offset of Job Correlator section.
72	48	SMF26LJC	2	binary	Length of Job Correlator section.
74	4A	SMF26NJC	2	binary	Number of Job Correlator sections.
76	4C	SMF26OEC	4	binary	Offset of Encryption/compression section.
80	50	SMF26LEC	2	binary	Length of Encryption/compression section.
82	52	SMF26NEC	2	binary	Number of Encryption/compression sections.

Accounting section

Offsets		Name	Length	Format	Description
0	0	SMF26LN8	2	binary	Length of accounting section.
2	2	SMF26NRA	1	binary	Number of accounting pairs.
3	3	SMF26AC1	variable	EBCDIC	An accounting pair consists of a 1-byte length field, which contains the length of the following string. The string contains accounting data. If the length field is zero, there is no following string.

Workload Management Section

Offsets		Name	Length	Format	Description
0	0	SMF26WCL	8	EBCDIC	Service class name at the time of execution.
8	8	SMF26WOC	8	EBCDIC	Original service class (assigned by WLM classification when the job finished conversion).
16	10	SMF26WIN	1	binary	Indicators **Bit** **Meaning when set** **0** Job ran in MODE=WLM **1** Job ran because of $S J **2-7** Reserved
17	11	SMF26WJC	8	EBCDIC	Eight character job class (padded on right with blanks).
25	19	SMF26WSE	16	EBCDIC	Sixteen character scheduling environment (padded on right with blanks).

Job Correlator Section

Offsets		Name	Length	Format	Description
0	0	SMF26JCR	64	EBCDIC	Job correlator of the job being purged.

Encryption/compression section

Offsets		Name	Length	Format	Description
0	0	SMF26BYU	8	binary	Total job uncompressed byte count.

Offsets		Name	Length	Format	Description
8	8	SMF26BYC	8	binary	Total job compressed byte count.
16	10	SMF26CCT	4	binary	Compressed data set count.
20	14	SMF26ECT	4	binary	Encrypted data set count.

Record type 26 (X'1A') — JES3 Job Purge

Record type 26 is written at job purge after all SYSOUT for the job is processed. This record identifies the job by job log identification, JES3-assigned job number, and programmer's name. Record type 26 contains operating information such as:

- Message class
- Job class
- JES3 job selection priority
- JES3 logical input device name
- Processing time
- Output lines
- Output punched cards
- Deadline schedule type
- Deadline schedule time and date
- Start and stop times for:
  - The reader
  - The Converter
  - The Execution processor
  - The output processor.

Note: The format of all fields in this record are binary unless data is entered in the field.

Record environment

The following conditions exist for the generation of this record:

Macro
SMFEWTM, BRANCH=NO (record exit: IEFU83)

Storage Residency
24-bit

Record mapping

Header/Self-defining Section

This section contains the common SMF record headers fields and the triplet fields (offset/length/number), if applicable, that locate the other sections on the record.

Offsets		Name	Length	Format	Description
0	0	SMF26LEN	2	binary	Record length. This field and the next field (total of four bytes) form the RDW (record descriptor word). See "Standard and Extended SMF record headers" on page 162 for details.
2	2	SMF26SEG	2	binary	Segment descriptor (see record length field).

Offsets		Name	Length	Format	Description
4	4	SMF26FLG	1	binary	System indicator: **Bit** **Meaning when set** **0-2** Reserved **3-6** Version indicators (See “Standard and Extended SMF record headers” on page 162 for details.) **7** Reserved.
5	5	SMF26RTY	1	binary	Record type 26 (X'1A').
6	6	SMF26TME	4	binary	Time since midnight, in hundredths of a second, that the record was moved into the SMF buffer.
10	A	SMF26DTE	4	packed	Date when the record was moved into the SMF buffer, in the form 0*cyydddF*. See “Standard and Extended SMF record headers” on page 162 for details.
14	E	SMF26SID	4	EBCDIC	System identification (from the SID parameter).
18	12	SMF26JBN	8	EBCDIC	Job name. The job name, time, and date that the reader recognized the JOB card (for this job) constitute the job log identification, or transaction name (for APPC output).
26	1Q	SMF26RST	4	binary	Time since midnight, in hundredths of a second, that the reader recognized the JOB statement (for this job).
30	1E	SMF26RSD	4	packed	Date when the reader recognized the JOB statement (for this job), in the form 0*cyydddF*. See “Standard and Extended SMF record headers” on page 162 for details.
34	22	SMF26UIF	8	EBCDIC	User-defined identification field (taken from common exit parameter area, not from USER=parameter on job statement).
42	2A	SMF26RSV	4		Reserved.
46	2E	SMF26SBS	2	binary	Subsystem identification — X'0005' signifies JES3.
48	30	SMF26IND	2	binary	Entry type indicator **Bit** **Meaning when set** **0** Descriptor section present **1** Events section present **2** Actuals section present **3-4** Reserved **5** Print section present **6** Reserved. **7** Triplet section present **8-15** Reserved

Descriptor Section

Offsets		Name	Length	Format	Description
50	32	SMF26LN1	2	binary	Length of descriptor section, including this field.

Offsets		Name	Length	Format	Description
52	34	SMF26RV1	2		Reserved.
54	36	SMF26IN3	1	binary	Job information indicator **Bit** **Meaning when set** **0** Dependent job (//* NET statement processed) **1** Deadline scheduling (DEADLINE parameter was specified on //* MAIN statement) **2** Deadline job met deadline **3** Process job (//* PROCESS statement processed) **4-5** Reserved **6** Job left system by way of DJ (dump job) **7** Job entered system by way of DJ (dump job).
55	37	SMF26INF	1	binary	Job information indicator **Bit** **Meaning when set** **0** Job priority (taken from PRTY=parameter on) JOB statement) **1** Job processed by preexec setup **2** TYPRUN=HOLD was specified on JOB statement **3-4** Reserved **5** Job was entered on internal reader **6** Job was rerun on a JES3 reader **7** Job was canceled by the operator.
56	38	SMF26JNM	4	EBCDIC	JES3-assigned job number if less than 10,000. If the job number is greater or equal to 10,000, this field contains zeros and the job number is in the SMF26JID field.
60	3C	SMF26JID	8	EBCDIC	8-character job identifier
68	44	SMF26NAM	20	EBCDIC	Programmer's name (taken from JOB statement).
88	58	SMF26MSG	1	EBCDIC	Message class (taken from MSGCLASS=parameter on JOB statement).
89	59	SMF26CLS	1	EBCDIC	Job class (taken from CLASS= parameter on JOB statement). This field is blank if the default is used or if a valid CLASS= parameter is specified on the //* MAIN statement (see SMF26CLN at offset 176).
90	5A	SMF26XPI	1	binary	JES3 job selection priority when the job was initially read (taken from: 1) PRTY= parameter on JOB statement, 2) class default priority from main processor job class table, or 3) default JES3 job priority).
91	5B	SMF26XPS	1	binary	JES3 job selection priority when the job was selected (taken from job's RESQ).
92	5C	SMF26RV8	4		Reserved.

Offsets		Name	Length	Format	Description
96	60	SMF26DEV	8	EBCDIC	JES3 logical input device name, or user identification if TSO/E job.
104	68	SMF26RVA	8		Reserved.
112	70	SMF26XTM	4	binary	Estimated processing time, in seconds.
116	74	SMF26ELN	4	binary	Estimated output lines (taken from LINES= parameter on //* MAIN statement or JES3 complex-wide default, which is in units of 1000).
120	78	SMF26EPU	4	binary	Estimated output punched cards (taken from CARDS= parameter on //* MAIN statement or JES3 complex-wide default, which is in units of 100).
124	7C	SMF26DTY	1	EBCDIC	Deadline schedule type (taken from DEADLINE parameter on //* MAIN statement). Valid types are A-Z and 0-9.
125	70	SMF26RV6	3		Reserved.
128	80	SMF26IGP	8	EBCDIC	JES3 logical input device group name.
136	88	SMF26PD3	8	EBCDIC	Procedure data definition name (DDNAME) used for JCL conversion (taken from PROC= parameter on //* MAIN statement or default).
144	90	SMF26NJO	8	EBCDIC	Name of system to which the job is sent.
152	98	SMF26NJI	8	EBCDIC	Name of local terminal supplied by the JES3 initialization deck.
160	A0	SMF26NET	8	EBCDIC	Identification of dependent job net to which this job belongs (taken from //* NET statement).
168	A8	SMF26DTM	4	binary	Deadline schedule time, in hundredths of a second (taken from DEADLINE parameter on //* MAIN statement).
172	AC	SMF26DDT	4	packed	Deadline schedule date, in the form 0*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for details. This is taken from the DEADLINE parameter on //* MAIN statement.
176	B0	SMF26CLN	8	EBCDIC	Job class (taken from CLASS= parameter on //* MAIN statement if valid, or the default (JS3BATCH)).

Events Section

Offsets		Name	Length	Format	Description
184	B4	SMF26LN2	2	binary	Length of events section, including this field.
186	BA	SMF26RV2	2		Reserved.
188	BC	SMF26RPT	4	binary	Reader stop time, in hundredths of a second. This field is filled in during JOB statement processing.
192	C0	SMF26RPD	4	packed	Reader stop date, in the form 0*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for details. This field is filled in during JOB statement processing.
196	C4	SMF26CST	4	binary	Converter start time, in hundredths of a second. This field is filled in following the JES3 LOGIN of the interpreter job.
200	C8	SMF26CSD	4	packed	Converter start date, in the form 0*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for details. This field is filled in following the JES3 LOGIN of the interpreter job.
204	CC	SMF26CPT	4	binary	Converter stop time, in hundredths of a second. This field is filled in at the end of the interpreter function.
208	D0	SMF26CPD	4	packed	Converter stop date, in the form 0*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for details. This field is filled in at the end of the interpreter function.
212	D4	SMF26XST	4	binary	Execution processor start time, in hundredths of a second. This field is filled in when the job is scheduled to run on a JES3 local or logical processor.

Offsets		Name	Length	Format	Description
216	D8	SMF26XSD	4	packed	Execution processor start date, in the form 0*cyydddF*. See “Standard and Extended SMF record headers” on page 162 for details. This field ID is filled in when the job is scheduled to run on a JES3 local or logical processor.
220	DC	SMF26XPT	4	binary	Execution processor stop time, in hundredths of a second. This field is filled in when the job ends on a JES3 local or global processor.
224	E0	SMF26XPD	4	packed	Execution processor stop date, in the form 0*cyydddF*. See “Standard and Extended SMF record headers” on page 162 for details. This field is filled in when the job ends on a JES3 local or global processor.
228	E4	SMF26OST	4	binary	Output processor start time, in hundredths of a second. This field is filled in when output service starts to process the job's data sets.
232	E8	SMF26OSD	4	packed	Output processor start date, in the form 0*cyydddF*. See “Standard and Extended SMF record headers” on page 162 for details. This field is filled in when output service starts to process the job's data sets.
236	EC	SMF26OPT	4	binary	Output processor stop time, in hundredths of a second. This field is filled in when: 1) an RQ is removed from the writer queue, 2) all output OSEs are deleted/released, and 3) a request from the SYSOUT interface is processed.
240	F0	SMF26OPD	4	packed	Output processor stop date, in the form 0*cyydddF*. See “Standard and Extended SMF record headers” on page 162 for details. This field is filled in when: 1) an RQ is removed from the writer queue, 2) all output OSEs are deleted/released, and 3) a request from the SYSOUT interface is processed.

Actuals section

Offsets		Name	Length	Format	Description
244	F4	SMF26LN3	2	binary	Length of actuals section, including this field.
246	F6	SMF26RV4	2		Reserved.
248	F8	SMF26ICD	4	binary	Number of input statements for the job. This field includes JCL and SYSIN statements.
252	FC	SMF26XLN	4	binary	Number of output lines generated to spool. This field if filled in when the job is ended on a JES3 local or global processor.
256	100	SMF26XPU	4	binary	Number of punched cards generated to spool. This field is filled in when the job is ended on a JES3 local or global processor.
260	104	SMF26RID	4	EBCDIC	Input processor system (CPU) identification.
264	108	SMF26CID	4	EBCDIC	Conversion processor system (CPU) identification.
268	10C	SMF26XID	4	EBCDIC	Execution processor system (CPU) identification.
272	110	SMF26OID	4	EBCDIC	Output processor system (CPU) identification.
276	114	SMF26JAF	42		Reserved for job accounting fields.
318	13E	NJEJMRID	8	EBCDIC	Networking identifier ‘NJEJMR’.
326	146	NJEJMRLN	2	binary	Length of data that follows, including this field.
328	148	NJEJOBNO	2		Reserved.
330	14A	NJEJOBNM	8	EBCDIC	Job name.
338	152	NJEXEQM	8	EBCDIC	Processing node name.
346	15A	NJEPRGMR	20	EBCDIC	Programmer name.
366	16E	NJEUSRID	8	EBCDIC	Origin or notify identification.
374	176	NJEACCT	8	EBCDIC	Networking account number.

Offsets		Name	Length	Format	Description
382	17E	NJEDEPT	8	EBCDIC	Programmer's department number.
390	186	NJEBLDG	8	EBCDIC	Programmer's building number.
398	18E	NJEROOM	8	EBCDIC	Programmer's room number.
406	196	NJEXEQU	8	EBCDIC	Processing user identifier.
414	19E	NJEJOBNX	4	EBCDIC	Origin node job number.
418	1A2	SMF26SRC	4	binary	Number of spool records.

Print Section

Offsets		Name	Length	Format	Description
0	0	SMF26LN6	2	binary	Length of print section, including this field.
2	2	SMF26EBT	4	binary	Estimated SYSOUT byte count.
6	6	SMF26XBT	4	binary	Actual SYSOUT byte count.
10	A	SMF26EPG	4	binary	Estimated page count.
14	E	SMF26XPG	4	binary	Actual page count. For page mode data sets, JES3 updated the page count when it encounters a “begin page” indicator in the data stream header.
18	12	SMF26EFM	8	EBCDIC	Output form number. This field is set regardless of the number of characters in the forms field.

Triplet Section

Offsets		Name	Length	Format	Description
50	32	SMF26LN7	2	binary	Length of triplet section.
52	34	SMF26OAG	4	binary	Offset of accounting section.
56	38	SMF26LAG	2	binary	Length of accounting section.
58	3A	SMF26NAG	2	binary	Number of accounting section.
60	3C	SMF26OWL	4		Offset of Workload Management section.
64	40	SMF26LWL	2	binary	Length of Workload Management section.
66	42	SMF26MWL	2	binary	Number of Workload Management sections.

Accounting Section

Offsets		Name	Length	Format	Description
0	0	SMF26LN8	2	binary	Length of accounting section.
2	2	SMF26NRA	1	binary	Number of accounting pairs.
3	3	SMF26AC1	variable	EBCDIC	An accounting pair consists of a 1-byte length field, which contains the length of the following string. The string contains accounting data. If the length field is zero, there is no following string.

Workload Management Section

Offsets		Name	Length	Format	Description
0	0	SMF26WCL	8	EBCDIC	Service class name at the time of execution.
8	8	SMF26WOC	8	EBCDIC	Original service class (assigned by WLM classification when the job finished conversion).

Offsets		Name	Length	Format	Description
16	10	SMF26WIN	1	binary	Indicators **Bit** **Meaning When Set** **0** Job ran in MODE=WLM **1** Job ran because of F J=job, RUN **2-7** Reserved
17	11	SMF26WJC	8	EBCDIC	Eight character job class (padded on right with blanks).
25	19	SMF26WSE	16	EBCDIC	Sixteen character scheduling environment (padded on right with blanks).

Record type 28 (X'1C') — NPM Statistics

The NetView® Performance Monitor (NPM) writes record type 28 at user-specified intervals and contains network statistics. For more information about the type 28 record, see *NPM Installation and Customization Guide*.

Record type 30 (X'1E') — Common address space work

SMFPRM*xx* parameters are described in *z/OS MVS Initialization and Tuning Reference*.

Information on system address spaces and full function start are described in *z/OS MVS Initialization and Tuning Guide*.

The type 30 SMF record provides accounting information. It consolidates data that is found in record types 4, 5, 20, 34, 35, and 40 (which simplifies accounting by installation-written post processing routines), and it provides additional information. Use record type 30, because the record types that it replaces are generally not being updated with new measurement data. SMF writes record type 30 when:

- A work unit (such as a TSO/E session, APPC/MVS transaction program, OMVS forked or spawned address space, started task, or batch job) starts. This subtype 1 record identifies the work unit but contains no resource data.
- An SMF interval ends, if you requested interval accounting.

  If this is the first interval since the work unit started, then this subtype 2 record contains the total resources used from the start of the work unit until the end of the current interval. With interval synchronization, this span of time is normally shorter than the length of the SMF global recording interval. For global interval recording without interval synchronization, this span of time is the same as the length of the SMF global recording interval.

  For other intervals, this subtype 2 record contains the total resources used from the end of the previous interval until the end of the current interval.

  For system address spaces that do not go through full function start, SMF generates a subtype 6 record that contains the total resources used since the start of the address space. Note that the data in the subtype 6 record is cumulative, unlike the subtype 2 record.
- A work unit (such as a TSO/E session, APPC/MVS transaction program, OMVS forked or spawned address space, started task, or batch job) completes.

  If you requested interval accounting, SMF generates a subtype 3 record that contains the total resources used from the end of the previous recording interval until the end of the work unit. This span of time is normally shorter than the length of the specified recording interval.

  For a job step, SMF generates a subtype 4 record that contains the total resources used from the time when the job step started until the time when the job step completed. If you requested interval recording, then this subtype 4 record generally contains the accumulated totals of the data in the interval subtype 2 and subtype 3 records that were generated for the step.

For a job, SMF generates a subtype 5 record that contains the total resources used from the time when the job started until the time when the job completed. This subtype 5 record generally contains the accumulated totals of the data in the step total subtype 4 records that were generated for the job.

For a description of the use of record type 30 for interval accounting, see "INTVAL and SYNCVAL — Performing interval accounting" on page 60.

The type 30 record contains operation information such as the job and step start and end times, step CPU time, step termination status, number of records in DD DATA and DD * data sets processed by the step and job, device allocation start time, problem program start time, and storage protect key. The record contains the number of page-ins, page-outs, swap-ins, and swap-outs for both virtual input output (VIO) and non-VIO data sets. The record contains information on the number of hiperspace page moves and the movement of pages between expanded storage and central storage. This data can be used in resource planning. Information is added to account for time spent in hiperspace processing on a step or interval basis. The record contains an entry for each data set defined by a DD statement or dynamic allocation. Each entry lists the device class, unit type, device number, the execute channel program (EXCP) count, and device connect time for the data set. The usage data section contains information that can be used to attribute usage of a product to the address space.

The type 30 record can be used with subtype selectivity function. Refer to "SYS and SUBSYS with TYPE and NOTYPE — Selecting subtypes for SMF recording" on page 59 for a description of subtype selectivity. The subtypes are:

Subtype
: **Meaning**

1
: Job start or start of other work unit

2
: Activity since previous interval ended

3
: Activity for the last interval before step termination

4
: Step total

5
: Job termination or termination of other work unit

6
: System address space, which did not go through full function start. See Creating address spaces for system components in *z/OS MVS Initialization and Tuning Guide* for information about system address spaces. When you select subtype 6 for record type 30, the following fields may contain zeros or blank:

    SMF30PGM
    SMF30STM
    SMF30PSN
    SMF30CL8
    SMF30UIF
    SMF30USR
    SMF30JNM

Information in specific fields may differ for different subtypes. For example, the record identifies the job (and job step) by the:

- Job log identification (job name, time and date that the reader recognized the job card for this job).
- Step name
- Number of the step within the job
- User identification

- Program name
- Performance group number or service class name
- JES job number.

If accounting numbers (which can be alphameric) are specified in the JOB or EXEC statements, they are included. For subtype 1 and subtype 5, the accounting numbers are taken from the JOB statement. For all other subtypes, the accounting numbers are taken from the EXEC statement.

Because some of the information necessary to complete a field is not always available when a type 30 record is written, some fields might be empty. For example, the SMF30AST, SMF30PPS, SMF30SIT, and SMF30STD fields are not filled in for a subtype 1 record.

Because system address spaces do not use full function start, the subtype 6 record is incomplete; that is, only certain fields in each section are valid. All unused fields are set to zero or blank.

The subtype 6 records are written only at the expiration of an interval; the values are cumulative and indicate data collected since the initialization of the address space. If a system address space later goes through full function start, data is not reported for the period between the expiration of the previous interval and the time that the address space goes through full function start. The subtype 6 record contains data for the APPC/MVS Cumulative Resource section, but data in the APPC/MVS Resource section is not reported in subtype 6.

The length of record type 30 is variable. The maximum length of the type 30 record is 32,756 bytes. If the volume of data in the type 30 record is such that the length would exceed the maximum length, one or more additional type 30 records are produced. The additional records contain only the header/self-defining, subsystem, identification, and one or more sections that can repeat. An example of a section that can repeat is the execute channel program (EXCP) section.

Rules: The following rules apply to all subtypes (except subtype 1). When examining a type 30 record

- A record is the first record if at least one of the following fields is non-zero:

  SMF30AON
  SMF30ARN
  SMF30CON
  SMF30DRN
  SMF30OON
  SMF30PON
  SMF30RON
  SMF30TON
  SMF30UON

- A record is an additional record if the following fields are all zero:

  SMF30AON
  SMF30ARN
  SMF30CON
  SMF30DRN
  SMF30OON
  SMF30PON
  SMF30RON
  SMF30TON
  SMF30UON

- In either a **first** or **additional** record:
  - There are more records to follow if at least one of the following fields is non-zero:

    SMF30EOS
    SMF30MOS
    SMF30OPM

SMF30RMS
SMF30UDS

- This is the **last** record if the following fields are all zero:

  SMF30EOS
  SMF30MOS
  SMF30OPM
  SMF30RMS
  SMF30UDS

The IEFACTRT exit will be called, at step and job termination, for each type 30 (subtype 4 and subtype 5) record written to the SMF data set. A separate call to IEFACTRT is made for each additional record.

Notes:

1. Data sets are recorded in the order of the DD statements; they are not identified by name. However, the data definition name (ddname) is included in the record. (An installation-written IEFUJV exit routine can record this order as each statement is validated). For concatenated DD statements, the ddname is the same on each entry, respectively.
2. CPU time is not expected to be constant between different runs of the same job step. For more information on EXCP count and CPU time, see Chapter 10, "EXCP count," on page 119 and Chapter 11, "CPU time," on page 121.
3. If the SMFPRM*xx* parameter DDCONS(YES) is specified, then duplicate execute channel program (EXCP) entries are consolidated. If DDCONS(NO) is specified, then duplicate EXCP entries are not consolidated. SMFPRM*xx* parameters are described in *z/OS MVS Initialization and Tuning Reference*.
4. If a section is not included in the record, the "number of" entry is zero. For example, subtype 1 does not have a completion segment, and SMF30TON is set to zero to indicate this.
5. If the IEFUSI exit changes the size of the private area, a flag is set in SMF30SFL in the paging and storage section.
6. Specifying the DETAIL parameter of the SMFPRM*xx* parmlib member for STC includes all EXCP sections in subtypes 4 and 5 for the step or job.
7. Specifying the NODETAIL parameter excludes EXCP sections from subtypes 4 and 5 for STC class subsystem jobs, but not for batch or TSO/E subsystems. NODETAIL is enforced for the master address space.

   For OMVS, the OMVS address space is considered a started task (STC), so NODETAIL is honored for processes running in the OMVS address space. However, processes that run under a BPXAS initiator are considered batch work, so NODETAIL has no effect.
8. Considerations for jobs that are evicted via the $EJ*xx*,STEP (or equivalent) command:
   - SMF30CNR (bit 14 of SMF30STI) is set in the subtype 4 record of the last step that executed prior to the eviction.
   - A subtype 5 record is not generated for a job that is evicted until the job resumes and completes execution.
   - Except for the following fields, subtype 5 fields that contain aggregated data will not include data from all steps in a job that resumes and completes execution following an eviction. In this case, subtype 5 fields will contain data aggregated from the steps that ran after the job resumes execution up until the job completes execution. In the subtype 5 record of an evicted job, these fields will contain data aggregated from all of the steps in the job:

     SMF30CPT
     SMF30CPS
     SMF30_TIME_ON_IFA
     SMF30_TIME_IFA_ON_CP
     SMF30_TIME_ON_SUP
     SMF30_TIME_SUP_ON_CP

9. While a job is executing, SMF writes the type 30, subtype 1, 4, and 5 records associated with each job step to the job's EVENTLOG data set. You can use the Job Step panel of the Spool Display and Search Facility (SDSF) to view these records. To control access to this information, the EVENTLOG is protected with two SAF resources in the JESSPOOL class: *nodeid.userid.jobname.jobid*.EVENTLOG.SMFSTEP and *nodeid.userid.jobname.jobid*.EVENTLOG.STEPDATA. See Jobs, job groups, output groups, and SYSIN/SYSOUT data sets in *z/OS SDSF Operation and Customization* for more information.

When you use the SMF30CPT field in the Accounting section:

Note that a workload may generate different values for SMF30CPT, if some eligible work for the IBM zEnterprise® Application Assist Processor (zAAP) or IBM z Integrated Information Processor (zIIP) running on a standard processor. If a repeatable value is more desirable than the possible performance benefits of letting zAAP or zIIP eligible work run on both specialty CPs and standard processors, specify IFAHONORPRIORITY=NO or IIPHONORPRIORITY=NO in the IEAOPTxx parmlib member.

Interval records may show this number to be hundredth (1/100) of a second less than other related SMF30 fields (such as SMF30_TIME_IFA_ON_CP). This difference is due to rounding differentials while calculating delta values, and will not occur for step end or job end.

If SMF30CPT is zero, and you would like to understand how much CPU time was used by the address space or you require more precise values in general, you can calculate the CPU and SRB time in microseconds (1 / 10^{-6}) using the following formulas:

- **CPU time:**

```
 (SMF30CSU * 10) / SMF30CPC * SMF30SUS / 16 = CPU time in microseconds
```

- **SRB time:**

```
(SMF30SRB * 10) / SMF30SRC * SMF30SUS / 16 = SRB time in microseconds
```

The CPU and SRB times computed from service units include zAAP time and zIIP time in addition to CP time. The time derived from CPU service is comparable to the sum of fields SMF30CPT, SMF30_TIME_ON_IFA and SMF30_TIME_ON_zIIP for work with no enclave activity. If the zAAP or zIIP processors are faster than the CP, zAAP or zIIP time is normalized to the time expected on the slower CP before service units are computed. Therefore, the derived time contains normalized zAAP or zIIP time. Field SMF30ZNF contains the normalization factor used. The normalization factor is 256 when the standard CPs are of the same speed as the zAAP or zIIP. Enclave time is summed with address space time in SMF30CPT. The preceding CPU time formula includes dependent enclave time but does not include independent enclave time. To compute independent enclave time, substitute SMF30ESU for SMF30CSU in the formula.

If you use derived processor times, you determine:

```
derived CP time = CPT / (CPT + zAAPNT + zIIPNT) * derived CPU time

derived Normalized zIIP time = zIIPNT / (CPT + zAAPNT time + zIIPNT) * derived CPU time

derived Normalized zAAP time =  zAAPNT / (CPT + zAAPNT + zIIPNT) * derived CPU time
```

where:

```
CPT = SMF30CPT
zAAPNT = SMF30_TIME_ON_IFA * (SMF30ZNF / 256)
zIIPNT = SMF30_TIME_ON_ZIIP * (SMF30SNF / 256)
```

assuming the denominator is not zero.

Record environment

The following conditions exist for the generation of each of the subtypes of this record:

Macro
SMFEWTM, BRANCH=YES (record exit: IEFU84)

Mode

Subtype
Mode

1,3,4,5
Task

2, 6
SRB

Storage Residency
31-bit

SUBSYS
Current value for address space being reported on (see SMF30WID field)

Record mapping

Header/self-defining section

This section contains the common SMF record headers fields and the triplet fields (offset/length/number) that locate the other sections on the record.

This triplet information should be checked prior to accessing a section of the record. All three fields being non-zero mean that the section exists on the record; conversely any of the fields being zero indicates that the section does not exist on the record. The "Number of" triplet field is the primary indication of the existence of the field.

Offsets		Name	Length	Format	Description
0	0	SMF30LEN	2	binary	Record Length. This field along with the next, are referred to as the RDW (record descriptor word). See "Standard and Extended SMF record headers" on page 162 for a detailed description.
2	2	SMF30SEG	2	binary	Segment descriptor (see record length field).
4	4	SMF30FLG	1	binary	System indicator: **Bit** **Meaning when set** **0** Subsystem identification follows system identification **1** Subtypes used **2** Reserved **3-6** Version indicators (See "Standard and Extended SMF record headers" on page 162 for a detailed description.) **7** Reserved.
5	5	SMF30RTY	1	binary	Record type 30 (X'1E').
6	6	SMF30TME	4	binary	Time since midnight, in hundredths of a second, that the record was moved to the SMF buffer.
10	A	SMF30DTE	4	packed	Date that the record was moved to the SMF buffer, in the form 0*cyydddF* (in local time). See "Standard and Extended SMF record headers" on page 162 for a detailed description.
14	E	SMF30SID	4	EBCDIC	System identification (from the SID parameter).
18	12	SMF30WID	4	EBCDIC	Work type indicator for the address space. The value identifies the type of address space that is being reported on (for example: "STC" for started tasks and system address spaces, "TSO" for TSO/E users, etc).

Offsets		Name	Length	Format	Description
22	16	SMF30STP	2	binary	Record subtype. For a list of the record subtypes, see "Record type 30 (X'1E') — Common address space work" on page 292.
24	18	SMF30SOF	4	binary	Offset to subsystem section from start of record, including the record descriptor word (RDW).
28	1C	SMF30SLN	2	binary	Length of subsystem section.
30	1E	SMF30SON	2	binary	Number of subsystem sections.
32	20	SMF30IOF	4	binary	Offset to identification section from start of record, including the record descriptor word (RDW).
36	24	SMF30ILN	2	binary	Length of identification section.
38	26	SMF30ION	2	binary	Number of identification sections.
40	28	SMF30UOF	4	binary	Offset to I/O activity section from start of record, including the record descriptor word (RDW).
44	2C	SMF30ULN	2	binary	Length of I/O activity section.
46	2E	SMF30UON	2	binary	Number of I/O activity sections.
48	30	SMF30TOF	4	binary	Offset to completion section from start of record, including the record descriptor word (RDW).
52	34	SMF30TLN	2	binary	Length of completion section.
54	36	SMF30TON	2	binary	Number of completion sections.
56	38	SMF30COF	4	binary	Offset to processor section from start of record, including the record descriptor word (RDW).
60	3C	SMF30CLN	2	binary	Length of processor section.
62	3E	SMF30CON	2	binary	Number of processor sections.
64	40	SMF30AOF	4	binary	Offset to accounting section from start of record, including the record descriptor word (RDW).
68	44	SMF30ALN	2	binary	Total length of the single accounting section.
70	46	SMF30AON	2	binary	Number of variable length text segments.
72	48	SMF30ROF	4	binary	Offset to storage section from start of record, including the record descriptor word (RDW).
76	4C	SMF30RLN	2	binary	Length of storage section.
78	4E	SMF30RON	2	binary	Number of storage sections.
80	50	SMF30POF	4	binary	Offset to performance section from start of record, including the record descriptor word (RDW).
84	54	SMF30PLN	2	binary	Length of the performance section.
86	56	SMF30PON	2	binary	Number of performance sections.
88	58	SMF30OOF	4	binary	Offset to operator section from start of record, including the record descriptor word (RDW).
92	5C	SMF30OLN	2	binary	Length of the operator section.
94	5E	SMF30OON	2	binary	Number of operator sections.
96	60	SMF30EOF	4	binary	Offset to the execute channel program (EXCP) section from start of record, including the record descriptor word (RDW).
100	64	SMF30ELN	2	binary	Length of the execute channel program (EXCP) section, in this record.
102	66	SMF30EON	2	binary	Number of execute channel program (EXCP) sections in this record.
104	68	SMF30EOR	2	binary	Number of execute channel program (EXCP) sections in subsequent records. When this number exceeds two bytes, it is not valid. See SMF30EOS for the correct value.

Offsets		Name	Length	Format	Description
106	6A	SMF30RVD	2		Reserved.
108	6C	SMF30EOS	4	binary	Number of execute channel program (EXCP) sections in subsequent records.
112	70	SMF30DRO	4	binary	Offset to APPC/MVS resource section from start of record, including the record descriptor word (RDW).
116	74	SMF30DRL	2	binary	Length of APPC/MVS resource section.
118	76	SMF30DRN	2	binary	Number of APPC/MVS resource sections in this record (this number is 0 or 1).
120	78	SMF30ARO	4	binary	Offset to APPC/MVS cumulative resource section from start of record, including the record descriptor word (RDW).
124	7C	SMF30ARL	2	binary	Length of APPC/MVS cumulative resource section.
126	7E	SMF30ARN	2	binary	Number of APPC/MVS cumulative resource sections in this record (this number is 0 or 1).
128	80	SMF30OPO	4	binary	Offset to OpenMVS process section.
132	84	SMF30OPL	2	binary	Length of z/OS UNIX process section.
134	86	SMF30OPN	2	binary	Number of z/OS UNIX process sections on current record.
136	88	SMF30OPM	4	binary	Number of z/OS UNIX process sections on subsequent records.
140	8C	SMF30UDO	4	binary	Offset to first usage data section from the start of the record, including the record descriptor word (RDW).
144	90	SMF30UDL	2	binary	Length of each usage data section - ‘76’.
146	92	SMF30UDN	2	binary	Number of usage data sections in this record.
148	94	SMF30UDS	4	binary	Number of usage data sections in subsequent records.
152	98	SMF30RMO	4	binary	Offset to first automatic restart management section.
156	9C	SMF30RML	2	binary	Length of automatic restart management section.
158	9E	SMF30RMN	2	binary	Number of automatic restart management sections.
160	A0	SMF30RMS	4	binary	Number of automatic restart management sections in subsequent records.
164	A4	SMF30MOF	4	binary	Offset to the Multisystem Enclave Remote Data section.
168	A8	SMF30MLN	2	binary	Length of MultiSystem Enclave Remote System Data section.
170	AA	SMF30MNO	2	binary	Number of MultiSystem Enclave Remote System Data sections in this record.
172	AC	SMF30MOS	4	binary	Number of MultiSystem Enclave Remote System Data sections in subsequent records.
176	B0	SMF30CDO	4	binary	Offset to the Counter Data Section.
180	B4	SMF30CDL	2	binary	Length of a Counter Data Section.
182	B6	SMF30CDN	2	binary	Number of Counter Data Sections.
184	B8	SMF30USO	4	binary	Offset to the zEDC usage statistics section.
188	BC	SMF30USL	2	binary	Length of the zEDC usage statistics section.
190	BE	SMF30USN	2	binary	Number of zEDC usage statistics sections.

Subsystem Section

This section contains general record and system identification information that you can use to determine the level of information on the rest of the record.

Triplet Information

This section is located on the record using the following triplet fields, which are located in the 'header/ self-defining' section:

Offset
SMF30SOF

Length
SMF30SLN

Number
SMF30SON - This field will always be '1' as this section is on each of the Type 30 records that is generated.

Offsets		Name	Length	Format	Description
0	0	SMF30TYP	2	binary	Subtype identification **Value** **Meaning** **1** Job start or start of other work unit. **2** Activity since previous interval ended. Produced only when interval recording is active. **3** Activity for the last interval before step termination. Produced only when interval recording is active. **4** Step total **5** Job termination or termination of other work unit. **6** System address space.
2	2	SMF30RS1	2		Reserved.
4	4	SMF30RVN	2	EBCDIC	Record version number **Value** **Meaning** **'05'** MVS/SP Version 5 **'04'** MVS/SP Version 4 **'03'** MVS/SP Version 3 **'02'** MVS/SP Version 2 **'01'** VS2
6	6	SMF30PNM	8	EBCDIC	Subsystem or product name, for example SMF.
14	E	SMF30OSL	8	EBCDIC	Code string for the operating system level to represent the version, release, and modification level as described for CVTPRODN. Guaranteed to be larger in each release.
22	16	SMF30SYN	8	EBCDIC	System name (from the SYSNAME parameter in the IEASYSxx parmlib member).
30	1E	SMF30SYP	8	EBCDIC	Sysplex name (from the SYSPLEX parameter in the COUPLExx parmlib member).

Identification Section

This section contains general address space and user information which can be used to identify the address space that the data is being reported for or to merge this record with other records that are generated for this address space.

Triplet information

This section is located on the record using the following triplet fields, which are located in the ‘header/ self-defining’ section:

Offset
SMF30IOF

Length
SMF30ILN

Number
SMF30ION - This field will always be ‘1’ as this section is on each of the Type 30 records that are generated.

Offsets		Name	Length	Format	Description
0	0	SMF30JBN	8	EBCDIC	Job or session name. The job name, time, and date that the reader recognized the JOB card (for this job) constitute the job log identification.
8	8	SMF30PGM	8	EBCDIC	Program name (taken from PGM= parameter on EXEC card). If a backward reference was used, this field contains PGM=*.DD.
16	10	SMF30STM	8	EBCDIC	Step name (taken from name on EXEC card).
24	18	SMF30UIF	8	EBCDIC	User-defined identification field (taken from common exit parameter area, not from USER=parameter on job statement).
32	20	SMF30JNM	8	EBCDIC	JES job identifier. Jobs scheduled by the APPC/MVS transaction scheduler (ASCH) start with an “A” followed by a seven-digit number.
40	28	SMF30STN	2	binary	Step number (first step = 1, and so on).
42	2A	SMF30CLS	1	binary	Job class (blank for TSO/E session or started tasks).
43	2B	SMF30JF1	1	binary	Flag word **Bit** **Meaning when set** **0** Job/Session ID section flag. **1-7** Reserved.
44	2C	SMF30PGN	2	binary	Beginning with z/OS V1R3, this field is always zero.
46	2E	SMF30JPT	2	binary	JES input priority. If no value is specified for the PRTY parameter (on the JOB card), this field contains: • For JES3, the default priority specified on the JES3 STANDARDS initialization card • For JES2, a zero. Note that JES2 does not use the priority value reported in the field. (The JES2 job selection priority is requested using the JES2 PRIORITY control statement.)
48	30	SMF30AST	4	binary	Device allocation start time, in hundredths of a second.
52	34	SMF30PPS	4	binary	Problem program start time, in hundredths of a second.
56	38	SMF30SIT	4	binary	Time since midnight, in hundredths of a second, that the initiator selected this step or job.

Offsets		Name	Length	Format	Description
60	3C	SMF30STD	4	packed	Date that the initiator selected this step, in the form 0*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for a detailed description.
64	40	SMF30RST	4	binary	Time since midnight, in hundredths of a second, that the reader recognized the JOB card (for this job).
68	44	SMF30RSD	4	packed	Date that the reader recognized the JOB card (for this job), in the form 0*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for a detailed description.
72	48	SMF30RET	4	binary	Time since midnight, in hundredths of a second, that the reader recognized the end of the JCL being read for the job or started task (reader stop time). For TSO/E this is the logon enqueue time.
76	4C	SMF30RED	4	packed	Date that the reader recognized the end of the JCL being read for the job or started task (reader stop date), in the form 0 *cyydddF*. See "Standard and Extended SMF record headers" on page 162 for a detailed description.
80	50	SMF30USR	20	EBCDIC	Programmer's name.
100	64	SMF30GRP	8	EBCDIC	RACF group ID. 0 = RACF is not active.
108	6C	SMF30RUD	8	EBCDIC	RACF user ID. 0 = RACF is not active.
116	74	SMF30TID	8	EBCDIC	RACF terminal ID. This field is zero if RACF is not active (or the user is not a terminal user).
124	7C	SMF30TSN	8	EBCDIC	Terminal symbolic name.
132	84	SMF30PSN	8	EBCDIC	The name of the step that invoked the procedure. This field contains blanks if not part of a procedure.
140	8C	SMF30CL8	8	EBCDIC	8-character job class (left justified, padded with blanks). For JES2, taken from the SMF30CLS field (if not specified), 'TSU' for TSO sessions, or 'STC' for started tasks. For JES3, taken from the CLASS parameter on the //* MAIN card (if valid), or the default (JS3BATCH).
148	94	SMF30ISS	8	binary	Time and date that the interval started for subtype 2 and 3 records, in time-of-day (TOD) format, an unsigned 64-bit fixed-point number where bit 51 is equivalent to 1 microsecond. The representation of this value in local time is stored in SMF30IST and SMF30IDT. Variations in setting the local time can make the times appear to be out of synchronization.
156	9C	SMF30IET	8	binary	Time and date that the interval ended for subtype 2 and 3 records, in time-of-day (TOD) format, an unsigned 64-bit fixed-point number where bit 51 is equivalent to 1 microsecond. If you requested synchronized interval recording, you can use this field to compare this record with other records generated at the end of the same interval. If the address space being reported was not swapped in when the interval ended, then the time contained in this field might be earlier than the time that the record was generated.
164	A4	SMF30SSN	4	binary	Substep number. This field is set to zero for non-z/OS UNIX steps. When the z/OS UNIX `exec` function is requested, a new substep is begun and this value is incremented.
168	A8	SMF30EXN	16	binary	Program name. For a z/OS UNIX program, this contains the name, for up to 16 bytes, starting after the last slash in the file name, of the program that was run. The z/OS UNIX name ends with the null character X'00'. For an MVS program, it is an unqualified name of up to 8 characters of the program that was executed. The MVS program name is padded with blanks to a length of 16 characters. For example, for a z/OS UNIX name of `/usr/joe/somepgm`, the field in SMF record type 30 is `somepgm` ended by `X'00'`. For a z/OS UNIX name of `/usr/joe/someverylongprogramname`, the field is truncated to `someverylongprog`.

Offsets		Name	Length	Format	Description
184	B8	SMF30ASI	2	binary	Address space identifier.
186	BA	SMF30COR	64	EBCDIC	JES job correlator.

I/O Activity Section

This section contains the summary I/O information at the address space level. This differs from the I/O information in the EXCP sections of the record which present the data at a DD Name/Device level.

Triplet information

This section is located on the record using the following triplet fields, which are located in the 'header/ self-defining' section:

Offset
SMF30UOF

Length
SMF30ULN

Number
SMF30UON - Reports the number of I/O activity sections on the current record. Because only one I/O activity section can appear on the record, this field is '1' (if the section exists) or '0' (if it doesn't).

Offsets		Name	Length	Format	Description
0	0	SMF30INP	4	binary	Number of card-image records in DD DATA and DD* data sets read by the reader for the map. This field is not set for subtypes 2 or 3.
4	4	SMF30TEP	4	binary	Total blocks transferred (accumulated execute channel program (EXCP) counts - valid up to X'FFFFFFFE', zero and invalid when SMF30TEF is set)
8	8	SMF30TPT	4	binary	Number of TPUTS (terminal writes) for a TSO/E session. If a batch job or a started task successfully processes TPUTs, this field might be non-zero for batch jobs or started tasks.
12	C	SMF30TGT	4	binary	Number of TGETS (terminal reads) for a TSO/E session.
16	10	SMF30RDR	1	binary	Reader device class as defined in JESPARMS. 0 — for TSO/E sessions or started tasks.
17	11	SMF30RDT	1	binary	Reader device type as defined in JESPARMS. 0 — for TSO/E sessions or started tasks.
18	12	SMF30TCN	4	binary	Total device connect time (in 128 micro-second units) for this address space. For a DIV object, this field contains total device connect time for reads, writes, and re-reads.

Offsets		Name	Length	Format	Description

22	16	SMF30DCF	4	binary	Flag word
					Bit
					Meaning when set
					0
					Device connect time may be incorrect
					If this flag is set, the system resources manager (SRM) disabled the channel measurement while the job was running. If channel measurement is disabled, device connect time is not recorded. Thus, if this bit is set, SMF30TCN and SMF30DCT reflect less than the actual total connect time.
					1
					If this bit is on, the following fields contain incomplete data: (SRM could not deliver deltas or values for this interval)
					`SMF30AIC SMF30EIC`
					`SMF30AID SMF30EID`
					`SMF30AIW SMF30EIW`
					`SMF30AIS SMF30EIS`
					2
					Field SMF30TEP is invalid
					3-31
					Reserved.

26	1A	SMF30RSB	2		Reserved.
28	1C	SMF30TRR	4	binary	Total address space REREAD count.
32	20	SMF30AIC	4	binary	DASD I/O connect time, in 128-microsecond units, for address space plus dependent enclaves. Note that the value of RqsvAIC for FICON® channel utilization cannot be calculated. For more information, see the footnote.
36	24	SMF30AID	4	binary	DASD I/O disconnect time, in 128-microsecond units, for address space plus dependent enclaves.
40	28	SMF30AIW	4	binary	DASD I/O pending plus control unit queue time, in 128-microsecond units, for address space plus dependent enclaves.
44	2C	SMF30AIS	4	binary	DASD I/O start subchannel count for address space plus dependent enclaves.
48	30	SMF30EIC	4	binary	DASD I/O connect time, in 128-microsecond units, for independent enclaves owned by the address space. Note that the value of RqsvEIC for FICON channel utilization cannot be calculated. For more information, see the footnote.
52	34	SMF30EID	4	binary	DASD I/O disconnect time, in 128-microsecond units, for independent enclaves owned by the address space.
56	38	SMF30EIW	4	binary	DASD I/O pending plus control unit queue time, in 128-microsecond units, for independent enclaves owned by the address space.
60	3C	SMF30EIS	4	binary	DASD I/O start subchannel count for independent enclaves.
64	40	SMF30TEX	8	binary	Total blocks transferred - accumulated EXCP counts. This field is the 8-byte equivalent of SMF30TEP, but this field remains valid after SMF30TEP is invalid.
72	48	SMF30DAS	4	binary	Number of DDs that had their DD accounting information suppressed.

Note: The system adjusts the connect time for FICON DASD to be 1 millisecond per request. This value differs from the channel reported connect time.

Completion Section

This section contains the completion information for the step on the Step Termination record (Subtype-4) and for the job on the Job Termination record (Subtype-5).

This section does not appear on the Job Initialization (Subtype-1) or Interval (Subtype-2 and 3) records.

Note: The SMF30STI field also contains some general record indicator flags which are not necessarily completion in nature. The system may fail a step or job even if the return code is zero. This could happen, for example, as a result of specifying CATLG_ERR FAILJOB(YES) and incurring that type of post execution error. (A return code is generated by the application program and is never changed by the operating system.) A user can deduce that a step failed due to a “post execution error” if bit SMF30SYE in the two-byte SMF30STI field in the SMF30 subtype 4 record is on.

Triplet Information

This section is located on the record using the following triplet fields, which are located in the ‘header/self-defining’ section:

Offset
SMF30TOF

Length
SMF30TLN

Number
SMF30TON - Reports the number of completion sections on the current record. Because only one completion section can appear on the record, this field is ‘1’ (if the section exists) or ‘0’ (if it doesn't).

Offsets		Name	Length	Format	Description
0	0	SMF30SCC	2	binary	**Step completion code** **X'0*ccc*'** Indicates system abnormal end (abend) of task in the job step, where *ccc* is the system abend code. (See *z/OS MVS System Codes*.) **X'8*ccc*'** Indicates a user abend in the job step, where *ccc* is the user abend code. **X'*nnnn*'** Indicates normal completion, where *nnnn* is the contents of the two low-order bytes in register 15 at termination. Since some programs interpret the return code to be a portion of the low-order two bytes of register 15, the contents of this field might not match what those programs consider to be the return code. **X'0000'** Indicates one of the following cases: • The job step was flushed (not processed) because of an error during allocation or in a preceding job step. • The job step terminated with an abend code ending in X'0D'. In this case, SMF30SCC contains the value from the low-order two bytes of the TCBCMPC field, which may contain zeros. • Normal job step completion with a return code of 0. Use this field in conjunction with the job/step termination indicator field, SMF30STI. **Job completion code** **X'0*ccc*'** Indicates a system abend in the last job step, where *ccc* is the system abend code. (See *z/OS MVS System Codes*.) **X'8*ccc*'** Indicates a user abend in the job step, where *ccc* is the user abend code. **X'*nnnn*'** Indicates normal completion, where *nnnn* is the contents of the two low-order bytes in register 15 at termination. Since some programs interpret the return code to be a portion of the low-order two bytes of register 15, the contents of this field might not match what those programs consider to be the return code. **X'0000'** Indicates one of the following cases (see note): • The last job step was flushed (not processed) because of an error during allocation or in a preceding job step. • The job step terminated with an abend code ending in X'0D'. In this case, SMF30SCC contains the value from the low-order two bytes of the TCBCMPC field, which may contain zeros. • Job completion with a return code of 0 in the final step of the job. Use this field in conjunction with the job/step termination indicator field, SMF30STI. **Note:** When a step in a multi-step job terminates abnormally, the subsequent steps, whether executed or flushed, do not propagate the step abend code for processing this record. The code appears in the step termination record (subtype 4). In this case, the field, SMF30SCC, can contain X'*nnnn*' or X'0000'. If an abend occurred in the job, the job termination indicator (bit 7 in the SMF30STI field). **Bit** **Meaning when set** **0** SMF30UAB - User abend

Offsets		Name	Length	Format	Description
2	2	SMF30STI	2	binary	Step/Job termination indicator **Bit** **Meaning when set** **0** Reserved **1** Canceled by exit IEFUJV. **2** Canceled by exit IEFUJI. **3** Canceled by exit IEFUSI. **4** Canceled by exit IEFACTRT. **5** Step is to be restarted. **6** If zero, then normal completion. If 1, then abnormal end of task (abend). If step completion code equals 0322 or 0522, then IEFUTL caused the abend. If step completion code equals 0722, then IEFUSO caused the abend. **7** If zero, then normal completion. If 1, then step was flushed. **8** EXCP counts might be incorrect because the record did not include all the DD statements. **9** Previous interval record was not written because an error occurred. The cumulative count might be incorrect because the counters were cleared. **10** EXCP sections were not merged from the interval to the step record or from the step to the job record. **11** Step completed with a “post execution” error. Post-execution errors include a failure that occurred because the ALLOCxx parmlib member specified CATLG_ERR FAILJOB(YES). **12** Step completed due to z/OS UNIX `exec` function request. **13** JOB abnormally ended because of COND= condition on the JOB card. This flag will be set on in the subtype 5 job termination record only. **14** Job was evicted via the $EJ*nn*,STEP,HOLD or equivalent command. This bit is set for subtype 4 (step end) records only. **15** Reserved.
4	4	SMF30ARC	4	binary	Abend reason code.

Processor Accounting Section

This section contains various Processor times for the address space for the period that the record represents.

Triplet information

This section is located on the record using the following triplet fields, which are located in the "header/self-defining" section:

Offset
SMF30COF

Length
SMF30CLN

Number
SMF30CON - Reports the number of processor accounting sections on the current record. Because only one processor accounting section can appear on the record, this field is "1" (if the section exists) or "0" (if it does not exist).

Offsets		Name	Length	Format	Description
0	0	SMF30PTY	2	binary	Reserved.
2	2	SMF30TFL	2	binary	Invalid timer flags: **Bit** **Meaning when set** **0** Indicates that timer flags are used. **1** SMF30CPT has an invalid value due to a timer value calculation error. **2** SMF30CPS has an invalid value due to a timer value calculation error. **3** SMF30JVU has an invalid value due to a timer value calculation error. **4** SMF30JVA has an invalid value due to a timer value calculation error. **5** SMF30ISB has an invalid value due to a timer value calculation error. **6** SMF30ICU has an invalid value due to a timer value calculation error. **7** SMF30IVU has an invalid value due to a timer value calculation error. **8** SMF30IVA has an invalid value due to a timer value calculation error. **9** SMF30IIP has an invalid value due to a timer value calculation error. **10** SMF30HPT has an invalid value due to a timer value calculation error. **11** SMF30RCT has an invalid value due to a timer value calculation error. **12** SMF30ASR has an invalid value due to a timer value calculation error. **13** SMF30ENC has an invalid value due to a timer value calculation error. **14** SMF30DET has an invalid value due to a timer value calculation error. **15** Reserved.

Offsets		Name	Length	Format	Description
4	4	SMF30CPT	4	binary	All standard CPU step time in hundredths of a second. Includes enclave time, preemptable class SRB time, client SRB time. Also includes time consumed by zAAP or zIIP eligible work running on a standard processor. This value includes the value in field SMF30OST.
8	8	SMF30CPS	4	binary	Step CPU time under the service request block (SRB), in hundredths of a second. You can calculate the SRB time in microseconds (1/100 of a second using the following formula: `(SMF30SRB*10)/SMF30SRC * SMF30SUS/16 = SRB time in microseconds` This value includes the value in field SMF30OST.
12	C	SMF30ICU	4	binary	Initiator CPU time under the task control block (TCB), in hundredths of a second. This field is set at step termination. `SMF30ICU = SMF30ICU_STEP_INIT (for this step) + SMF30ICU_STEP_TERM (from the previous step)`
16	10	SMF30ISB	4	binary	Initiator CPU time under the service request block (SRB), in hundredths of a second. This field is set at step termination. `SMF30ISB = SMF30ISB_STEP_INIT (for this step) + SMF30ISB_STEP_TERM (from the previous step)`
20	14	SMF30JVU	4	binary	Step vector CPU time, in hundredths of a second.
24	18	SMF30IVU	4	binary	Initiator vector CPU time, in hundredths of a second. This field is set at step termination.
28	1C	SMF30JVA	4	binary	Step vector affinity time, in hundredths of a second.
32	20	SMF30IVA	4	binary	Initiator vector affinity time, in hundredths of a second. This field is set at step termination.
36	24	SMF30IST	4	binary	Interval start time for type 30 subtype 2 and 3 records, in hundredths of a second.
40	28	SMF30IDT	4	packed	Interval start date for type 30 subtype 2 and 3 records, in the form 0*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for a detailed description.
44	2C	SMF30IIP	4	binary	Amount of CPU time used to process I/O interrupts, in hundredths of a second.
48	30	SMF30RCT	4	binary	Amount of CPU time used by the region control task (RCT), in hundredths of a second.
52	34	SMF30HPT	4	binary	CPU time consumed for the step, in hundredths of a second, to support requests for data to be transferred between a hiperspace and an address space, when the hiperspace is backed by expanded storage. The CPU time may vary depending on the availability of expanded storage.
56	38	SMF30CSC	4	binary	Integrated Cryptographic Service Facility/MVS (ICSF/MVS) service count. This is the number of cryptographic instructions executed on behalf of caller (within caller's address space).
60	3C	SMF30DMI	4	binary	ADMF-Number of pages moved with ADMF WRITE operation.
64	40	SMF30DMO	4	binary	ADMF-Number of pages moved with ADMF READ operation.
68	44	SMF30ASR	4	binary	Additional CPU time accumulated by the preemptible SRBs and client SRBs for this job, in hundredths of a second. This value is also included in the value in SMF30CPT.
72	48	SMF30ENC	4	binary	CPU time used by the independent enclave, but only when in the WLM enclave. Note that independent enclave time on an IFA is not included; see field SMF30_ENCLAVE_TIME_ON_IFA for that value. SMF30ENC is also part of the value in SMF30CPT.

Offsets		Name	Length	Format	Description
76	4C	SMF30DET	4	binary	CPU time used by the dependent enclave, but only when in the WLM enclave. Note that dependent enclave time on an IFA is not included; see field SMF30_DEP_ENCLAVE_TIME_ON_IFA for that value. SMF30DET is also part of the value in SMF30CPT.
80	50	SMF30CEP	4	binary	Cumulative CPU time consumed for an address space or job while enqueue promoted (in 1.024 millisecond units).
84	54	SMF30TF2	1	binary	Additional timer flags. **Bit** **Meaning when set** **0 (SMF30_TIME_ON_IFA_F)** SMF30_TIME_ON_IFA has an invalid value due to a timer value calculation error. **1 (SMF30_ENCLAVE_TIME_ON_IFA_F)** SMF30_ENCLAVE_TIME_ON_IFA has an invalid value due to a timer value calculation error. **2 (SMF30_DEP_ENCLAVE_TIME_ON_IFA_F)** SMF30_DEP_ENCLAVE_TIME_ON_IFA has an invalid value due to a timer value calculation error. **3 (SMF30_TIME_IFA_ON_CP_F)** SMF30_TIME_IFA_ON_CP has an invalid value due to a timer value calculation error. **4 (SMF30_ENCLAVE_TIME_IFA_ON_CP_F)** SMF30_ENCLAVE_TIME_IFA_ON_CP has an invalid value due to a timer value calculation error. **5 (SMF30_DEP_ENCLAVE_TIME_IFA_ON_CP_F)** SMF30_DEP_ENCLAVE_TIME_IFA_ON_CP has an invalid value due to a timer value calculation error. **6 (SMF30_CEPI_F)** Indicates failure in SMF30CEPI. **7 (SMF30CRP_F)** Indicates failure in SMF30CRP.

Offsets		Name	Length	Format	Description
85	55	SMF30T32	1	binary	Additional failure flags. **Bit** **Meaning when set** **0 (SMF30_TIME_ON_zIIP_F)** SMF30_TIME_ON_zIIP has an invalid value due to a timer value calculation error. **0 (SMF30_TIME_ON_SUP_F)** SMF30_TIME_ON_SUP has an invalid value due to a timer value calculation error. **1 (SMF30_ENCLAVE_TIME_ON_zIIP_F)** SMF30_ENCLAVE_TIME_ON_zIIP has an invalid value due to a timer value calculation error. **1 (SMF30_ENCLAVE_TIME_ON_SUP_F)** SMF30_ENCLAVE_TIME_ON_SUP has an invalid value due to a timer value calculation error. **2 (SMF30_DEP_ENCLAVE_TIME_ON_zIIP_F)** SMF30_DEP_ENCLAVE_TIME_ON_zIIP has an invalid value due to a timer value calculation error. **2 (SMF30_DEP_ENCLAVE_TIME_ON_SUP_F)** SMF30_DEP_ENCLAVE_TIME_ON_SUP has an invalid value due to a timer value calculation error. **3 (SMF30_TIME_zIIP_ON_CP_F)** SMF30_TIME_zIIP_ON_CP has an invalid value due to a timer value calculation error. **3 (SMF30_TIME_SUP_ON_CP_F)** SMF30_TIME_SUP_ON_CP has an invalid value due to a timer value calculation error. **4 (SMF30_ENCLAVE_TIME_zIIP_ON_CP_F)** SMF30_ENCLAVE_TIME_zIIP_ON_CP has an invalid value due to a timer value calculation error. **4 (SMF30_ENCLAVE_TIME_SUP_ON_CP_F)** SMF30_ENCLAVE_TIME_SUP_ON_CP has an invalid value due to a timer value calculation error. **5 (SMF30_DEPENC_TIME_zIIP_ON_CP_F)** SMF30_DEPENC_TIME_zIIP_ON_CP has an invalid value due to a timer value calculation error. **5 (SMF30_DEPENC_TIME_SUP_ON_CP_F)** SMF30_DEPENC_TIME_SUP_ON_CP has an invalid value due to a timer value calculation error. **6 - 7** Reserved.
86	56	SMF30T33	1	binary	Additional failure flags. **Bit** **Meaning when set** **0 - 5** Reserved. **6 (SMF30_ENCLAVE_TIME_zIIP_QUAL_F)** SMF30_ENCLAVE_TIME_zIIP_QUAL has an invalid value due to a timer value calculation error. **6 (SMF30_ENCLAVE_TIME_SUP_QUAL_F)** SMF30_ENCLAVE_TIME_SUP_QUAL has an invalid value due to a timer value calculation error. **7 (SMF30_DEPENC_TIME_zIIP_QUAL_F)** SMF30_DEPENC_TIME_zIIP_QUAL has an invalid value due to a timer value calculation error. **7 (SMF30_DEPENC_TIME_SUP_QUAL_F)** SMF30_DEPENC_TIME_SUP_QUAL has an invalid value due to a timer value calculation error.

Offsets		Name	Length	Format	Description
87	57	SMF30_BoostInfo	1	binary	Boost Information **Bit** **Meaning when set** **0** zIIP boost was active at some point within the interval. An SMF30 step-end record will have the “active” bit on if the bit was on in any interval record created for the step. An SMF30 job record will have the “active” bit on if the bit was on in any interval record created for the job. **1** Speed boost was active at some point within the interval. An SMF30 step-end record will have the “active” bit on if the bit was on in any interval record created for the step. An SMF30 job record will have the “active” bit on if the bit was on in any interval record created for the job. **5 - 7** Boost class: 001: IPL 010: Shutdown 011: Recovery process **Note:** The boost class value is valid only when one or more boosts is active; that is, a boost active bit is also on.
88	58	SMF30_TIME_ON_IFA	4	binary	Accumulation of CPU time spent on zAAP. Time is in hundredths of a second (includes enclave time).
92	5C	SMF30_ENCLAVE_TIME_ON_IFA	4	binary	Accumulation of enclave time spent on zAAP. Time is in hundredths of a second.
96	60	SMF30_DEP_ENCLAVE_TIME_ON_IFA	4	binary	Accumulation of dependent enclave time spent on zAAP. Time is in hundredths of a second.
100	64	SMF30_TIME_IFA_ON_CP	4	binary	Accumulation of CPU time spent running zAAP eligible work on a standard CP. Time is in hundredths of a second (includes enclave time).
104	68	SMF30_ENCLAVE_TIME_IFA_ON _CP	4	binary	Accumulation of zAAP enclave time spent on a standard CP. Time is in hundredths of a second.
108	6C	SMF30_DEP_ENCLAVE_TIME_IFA_ON_CP	4	binary	Accumulation of zAAP dependent enclave time spent on a standard CP. Time is in hundredths of a second.
112	70	SMF30CEPI	4	binary	CPU time consumed for an address space or job while enqueue promoted (in 1.024 millisecond units). Contains only the time consumed during the interval (not cumulative).
116	74	SMF30_TIME_ON_zIIP SMF30_TIME_ON_SUP	4	binary	Accumulation of time spent on zIIP. Time is in hundredths of a second (includes enclave time).
120	78	SMF30_ENCLAVE_TIME_ON_zIIP SMF30_ENCLAVE_TIME_ON_SUP	4	binary	Accumulation of enclave time spent on zIIP. Time is in hundredths of a second.
124	7C	SMF30_DEPENC_TIME_ON_zIIP SMF30_DEPENC_TIME_ON_SUP	4	binary	Accumulation of dependent enclave time spent on zIIP. Time is in hundredths of a second.
128	80	SMF30_TIME_zIIP_ON_CP SMF30_TIME_SUP_ON_CP	4	binary	Accumulation of CPU time spent running zIIP eligible work on a standard CP. Time is in hundredths of a second (includes enclave time).

Offsets		Name	Length	Format	Description
132	84	SMF30_ENCLAVE_TIME _zIIP_ON _CP SMF30_ENCLAVE_TIME _SUP_ON _CP	4	binary	Accumulation of zIIP enclave time spent on a standard CP. Time is in hundredths of a second.
136	88	SMF30_DEPENC_TIME _zIIP_ON_CP SMF30_DEPENC_TIME _SUP_ON_CP	4	binary	Accumulation of zIIP dependent enclave time spent on a standard CP. Time is in hundredths of a second.
140	8C	SMF30_ENCLAVE_TIME _zIIP_QUAL SMF30_ENCLAVE_TIME _SUP_QUAL	4	binary	Normalized enclave time qualified to be on zIIP in hundredths of a second. Note that qualified time is the SRB time for an enclave that a program (Db2, for example) has identified to Workload Management for zIIP eligibility. The program also indicates the portion of the SRB time intended for eligibility to the zIIP(s). The eligible time achieved is reported in xxx_TIME_ON_ZIIP and xxx_TIME_ZIIP_ON_CP fields.
144	90	SMF30_DEPENC_TIME _zIIP_QUAL SMF30_DEPENC_TIME _SUP_QUAL	4	binary	Normalized dependent enclave time qualified to be on zIIP in hundredths of a second. Note that qualified time is the SRB time for an enclave that a program (Db2, for example) has identified to Workload Management for zIIP eligibility. The program also indicates the portion of the SRB time intended for eligibility to the zIIP(s). The eligible time achieved is reported in xxx_TIME_ON_ZIIP and xxx_TIME_ZIIP_ON_CP fields.
148	94	SMF30CRP	4	binary	CPU time consumed for an address space or job while promoted because of chronic resource contention (in 1.024 millisecond units). For interval records, this field contains only the time consumed during the interval itself.
152	98	SMF30ICU_Step _Term	4	binary	CPU TCB time spent by the Initiator during job step termination processing. This field is the step termination portion of SMF30ICU that is reported in the next step end record.
156	9C	SMF30ICU_Step _Init	4	binary	CPU TCB time spent by the Initiator during job step initialization processing. This field is the step initialization portion of SMF30ICU for this step end record.
160	A0	SMF30ISB_Step_Term	4	binary	CPU SRB time spent by the Initiator during job step termination processing. This field is the step termination portion of SMF30ISB that is reported in the next step end record.
164	A4	SMF30ISB_Step_Init	4	binary	CPU SRB time spent by the Initiator during job step initialization processing. This field is the step initialization portion of SMF30ISB for this step end record.
168	A8	SMF30_Missed_SMF30BL K	4	binary	Accumulated value of I/O block counts when serialization could not be obtained for accumulating the value to SMF30BLK. This value is maintained at the job step level as opposed to the DD level of its SMF30BLK counterpart.
172	AC	SMF30_Missed_SMF30DC T	4	binary	Accumulated value of device connect time when serialization could not be obtained for accumulating the value to SMF30DCT. This value is maintained at the job step level as opposed to the DD level of its SMF30DCT counterpart.
176	B0	SMF30_Highest_Task _CPU_Percent	2	binary	For interval records, the largest percentage of CPU time used by any task in the address space, rounded to the nearest integer. The percentage value is calculated as: TCB time * 100 / interval time. For step-end and job-end records, the value is the largest reported interval value.
178	B2	SMF30_Highest_Task _CPU_Program	8	EBCDIC	Name of the program loaded by the task that used the largest percentage of CPU time in this address space. This field corresponds to SMF30_Highest_Task_CPU_Percent. A value of blanks indicates that no task reported any CPU time in the address space, or that the CPU time could not be obtained. A value of ???????? indicates that the program name could not be obtained for the task that reported the highest percentage of CPU time.

Offsets		Name	Length	Format	Description
186	BA	SMF30CAS_Flag	1	binary	CPU accounting segment flags. **Bit** **Meaning when set** **0** SMF30CAS_InEligHonorPriority indicates eligible work in this address space is not offloaded to CPs for help processing. Once this bit is set on for a job interval or step-end record, this bit will also be set on for step-total and job-end records.
187	BB	SMF30CAS_ROBB	1	binary	Reserved.
188	BC	SMF30CAS_OA54589	4	binary	OSPROTECT-related flags. These flags are specific to a job step. A job-end (subtype 5) record represents an accumulation of all of the bits defined for each byte, across all job steps; therefore, that data might not be usable to determine the trust state of any individual job step. With respect to OSPROTECT, a job or address space that is not APF-authorized and that has at least one task running in a user key (8 - 15) is considered to be untrusted; otherwise, a job or address space is considered to be trusted.
188	BC	*	1	binary	Byte 0. The bits are defined as follows. (Bits not specified are reserved but might not be 0.) When the X'20' or X'04' bit is on, OSPROTECT=1 is in effect. When both bits are off, OSPROTECT=1 is not in effect. **Bit** **Meaning when set** **X'20'** OSPROTECT=1 is in effect. **X'04'** OSPROTECT=1 is in effect.
189	BD	*	1	binary	Byte 1. All bits in this byte are reserved but might not be 0.
190	BE	*	1	binary	Byte 2. All bits in this byte are reserved but might not be 0.
191	BF	*	1	binary	Byte 3. The bits are defined as follows. (Bits not specified are reserved but might not be 0.) **Bit** **Meaning when set** **X'40'** See the definition of the X'02' bit. **X'20'** See the definition of the X'02' bit. **X'10'** This job step turned on the JSCBAUTH bit at some point after the job step program received control. This can be a normal process for z/OS UNIX. **X'02'** The X'40', X'20', and X'02' bits identify the state of trust, with respect to OSPROTECT=1 functions, as follows: • X'02' bit is on, X'40' bit is off: Untrusted • X'02' bit is on, X'40' bit is on, X'20' bit is off: Trusted • X'02' bit is on, X'40' bit is on, X'20' bit is on: Untrusted • X'02' bit is off: Trusted

Execute Channel Program (EXCP) Section

This section contains the I/O information for a specific DD Name/Device address pair for the address space. There can be multiple EXCP sections for a given address space.

With the SMFPRMxx parameter EMPTYEXCPSEC(NOSUPPRESS) specified, the system generates one EXCP section for each SMS candidate volume. The SMS candidate volume EXCP section contains only the DD name, SMF30DDN. All other fields in the EXCP section are zeros. This is the default behavior. Also by default, SMF generates a similarly empty EXCP section for non-dataset allocations like DD DUMMY or spool file allocations.

With SMFPRMxx parameter EMPTYEXCPSEC(SUPPRESS) specified, no empty EXCP sections are created for non-allocated candidate volume in the SMS storage group, or for empty EXCP sections that are generated for non-dataset allocations like DD DUMMY or spool file allocations.

Triplet Information

This section is located on the record using the following triplet fields, which are located in the ‘header/self-defining’ section:

Offset
SMF30EOF

Length
SMF30ELN

Number
SMF30EON - Reports the number of EXCP sections on the current record.

This section also has additional control fields in the ‘header/self-defining’ section:

- SMF30EOS reports the number of EXCP sections for the current period on Subsequent Type 30 records. These are known as the ‘chained’ Type 30 records.
- SMF30EOR also reports this same information but is only a 2 byte field which can overflow so SMF30EOS is the preferred field for processing this data.

Offsets		Name	Length	Format	Description
0	0	SMF30EXP	30	structure	Data set access information. **Note:** Virtual I/O devices are identified by the following: **Device Class** 0 **Unit Type** 0 **Device Number** X'7FFF' It is important to understand the following: • Allocation messages for VIO data sets will show VIO ALLOCATED TO ddname. • SMF records will show VIO unit addresses as X'7FFF'. • The actual in-storage UCB built for VIO will show address X'3FFF'. For example, the followin messages indicate that ddname is not allocated to a Virtual I/O device, but is instead allocated to a real device whose unit address is X'3FFF' or X'7FFF' respectively. • IEF237I X'3FFF' ALLOCATED TO ddname • IEF237I X'7FFF' ALLOCATED TO ddname
0	0	SMF30DEV	1	binary	Device class.
1	1	SMF30UTP	1	binary	Unit type.
2	2	SMF30CUA	2	binary	Device number.

Offsets		Name	Length	Format	Description
4	4	SMF30DDN	8	EBCDIC	DD Name used to access the data set.
12	C	SMF30BLK	4	binary	Count of blocks issued for the device against the data set. This field has a maximum value of X'FFFFFFFF' = 4,294,967,295. If it exceeds that value it will wrap to zero and then continue to increase again for additional blocks transferred.
16	10	SMF30BSZ	2	binary	Largest blocksize of the data set **Bit** **Meaning when set** **0** Indicated changed blocksize for the data set. Post processors should use this field to avoid the possibility of negative numbers. **1-15** Largest blocksize of the data set.
18	12	SMF30DCT	4	binary	Device connect time for this data set (in 128 micro-second units). For DIV object, device connect time is not collected by SMF; however, this field may not always be zero. For example, if a user is using a DIV data set and calls a VSAM utility to process it using the same DD statement, this will result in device connect time being charged by VSAM to the DIV object.
22	16	SMF30XBS	8	binary	Block size value.

Accounting section

This section contains the user accounting information for the address space and the unit of work that is being reported on. Job-level accounting information from the ACCT parameter of the JOB statement is presented on the Job records for the address space (subtypes 1 and 5). Step-level accounting information from the ACCT parameter of the EXEC statement is presented on the Step records for the address space (subtypes 2, 3, and 4).

Note that accounting information for work running in forked or spawned WLM-managed BPXAS address spaces is reported at the job level (subtypes 1 and 5) only.

The format of the data in the section is continuous internal text, which is:

Length:
: 1 byte; `0` indicates no associated accounting field

Field
: Variable; length defined by previous Length field

Triplet Information

This section is located on the record using the following triplet fields, which are located in the ‘header/self-defining’ section:

Offset
: SMF30AOF

Length
: SMF30ALN

Number
: SMF30AON - This field will contain the number of ‘subsections’ in the accounting section.

Offsets		Name	Length	Format	Description
0	0	SMF30ACL	1	binary	Length of accounting section (excluding this field).
1	1	SMF30ACT	*variable*	EBCDIC	Job or step accounting field.

Storage and Paging Section

This section contains the statistics on the use of different kinds of storage by the address space and the different kinds of paging activity for the address space.

Triplet Information

This section is located on the record using the following triplet fields, which are located in the 'header/self-defining' section:

Offset
SMF30ROF

Length
SMF30RLN

Number
SMF30RON - Reports the number of storage and paging sections on the current record. Because only one storage and paging section can appear on the record, this field is '1' (if the section exists) or '0' (if it doesn't).

Offsets		Name	Length	Format	Description
0	0	SMF30RSV	2		Reserved. Note that SMF30RGN, formerly a two-byte field at this offset, has been increased to four bytes and moved to the end of the Storage and Paging Section.
2	2	SMF30SFL	1	binary	Storage Flags. If storage was not allocated (job step was flushed), these fields equal zero. **Bit** **Meaning when set** **0** V=R is specified. This bit has no meaning for subtype 5 records. **1** IEFUSI changed region limit values for the extended private area **2** IEFUSI set MEMLIMIT value (even if IEFUSI did not change the value). **3** If this bit is on, the following fields contain incomplete data: (SRM could not deliver deltas or values for this interval) SMF30ERS SMF30KIE SMF30POA SMF30BIA SMF30KOA SMF30POE SMF30BIE SMF30KOE SMF30PSC SMF30BOA SMF30LPI SMF30PSF SMF30BOE SMF30NSW SMF30PSO SMF30CPI SMF30PAI SMF30PST SMF30CPM SMF30PEI SMF30VPI SMF30HPI SMF30PIA SMF30VPO SMF30HPO SMF30PIE SMF30VPR SMF30KIA **4** Reserved. **5** When this bit is on, the following fields are not valid: SMF30TIH SMF30TIU SMF30TIS These fields are populated at z/OS 2.4 and later. **6-7** Reserved.

Offsets		Name	Length	Format	Description
3	3	SMF30SPK	1	binary	Storage protect key, in the form *xxxx*0000 , where *xxxx* is the key.
4	4	SMF30PRV	2	binary	Largest amount of storage used from bottom of private area, in 1 K units. This storage area includes subpools 0-127, 129–132, 244, 251 and 252. If ADDRSPC=REAL is specified, this field equals the amount of contiguous real storage that was used.
6	6	SMF30SYS	2	binary	Largest amount of storage used from top of private area, in 1K units. This storage area includes the local system queue area (LSQA) and the SWA — subpools 229, 230, 236, 237, 249, and 253-255. If ADDRSPC=REAL is specified, this field equals the amount of storage used that was not from the contiguous real storage reserved for the program.
8	8	SMF30PGI (SMF30PIA)	4	binary	Number of pages that were paged in from auxiliary storage.
12	C	SMF30PGO (SMF30POA)	4	binary	Number of pages that were paged out to auxiliary storage.
16	10	SMF30CPM	4	binary	Number of attempts to read data from an ESO hiperspace that were not satisfied because the data has been deleted.
20	14	SMF30NSW	4	binary	Number of address space swap sequences. (A swap sequence consists of an address space swap-out and swap-in. Logical swap-out and swap-in are not included.)
24	18	SMF30PSI	4	binary	Number of pages swapped in from auxiliary storage to central storage. This field includes: (local system queue area (LSQA), fixed pages, and pages that the real storage manager determined to be active when the address space was swapping in. It does not include page reclaims or pages found in storage during the swap-in process (such as pages brought in by the service request blocks (SRB), started after completion of swap-in Stage 1 processing).
28	1C	SMF30PSO	4	binary	Number of pages swapped out from central storage to auxiliary storage. This field includes: local system queue area (LSQA), private area fixed pages, and private area non-fixed changed pages.
32	20	SMF30VPI	4	binary	Number of VIO page-ins from auxiliary storage to central storage for this step. This field includes page-ins resulting from page faults or specific page requests on a VIO window. It does not include VIO swap-ins or page-ins for the common area.
36	24	SMF30VPO	4	binary	Number of VIO page-outs from central storage to auxiliary storage for this step. This field includes page-outs resulting from specific page requests on a VIO window as well as those pages stolen by the paging supervisor through infrequent use. It does not include VIO swap-outs or page-outs for the common area.
40	28	SMF30VPR	4	binary	Number of VIO reclaims.
44	2C	SMF30CPI	4	binary	Number of common area page-ins (LPA + CSA) from auxiliary storage to central storage.
48	30	SMF30HPI	4	binary	Number of hiperspace page-ins from auxiliary to processor storage.
52	34	SMF30LPI	4	binary	Number of LPA page-ins from auxiliary storage to central storage.
56	38	SMF30HPO	4	binary	Number of hiperspace page-outs from processor to auxiliary storage.
60	3C	SMF30PST	4	binary	Number of pages stolen from this address space.
64	40	SMF30PSC	8	binary	Number of CPU page seconds for this address space, in page millisecond units. (A page millisecond unit equals 1.024 milliseconds.)

Offsets		Name	Length	Format	Description
72	48	SMF30RGB	4	binary	Private area size in bytes (less than 16 megabytes).
76	40	SMF30ERG	4	binary	Private area size in bytes (greater than 16 megabytes).
80	50	SMF30ARB	4	binary	Maximum virtual storage in bytes allocated from the local system queue area (LSQA) and the SWA subpools (less than 16 megabytes).
84	54	SMF30EAR	4	binary	Maximum virtual storage in bytes allocated from the local system queue area (LSQA) and the SWA subpools (greater than 16 megabytes).
88	58	SMF30URB	4	binary	Maximum virtual storage in bytes allocated from the user subpools (less than 16 megabytes).
92	5C	SMF30EUR	4	binary	Maximum virtual storage in bytes allocated from the user subpools (greater than 16 megabytes).
96	60	SMF30RGN	4	binary	Region size established, in 1K units, rounded up to a 4K boundary. The contents of this field is determined as follows: • If the ADDRSPC=REAL parameter is specified in the JCL, the contents of this field equals the amount of contiguous central storage reserved for the program. • If the REGION= parameter value in the JCL **exceeds** 16 megabytes: – If the IEFUSI exit changes the region limit or size **above** 16 megabytes, the contents of this field equals the changed region limit or size – Otherwise, the contents of this field equals the REGION parameter value (minimum value of 32 megabytes). • If the REGION= parameter value in the JCL **equals or is less than** 16 megabytes: – If the IEFUSI exit changes the region limit or size **below** 16 megabytes, the contents of this field equals the changed region limit or size – Otherwise, the contents of this field equals the REGION parameter value. **Note:** If both the region limit and size are changed, but do not match, the contents of this field equals the smaller of the changed region limit or size.
100	64	SMF30DSV	4	binary	Amount of user key data space and hiperspace virtual storage (high water mark) used during the step/job (in megabytes). Must be in key 8 or higher, and the creator of the dataspace must be in problem program state. If these two conditions are not true, this field contains zeros.
104	68	SMF30PIE	4	binary	Number of unblocked pages that were paged in from expanded storage.
108	6C	SMF30POE	4	binary	Number of unblocked pages that were paged out to expanded storage.
112	70	SMF30BIA	4	binary	Number of blocked pages that were paged in from auxiliary storage.
116	74	SMF30BOA	4	binary	Number of blocked pages that were paged out to auxiliary storage.
120	78	SMF30BIE	4	binary	Number of blocked pages that were paged in from expanded storage.
124	7C	SMF30BOE	4	binary	Number of blocked pages that were paged out to expanded storage.
128	80	SMF30KIA	4	binary	Number of blocks that were paged in from auxiliary storage.
132	84	SMF30KOA	4	binary	Number of blocks that were paged out to auxiliary storage.
136	88	SMF30KIE	4	binary	Number of blocks that were paged in from expanded storage.

Offsets		Name	Length	Format	Description
140	8C	SMF30KOE	4	binary	Number of blocks that were paged out to expanded storage.
144	90	SMF30PSF	8	binary	Number of CPU page seconds for the IARVSERV shared central storage frames in use by this address space, in page milliseconds.
152	98	SMF30PAI	4	binary	Binary number of IARVSERV shared pages that were paged in from auxiliary storage when referenced by a unit of work whose home space was this address space.
156	9C	SMF30PEI	4	binary	Number of IARVSERV shared pages that were paged in from expanded storage in this address space.
160	A0	SMF30ERS	8	binary	Expanded storage page residency time in page-milliseconds.
168	A8	SMF30MEM	8	binary	MEMLIMIT value in 1MB units as determined at step initialization time, after IEFUSI processing. An increase in the system default memlimit value is not reflected here. The maximum value of this field is '00000FFFFFFFF000'x that is equivalent to MEMLIMIT having no limit.
176	B0	SMF30MES	1	binary	Source of Memlimit, which is one of the following: **Value** **Meaning** **X'01'** MEMLIMIT set by SMF. **X'02'** MEMLIMIT set explicitly in the JCL with MEMLIMIT parameter on JOB or EXEC statement. **X'03'** MEMLIMIT is unlimited based on REGION=0 specification. **X'04'** MEMLIMIT set by IEFUSI (even if IEFUSI did not change the value). **X'0A'** System provided a default for MEMLIMIT based on REGION=0 specification and a subsequent curtailment of REGION in the IEFUSI exit.
177	B1	SMF30SLM	1	binary	Flags that indicate the actions taken on the job step region or MEMLIMIT due to a rule defined in the SMFLIMxx member of parmlib. For subtype 5, this will be a copy of the SMF30SLM value for the last executed job step. **Value** **Meaning** **X'80'** SMFLIM REGIONBELOW acted on the non-extended REGION for this step. **X'40'** SMFLIM REGIONABOVE acted on the extended REGION for this step. **X'20'** SMFLIM SYSRESVBELOW acted on the non-extended REGION for this step. **X'10'** SMFLIM SYSRESVABOVE acted on the extended REGION for this step. **X'08'** SMFLIM MEMLIMIT acted on the MEMLIMIT for this step. **X'04'** The IEFUSI exit set the output flag that caused all SMFLIM decision making to be bypassed.

Offsets		Name	Length	Format	Description
178	B2	SMF30_RAXFLAGS	1	binary	**Bit** **Meaning when set** **0 (SMF30_USERKEYCOMMONAUDITENABLED)** When SMF30_USERKEYCOMMONAUDITENABLED is on, auditing of successful and unsuccessful user-key common storage usage attempts enabled for this step/job. The following fields are only applicable when this flag is on: SMF30_USERKEYCSAUSAGE SMF30_USERKEYCADSUSAGE SMF30_USERKEYCHANGKEYUSAGE SMF30_USERKEYRUCSAUSAGE **1 (SMF30_USERKEYCSAUSAGE)** When SMF30_USERKEYCSAUSAGE is on, successful or unsuccessful attempts were made to obtain user-key CSA or RUCSA storage for this step/job. See SMF30_USERKEYRUCSAUSAGE for usage specific to RUCSA. This bit is only valid when SMF30_USERKEYCOMMONAUDITENABLED is on. Once this bit is set within a step, it stays on for that step. This bit will be on in job end records if it is on for any step in the job. **2 (SMF30_USERKEYCADSUSAGE)** When SMF30_USERKEYCADSUSAGE is on, successful or unsuccessful attempts were made to create a user-key CADS for this step/job. This bit is only valid when SMF30_USERKEYCOMMONAUDITENABLED is on. Once this bit is set within a step, it stays on for that step. This bit will be on in job end records if it is on for any step in the job. **3 (SMF30_USERKEYCHANGKEYUSAGE)** When SMF30_USERKEYCHANGKEYUSAGE is on, successful or unsuccessful attempts were made to change the key of common ESQA storage to a user key (via CHANGKEY) for this step/job. This bit is only valid when SMF30_USERKEYCOMMONAUDITENABLED is on. Once this bit is set within a step, it stays on for that step. This bit will be on in job end records if it is on for any step in the job. **4 (SMF30_USERKEYRUCSAUSAGE)** When SMF30_USERKEYRUCSAUSAGE is on, successful or unsuccessful attempts were made to obtain, reference, free, or change the state of RUCSA storage for this step. Once this bit is set within a step, it stays on for that step. This bit will be on in job end records if it is on for any step in the job. **5 - 7** Reserved.
179	B3	*	5	binary	Reserved.
184	B8	SMF30HVR	8	binary	High water mark for the number of real storage frames that is used to back 64-bit private storage.
192	C0	SMF30HVA	8	binary	High water mark for the amount of auxiliary storage that is used to back 64-bit private storage. This value is a total of the number of paging data set slots and storage-class memory (SCM) blocks.

Offsets		Name	Length	Format	Description
200	C8	SMF30HVO	8	binary	Amount of 64-bit private storage in bytes that is obtained by this step or job. This includes guarded virtual storage. The SMF30HVO field contains a snapshot value of high virtual private storage allocation. As the memory objects owned by the executed program have already been detached at the time the step or job goes through termination, SMF30HVO contains the memory object size still allocated to the initiator address space, but no longer reflects the memory objects that may have been allocated by the program executed in the job step. In contrast to SMF30HVO, the SMF30HVH field is maintained as a high water mark. Its content reflects the high virtual memory object size that was once allocated by the job step being executed under the initiator address space.
208	D0	SMF30HVH	8	binary	High water mark for the number of usable bytes of 64-bit private storage that is obtained by this step or job. This does not include guarded virtual storage.
216	D8	SMF30HSO	8	binary	Amount of 64-bit IARV64 REQUEST=SHAREMEMOBJ shared storage, in bytes, to which this step or job has addressability or access.
224	E0	SMF30HSH	8	binary	High water mark for the number of usable bytes of 64-bit IARV REQUEST=SHAREMEMOBJ shared storage to which this step or job has access.
232	E8	SMF30TIH	4	binary	High water mark of TIOT space used for TIOT entries (in bytes).
236	EC	SMF30TIU	4	binary	Current TIOT space used for TIOT entries (in bytes.) This will only contain a non-zero value for interval records, since TIOT entries are freed by unallocation processing at step end and job end.
240	F0	SMF30TIS	4	binary	Size of the TIOT available for TIOT entries (in bytes). This does not include the space reserved by the system for the TIOT prefix, header, and trailer.
244	F4	SMF30NumberOfDataSpacesHWM	4	binary	The high water mark for the number of in-use data spaces created by problem state user key invokers of DSPSERV during this job step.
248	F8	SMF30UserDataSpaceCreateReqCount	8	binary	The total number of data spaces created by problem state user key callers during this job step.

Performance Section

This section contains the SRM service units used by the address space for the period being reported on. For more information on SRM service units, see *z/OS MVS Initialization and Tuning Guide*.

Triplet Information

This section is located on the record using the following triplet fields, which are located in the 'header/self-defining' section:

Offset
SMF30POF

Length
SMF30PLN

Number
SMF30PON - Reports the number of performance sections on the current record. Because only one performance section can appear on the record, this field is '1' (if the section exists) or '0' (if it doesn't).

Offsets		Name	Length	Format	Description
0	0	SMF30SRV	4	binary	Total service units. This field grows to X'FFFFFFFF' and then wraps back to zero and continues growing. When wrapping occurs, SMF30SRV_INV is set to on. SMF30SRV_L is the 8-byte equivalent of this field.
4	4	SMF30CSU	4	binary	CPU service units. This field grows to X'FFFFFFFF' and then wraps back to zero and continues growing. When wrapping occurs, SMF30CSU_INV is set to on. SMF30CSU_L is the 8-byte equivalent of this field.
8	8	SMF30SRB	4	binary	Service request block (SRB) service units. This field grows to X'FFFFFFFF' and then wraps back to zero and continues growing. When wrapping occurs, SMF30SRB_INV is set to on. SMF30SRB_L is the 8-byte equivalent of this field.
12	C	SMF30IO	4	binary	I/O service units. This field grows to X'FFFFFFFF' and then wraps back to zero and continues growing. When wrapping occurs, SMF30IO_INV is set to on. SMF30IO_L is the 8–byte equivalent of this field.
16	10	SMF30MSO	4	binary	Main storage occupancy (MSO) service units. This field grows to X'FFFFFFFF' and then wraps back to zero and continues growing. When wrapping occurs, SMF30MSO_INV is set to on. SMF30MSO_L is the 8–byte equivalent of this field.
20	14	SMF30TAT	4	binary	System resources manager (SRM) transaction active time, in 1024-microsecond units.
24	18	SMF30SUS	4	binary	Copy of RmctAdjC when this SMF record was produced, number of sixteenths of one CPU microsecond per CPU service unit.
28	1C	SMF30RES	4	binary	System resources manager (SRM) transaction residency time, in 1024-microsecond units. That is the amount of time the SRM transaction was in real storage.
32	20	SMF30TRS	4	binary	Number of system resources manager (SRM) transactions.
36	24	SMF30WLM	8	EBCDIC	Workload name. This field is blank (X‘40’) when in workload management compatibility mode.
44	2C	SMF30SCN	8	EBCDIC	Service class name. This field will contain SYSOTHER during the time of a WLM POLICY switch.
52	34	SMF30GRN	8	EBCDIC	Resource group name.
60	3C	SMF30RCN	8	EBCDIC	Report class name. This field is blank (X'40') during the time of a WLM POLICY switch.
68	44	SMF30ETA	4	binary	Independent enclave transaction active time in 1024-microsecond units.
72	48	SMF30ESU	4	binary	Independent enclave CPU service units. This field grows to X'FFFFFFFF' and then wraps back to zero and continues growing. When wrapping occurs, SMF30ESU_INV is set to on. SMF30ESU_L is the 8–byte equivalent of this field.
76	4C	SMF30ETC	4	binary	Independent enclave transaction count.
80	50	SMF30PFL	16	EBCDIC	Scheduling environment name. Binary zeros if no scheduling environment is specified.
96	60	SMF30JQT	4	binary	Job preparation time. This is the elapsed time before the job was first queued for execution. It excludes time to read the job into the system. It includes delays incurred waiting for and during conversion, such as when eligible systems are not active to convert the job. If the JOB statement specified TYPRUN=JCLHOLD, this time is 0. The time is in 1024-microsecond units.
100	64	SMF30RQT	4	binary	Time following job preparation when the job was ineligible for execution due to either the job's eligible systems being inactive or the job's scheduling environment not being available. The time is in 1024-microsecond units.

Offsets		Name	Length	Format	Description
104	68	SMF30HQT	4	binary	Time following job preparation when the job was ineligible for execution for reasons not included in SMF30RQT. This includes job hold, job class hold, job queue hold, duplicate job name serialization, and job class execution limits. If the JOB statement specified TYPRUN=HOLD, the time that the job is held for this reason is not included. The time is in 1024-microsecond units.
108	6C	SMF30SQT	4	binary	Time the job was eligible for execution. This is the amount of time between the end of job conversion and Problem Program Start time (SMF30PPS). The time is in 1024-microsecond units. For JES3, this field includes time the job was ineligible for execution.
112	70	SMF30PF1	1	EBCDIC	Performance section flag byte: **Value (Name)** **Meaning** **X'80' (SMF30PFJ)** Job service class association was modified by a system operator prior to job initiation. **X'40' (SMF30PFR)** Job service class association was modified by a system operator during job execution. **X'20' (SMF30PFF)** Job initiation forced by a system operator. **X'10' (SMF30RTR)** Job has been restarted. There is one set of SMF30 records for each time the job is restarted. **X'08' (SMF30MSI)** Remote system data is incomplete. **X'04' (SMF30WMI)** Job is executing in a workload manager batch initiator. **X'02' (SMF30CCP)** Service class assigned to the address space was designated CPU-critical in the WLM service definition. **X'01' (SMF30CSP)** Service class assigned to the address space was designated storage-critical in the WLM service definition.

Offsets		Name	Length	Format	Description

113	71	SMF30PF2	1	EBCDIC	Performance section flag byte:
					
					Value (Name)
					Meaning
					
					X'80' (SMF30ASP)
					Address space was designated storage-critical.
					
					X'40' (SMF30SME)
					Address space cannot be managed to transaction goals, because "manage region to goals of region" was specified in the WLM service definition.
					
					X'20' (SMF30CPR)
					Address space is currently CPU-protected.
					
					X'10' (SMF30SPR)
					Address space is currently storage-protected.
					
					X'08' (SMF30PIN)
					If this bit is on, the following fields contain incomplete data: (SRM could not deliver deltas or values for this interval)
					
					`SMF30CSU SMF30MSO SMF30SPR`
					`SMF30ESU SMF30PFL SMF30SQT`
					`SMF30ETA SMF30PFR SMF30SRB`
					`SMF30ETC SMF30RCN SMF30SRV`
					`SMF30GRN SMF30RES SMF30SUS`
					`SMF30HQT SMF30RQT SMF30TAT`
					`SMF30IO SMF30RTR SMF30TRS`
					`SMF30JPN SMF30SCN SMF30WLM`
					`SMF30JQT SMF30SME SMF30CRM`
					`SMF30SRV_L SMF30CSU_L`
					`SMF30SRB_L SMF30IO_L`
					`SMF30MSO_L SMF30ESU_L`
					
					X'04' (SMF30CRM)
					If this bit is on, it indicates that the address space matched a classification rule that specified "manage region using goals of both", which means it is managed towards the velocity goal of the region. But, transaction completions are reported and used for management of the transaction service classes with response time goals. This option must only be used with CICS TORs. The associated AORs must remain at the default "manage region using goals of transaction".

Offsets		Name	Length	Format	Description
114	72	SMF30INV	1	EBCDIC	Performance section flag byte: **Value (Name)** **Meaning** **X'80' (SMF30SRV_INV)** When this bit is on, it indicates that the value in SMF30SRV has grown past its four byte maximum value capacity of X'FFFFFFFF' and has wrapped back to zero. SMF30SRV_L is the 8-byte equivalent of SMF30SRV. **X'40' (SMF30CSU_INV)** When this bit is on, it indicates that the value in SMF30CSU has grown past its four byte maximum value capacity of X'FFFFFFFF' and has wrapped back to zero. SMF30CSU_L is the 8-byte equivalent of SMF30CSU. **X'20' (SMF30SRB_INV)** When this bit is on, it indicates that the value in SMF30SRB has grown past its four byte maximum value capacity of X'FFFFFFFF' and has wrapped back to zero. SMF30SRB_L is the 8–byte equivalent of SMF30SRB. **X'10' (SMF30IO_INV)** When this bit is on, it indicates that the value in SMF30IO has grown past its four byte maximum value capacity of X'FFFFFFFF' and has wrapped back to zero. SMF30IO_L is the 8–byte equivalent of SMF30IO. **X'08' (SMF30MSO_INV)** When this bit is on, it indicates that the value in SMF30MSO has grown past its four byte maximum value capacity of X'FFFFFFFF' and has wrapped back to zero. SMF30MSO_L is the 8–byte equivalent of SMF30MSO. **X'04 (SMF30ESU_INV)** When this bit is on, it indicates that the value in SMF30ESU has grown past its four byte maximum value capacity of X'FFFFFFFF' and has wrapped back to zero. SMF30ESU_L is the 8–byte equivalent of SMF30ESU.
115	73	SMF30ZEP	1	binary	Contains information associated with a potential future function and no further details are available at this time.
116	74	SMF30JPN	8	EBCDIC	Subsystem collection name from IWMCLSFY SUBCOLN.
124	7C	SMF30MSC	4	binary	MSO Service Definition Coefficient (SDC) scaled by 10000.
128	80	SMF30CPC	2	binary	CPU Service Definition Coefficient (SDC) scaled by 10.
130	82	SMF30LOC	2	binary	IOC Service Definition Coefficient (SDC) scaled by 10.
132	84	SMF30SRC	2	binary	SRB Service Definition Coefficient (SDC) scaled by 10.
134	86	SMF30ZNF	2	binary	Normalization factor for IFA service time. Used to convert between real IFA times and “normalized” IFA times, that is, the equivalent time on a standard CP. Multiply SMF30_TIME_ON_IFA by this value and divide by 256 to calculate the normalized IFA time.
136	88	SMF30SNF	2	binary	Normalization factor for zIIP service time. Used to convert between real zIIP times and normalized zIIP times, that is, the equivalent time on a standard CP. Multiply SMF30_TIME_ON_zIIP by this value and divide by 256 to calculate the normalized zIIP time.
138	8A	SMF30RS6	6	EBCDIC	Reserved.
144	90	SMF30SRV_L	8	binary	Total service units. This is the 8-byte equivalent of SMF30SRV. The value of this field continues to grow after SMF30SRV_INV is set.
152	98	SMF30CSU_L	8	binary	CPU service units. This is the 8-byte equivalent of SMF30CSU. The value of this field continues to grow after SMF30CSU_INV is set.
160	A0	SMF30SRB_L	8	binary	SRB service units. This is the 8-byte equivalent of SMF30SRB. The value of this field continues to grow after SMF30SRB_INV is set.
168	A8	SMF30IO_L	8	binary	I/O service units. This is the 8-byte equivalent of SMF30IO. The value of this field continues to grow after SMF30IO_INV is set.

Offsets		Name	Length	Format	Description
176	B0	SMF30MSO_L	8	binary	MSO service units. This is the 8-byte equivalent of SMF30MSO. The value of this field continues to grow after SMF30MSO_INV is set.
184	B8	SMF30ESU_L	8	binary	ESU service units. This is the 8-byte equivalent of SMF30ESU. The value of this field continues to grow after SMF30ESU_INV is set.
192	C0	SMF30ACB	1	binary	Contains information associated with a potential future function, no further details are provided at this time.
193	C1	SMF30CR	1	binary	Contains information associated with a potential future function, no further details are provided at this time.
194	C2	SMF30_Capacity_ Change_Cnt	2	binary	The number of processor capacity changes that occurred since the previous interval or event interval. This number will be greater than 1 when the number of processor capacity changes exceeded the number specified in the MAXEVENTINTRECS parmlib option.
196	C4	SMF30_RCTPCPUA _Actual	4	binary	Physical CPU adjustment factor (this is the adjustment factor for converting CPU time to equivalent service, in basic-mode with all processors online). Based on model capacity rating.
200	C8	SMF30_RCTPCPUA _Nominal	4	binary	Physical CPU adjustment factor (this is the adjustment factor for converting CPU time to equivalent service in basic-mode with all processors online). Based on nominal model capacity rating.
204	CC	SMF30_RCTPCPUA_ scaling_factor	4	binary	Scaling factor for SMF30_RCTPCPUA_actual and SMF30_RCTPCPUA_nominal.
208	D0	SMF30_Capacity _Adjustment_Ind	1	binary	Field values and meanings are: **Value** **Meaning** **0** The indication is not reported. **1-99** Some amount of reduction is indicated. **100** The machine is operating in normal capacity. Primary CPUs and all secondary-type CPUs are similarly affected.
209	D1	SMF30_Capacity_ Change_Rsn	1	binary	Indicates the reason that is associated with the present value contained in SMF30_Capacity_Adjustment_Ind. The bit values of this field correspond to those described in RMCTZ_Capacity_Adjustment_Indication of the IRARMCTZ mapping macro. (See *MVS Data Areas*.)

Offsets		Name	Length	Format	Description
210	D2	SMF30_Capacity_ Flags	1	binary	Processor capacity flags. **Bit (Name)** **Meaning when set** **0 (SMF30_Event_Driven_Intvl_Rec)** Indicates that the current interval record was generated as a result of an event, rather than as a result of standard interval expiration based on time. **1 (SMF30_RQSVSUS_Err)** Indicates that an error occurred while collecting the data for SMF30SUS following a change in processor capacity. If this bit is found to be on when the record is being written, an additional attempt to collect the data from SRM is made. If that attempt is successful, the data is filled in at that time and the SMF30PIN error bit will be off. **2 (SMF30_Capacity_Data_Err)** Indicates that error occurred while collecting the processor capacity data, therefore the following fields are unreliable: SMF30_RCTPCPUA_Actual SMF30_RCTPCPUA_Nominal SMF30_RCTPCPUA_scaling_factor SMF30_Capacity_Adjustment_Ind SMF30_Capacity_Change_Rsn **3 (SMF30_PCD_Rsvd_Exists)** Indicates records generated on systems running z/OS V1R7 through z/OS V1R9. When off, this bit indicates records generated on systems running z/OS V1R10 and later.
212	D4	SMF30_RMCTADJN _Nominal	4	binary	Nominal CPU rate adjustment.

Operator Section

This section contains the actions performed by the operator for this address space during the period being reported.

Counts are increased by one when the mount is verified. If an incorrect volume is mounted, the count is not increased even though another mount message is issued.

Triplet Information

This section is located on the record using the following triplet fields, which are located in the 'header/ self-defining' section:

Offset
SMF30OOF

Length
SMF30OLN

Number
SMF30OON - Reports the number of operator sections on the current record. Because only one operator section can appear on the record, this field is '1' (if the section exists) or '0' (if it doesn't).

Offsets		Name	Length	Format	Description
0	0	SMF30PDM	4	binary	Number of non-specific DASD mounts.
4	4	SMF30PRD	4	binary	Number of specific DASD mounts.
8	8	SMF30PTM	4	binary	Number of non-specific tape mounts.
12	C	SMF30TPR	4	binary	Number of specific tape mounts.
16	10	SMF30MTM	4	binary	Number of non-specific MSS mounts. As of MVS/SP4.1, this field is no longer valid, and contains zeroes.

Offsets		Name	Length	Format	Description
20	14	SMF30MSR	4	binary	Number of specific MSS mounts. As of MVS/SP4.1, this field is no longer valid, and contains zeroes.

APPC/MVS Resource Section

This section contains summary data related to how an address space uses APPC/MVS resources. For information about cumulative summary data, see the “APPC/MVS Cumulative Resource Section”. For more information about APPC/MVS, see Chapter 7, “APPC/MVS accounting,” on page 101. This section will appear on the record only if the address space has used APPC/MVS services and there is data to be reported.

Triplet Information

This section is located on the record using the following triplet fields, which are located in the ‘header/self-defining’ section:

Offset
SMF30DRO

Length
SMF30DRL

Number
SMF30DRN - Reports the number of APPC/MVS resource sections on the current record. Because only one APPC/MVS resource section can appear on the record, this field is ‘1’ (if the section exists) or ‘0’ (if it doesn't).

Offsets		Name	Length	Format	Description
0	0	SMF30DC	4	binary	Number of conversations, both currently active and deallocated, associated with the transaction program ID.
4	4	SMF30DCA	4	binary	Number of all conversations allocated.
8	8	SMF30DSC	4	binary	Number of times the transaction program issued a Send call. **Note:** Because an interval or step might end in the middle of a Send call, this field might contain zero while SMF30DDS contains a nonzero value.
12	C	SMF30DDS	8	long floating point hex	Amount of data, in bytes, sent by the transaction program.
20	14	SMF30DRC	4	binary	Number of times the transaction program issued a Receive call. **Note:** Because an interval or step might end in the middle of a Receive call, this field might contain zero while SMF30DDR contains a nonzero value.
24	18	SMF30DDR	8	long floating point hex	Amount of data, in bytes, received by the transaction program.
32	20	SMF30DAC	4	binary	Number of active conversations.
36	24	SMF30DTR	4	binary	Number of APPC/MVS transactions programs scheduled by the APPC/MVS transaction scheduler (ASCH).

APPC/MVS Cumulative Resource Section

This section contains cumulative summary data related to how an address space uses APPC/MVS resources. Regardless of whether the record is an interval, step termination, or step total record, this section represents cumulative data since the start of the job. This section will only appear on the record if the address space has used APPC/MVS services and there is data to be reported.

Triplet Information

This section is located on the record using the following triplet fields, which are located in the 'header/self-defining' section:

Offset
SMF30ARO

Length
SMF30ARL

Number
SMF30ARN - This field will be '1' (if the section is on the record) or '0' (if it isn't)

Offsets		Name	Length	Format	Description
0	0	SMF30CN	4	binary	Total number of conversations associated with the transaction program (TP) ID, both currently active and deallocated.
4	4	SMF30CNA	4	binary	Total number of all conversations allocated.
8	8	SMF30SEN	4	binary	Total number of times the transaction program (TP) issued a Send call.
12	C	SMF30DAT	8	long floating point hex	Total amount of data sent by the transaction program (TP) in bytes (long floating point).
20	14	SMF30REC	4	binary	Total number of times the transaction program (TP) issued a Receive call.
24	18	SMF30DAR	8	long floating point hex	Total amount of data received by the transaction program (TP) in bytes (long floating point).
32	20	SMF30TAC	4	binary	Total number of active conversations.
36	24	SMF30ATR	4	binary	Total number of APPC/MVS transactions programs scheduled by the APPC/MVS transaction scheduler (ASCH).

z/OS UNIX Process Section

Reports on the use of z/OS UNIX by z/OS UNIX processes.

Offsets		Name	Length	Format	Description
0	0	SMF30OPI	4	binary	z/OS UNIX process ID.
4	4	SMF30OPG	4	binary	z/OS UNIX process group ID.
8	8	SMF30OUI	4	binary	z/OS UNIX process user ID.
12	C	SMF30OUG	4	binary	z/OS UNIX process user group ID.
16	10	SMF30OSI	4	binary	z/OS UNIX process session ID.
20	14	SMF30OSC	4	binary	Number of z/OS UNIX services requested by the process. When the z/OS UNIX parmlib option SYSCALL_COUNTS is set to NO, there is no collection of data for the count of syscalls. When gathering syscall counts for a job, do not switch between SYSCALL_COUNTS=YES and SYSCALL_COUNTS=NO because doing so can lead to inaccurate values in the SMF30OSC field.
24	18	SMF30OST	4	binary	Total CPU time (in hundredths of a second) accumulated by z/OS UNIX services requested by the process. Note that the value in SMF30OST is already included in fields SMF30CPT or SMF30CPS. When the z/OS UNIX parmlib option SYSCALL_COUNTS is set to NO, there is no collection of data for CPU usage. When gathering CPU usage for a job, do not switch between SYSCALL_COUNTS=YES and SYSCALL_COUNTS=NO because doing so can lead to inaccurate values in the SMF30OST field.
28	1C	SMF30ODR	4	binary	Number of z/OS UNIX directory reads for the process.
32	20	SMF30OFR	4	binary	Read I/O block count for z/OS UNIX regular files.
36	24	SMF30OFW	4	binary	Write I/O block count for z/OS UNIX regular files.

Offsets		Name	Length	Format	Description
40	28	SMF30OPR	4	binary	Read I/O block count for z/OS UNIX pipes and AF_UNIX sockets.
44	2C	SMF30OPW	4	binary	Write I/O block count for z/OS UNIX pipes and AF_UNIX sockets.
48	30	SMF30OSR	4	binary	Reserved.
52	34	SMF30OSW	4	binary	Reserved.
56	38	SMF30OLL	4	binary	Number of pathname lookup calls to the logical file system.
60	3C	SMF30OLP	4	binary	Number of pathname lookup calls to the physical file system.
64	40	SMF30OGL	4	binary	Number of pathname generation calls to the logical file system.
68	44	SMF30OGP	4	binary	Number of pathname generation calls to the physical file system to determine a pathname.
72	48	SMF30OPP	4	binary	Parent process ID.
76	4C	SMF30OKR	4	binary	Reserved.
80	50	SMF30OKW	4	binary	Reserved.
84	54	SMF30OMS	4	binary	Reserved.
88	58	SMF30OMR	4	binary	Reserved.
92	5C	SMF30OSY	4	binary	Number of times the **sync()** function was called.

Automatic Restart Management Section

This section contains information related to a batch job or started task that registers as an element of automatic restart management. The element name, element type, and timestamps of the completion of various events are recorded. If the timestamp for an event is zero, then that particular event had not been completed by the time the record was generated.

Triplet Information

This section is located on the record using the following triplet fields, which are located in the 'header/self-defining' section:

Offset
SMF30RMO

Length
SMF30RML

Number
SMF30RMN

Offsets		Name	Length	Format	Description
0	0	SMF30RNM	16	EBCDIC	Element name.
16	10	SMF30RTP	8	EBCDIC	Element type.
24	18	SMF30RRG	16	EBCDIC	Restart group for element in SMF30RNM.
40	28	SMF30RSN	8	EBCDIC	The system name for the system on which the element was initially started; blank, for the initial start. **Note:** The current system name is in the SMF30SYN field.
48	30	SMF30RGT	4	binary	The time (local) when the element issued the IXCARM macro with the REGISTER parameter, in hundredths of a second.
52	34	SMF30RGD	4	binary	The date when the element issued the REGISTER request, in the form 0*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for a detailed description.
56	38	SMF30RWT	4	binary	The time (local) when the element issued the IXCARM macro with the WAITPRED parameter, in hundredths of a second. This field will be zero if this function was not requested.

Offsets		Name	Length	Format	Description
60	3C	SMF30RWD	4	binary	The date when the element issued IXCARM with the WAITPRED parameter, in the form 0*cyydddF* (where 'F' is the sign). This field will be zero if this function was not requested.
64	40	SMF30RYT	4	binary	The time (local) when the element issued the IXCARM macro with the READY parameter, in hundredths of a second.
68	44	SMF30RYD	4	binary	The date when this element issued the IXCARM macro with the READY parameter, in the format 0*cyydddF* (where 'F' is the sign).
72	48	SMF30RTT	4	binary	The time (local) when the element was deregistered, in hundredths of a second. This field will be zero if this element is not yet deregistered or if it ended abnormally.
76	4C	SMF30RTD	4	binary	The date when this element was deregistered, in the format 0*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for a detailed description. This field will be zero if this element is not yet deregistered or if it ended abnormally.

Usage Data Section

This section contains the product ID information (specified on the REGISTER request of the IFAUSAGE macro) and the usage data that has been collected for the time period (interval, step, or job), for the product in the current address space only.

For registered products with a domain of TASK and a scope of ALL (example, IMS), there will be one usage section in the record for each unique product that is actively registered at the time the specified interval ended (as opposed to any part of the specified interval). In addition, there will be one section in the record for each unique product ID that has deregistered at least once during the specified interval.

Note: The data for deregistered products with a domain of TASK and a scope of FUNCTION is consolidated into one section in the record by unique product ID. This is only performed at the specified interval level.

For all other registered products, there will be one section in the record for each unique product ID (owner, name, version, qualifier) that is actively registered for any part of that specified interval.

Triplet Information

This section is located on the record using the following triplet fields, which are located in the 'header/self-defining' section:

Offset
SMF30UDO

Length
SMF30UDL

Number
SMF30UDN

Offsets		Name	Length	Format	Description
0	0	SMF30UPO	16	EBCDIC	Product owner or vendor name (specified on the PRODOWNER option of the IFAUSAGE macro).
16	10	SMF30UPN	16	EBCDIC	Product name (specified on the PRODNAME option of the IFAUSAGE macro).
32	20	SMF30UPV	8	EBCDIC	Product version (if specified on the PRODVERS option of the IFAUSAGE macro or 'NONE').
40	28	SMF30UPQ	8	EBCDIC	Product qualifier (if specified on the PRODQUAL option of the IFAUSAGE macro or 'NONE').
48	30	SMF30UPI	8	EBCDIC	Product ID (if specified on the PRODID option of the IFAUSAGE macro or 'NONE').
56	38	SMF30UCT	4	binary	Product TCB Time (in hundredths of a second).

Offsets		Name	Length	Format	Description
60	3C	SMF30UCS	4	binary	Product SRB Time (in hundredths of a second).
64	40	SMF30URD	8	various	Product specific resource data (specified on the DATA option on the IFAUSAGE macro FUNCTIONDATA request). SMF30UDF identifies the format of the data in this field.
72	48	SMF30UDF	1	binary	Data format of value in SMF30URD **Value** **Meaning** **0** No data specified. **1** CPU time in long floating Point (in hundredths of a second). **2** Binary (64-bit). **3** Long floating point.
73	49	SMF30UFG	1	binary	Usage entry flags **Bit** **Meaning when set** **0** Unauthorized register **1-7** Unused
74	4A		2		Reserved.

Multisystem Enclave Remote System Data Section

This section contains remote system data for each system that executed work under a multisystem enclave.

Triplet Information

This section is located on the record using the following triplet fields, which are located in the 'header/self-defining' section:

Offset
SMF30MOF

Length
SMF30MLN

Number
SMF30MNO

Offsets		Name	Length	Format	Description
0	0	SMF30MRS	8	EBCDIC	System name on which enclaves created by this address space executed.
8	8	SMF30MRA	4	binary	CPU rate adjustment factor for the system named by SMF30MRS. This is the number of sixteenths of one microsecond of CPU time per CPU service unit.
12	C	SMF30MRD	4	binary	CPU time, in hundredths of a second, accumulated by dependent enclaves that executed on the system named by SMF30MRS.
16	10	SMF30MRI	4	binary	CPU time, in hundredths of a second, accumulated by independent enclaves that executed on the system named by SMF30MRS.

Counter data section

This section contains various counters for the address space for the period that the record represents. This section is only generated when **SMF30COUNT** has been specified in the SMFPRM*xx* member of parmlib (see in *z/OS MVS System Management Facilities (SMF)*) or via the **SETSMF** command (see in *z/OS MVS System Commands*).

To receive non-zero data in this section, the Hardware Instrumentation Services (HIS) component must be active and collecting the basic counter set. For more information, see Starting, configuring, and stopping hardware event collection in *z/OS MVS System Commands*.

SMF type 30 instruction counts may include instructions from z/OS events that are not attributable to the job. The instruction counts from these z/OS events can significantly impact SMF type 30 instruction counts.

Triplet Information

This section is located on the record using the following triplet fields, which are located in the “header/ self-defining” section:

Offset
SMF30CDO

Length
SMF30CDL

Number
SMF30CDN - Reports the number of counter data sections on the current record. This can be “0”, indicating the counter data section does not exist.

Offsets		Name	Length	Format	Description
0	0	SMF30InstFlgs1MRS	1	binary	Instruction Counter related flags. If a bit in this byte is on in the subtype 2/3 record, it is on in the subtype 4 record. Similarly, this holds between subtype 4 and subtype 5 records. **Bit** **Meaning when set** **0** When on, there was a disruption in the collection of instruction counts or the counts could not be obtained. **1** The following fields contain incomplete data (SRM could not deliver deltas or values for this interval): • SMF30_Inst_CP_Enclave • SMF30_Inst_Offload_Enclave • SMF30_Inst_OffloadOnCP_Enclave • SMF30_Inst_CP_DepEnc • SMF30_Inst_Offload_DepEnc • SMF30_Inst_OffloadOnCP_DepEnc
1	1		7	binary	Reserved
8	8	SMF30_Inst_CP_Task	8	binary	The number of instructions executed while running on a standard processor as a task when it is not eligible for an offload processor and it is not associated with an enclave.
16	10	SMF30_Inst_CP_NonPreemptSRB	8	binary	The number of instructions executed while running on a standard processor as a non-preemptable SRB.
24	18	SMF30_Inst_CP_PreemptSRB	8	binary	The number of instructions executed while running on a standard processor as a preemptable or client SRB when it is not associated with an enclave.
32	20	SMF30_Inst_Offload	8	binary	The number of instructions executed while running on an offload processor when not associated with an enclave.
40	28	SMF30_Inst_OffloadOnCP	8	binary	The number of instructions executed while running on a standard processor as eligible for an offload processor while not associated with an enclave.
48	30	SMF30_Inst_CP_Enclave	8	binary	The number of instructions executed while running on a standard processor as not eligible for an offload processor for an independent enclave.
56	38	SMF30_Inst_Offload_Enclave	8	binary	The number of instructions executed while running on an offload processor for an independent enclave.
64	40	SMF30_Inst_OffloadOnCP_Enclave	8	binary	The number of instructions executed while running on a standard processor as eligible for an offload processor for an independent enclave.

Offsets		Name	Length	Format	Description
72	48	SMF30_Inst_CP_DepEnc	8	binary	The number of instructions executed while running on a standard processor as not eligible for an offload processor for a dependent enclave.
80	50	SMF30_Inst_Offload_DepEnc	8	binary	The number of instructions executed while running on an offload processor for a dependent enclave.
88	58	SMF30_Inst_OffloadOnCP_ DepEnc	8	binary	The number of instructions executed while running on a standard processor as eligible for an offload processor for a dependent enclave.

zEDC usage statistics section

This section contains various counters for the zEDC usage statistics for the period that the record represents. This section is only produced when zEDC compression and decompression activities occur during the period.

Triplet information: This section is located on the record using the following triplet fields, which are located in the header/self-defining section:

Offset
SMF30USO — Offset of the zEDC usage statistics section.

Length
SMF30USL — Length of the zEDC usage statistics section.

Number
SMF30USN — Number of zEDC usage statistics sections on the current record. This can be zero, indicating that the zEDC usage statistics section does not exist.

Offsets		Name	Length	Format	Description
0	0	SMF30_US_ComprReq	8	binary	Total number of compression and decompression requests (both supervisor-state and problem-state requests) 1
8	8	SMF30_US_ComprReq_Prob	8	binary	Total number of problem-state compression and decompression requests. 2
16	10	SMF30_US_QueueTime	8	binary	Total queue time. The amount of time, in microseconds, from when the request was submitted until the adapter started executing the request. 2
24	18	SMF30_US_ExecTime	8	binary	Total execution time, in microseconds. 2
32	20	SMF30_US_Def_UncomprIn	8	binary	Total number, in bytes, of uncompressed data input.
40	28	SMF30_US_Def_ComprOut	8	binary	Total number, in bytes, of compressed data output.
48	30	SMF30_US_Inf_ComprIn	8	binary	Total number, in bytes, of compressed data input.
56	38	SMF30_US_Inf_DecomprOut	8	binary	Total number, in bytes, of decompressed data output.

Table notes:

On the z/OS IBM z15 processor and above there are specific differences to the SMF30 fields:

1. On a z15 and above processor, the request count will only represent the number of authorized requests.
2. No longer captured on the z15 and above processors and will remain zero.

Record type 31 (X'1F') — TIOC Initialization

Note: While record type 31 is no longer generated because telecommunications access method (TCAM) was withdrawn from service in 2002, record type 31 remains as a placeholder.

Record type 31 is written when a MODIFY TCAM operator command is issued. This record contains the number of time-sharing buffers, buffer size, maximum number of output and input buffers allowed per terminal before OWAIT or LWAIT, OWAIT and RESTART thresholds, number of buffers reserved on the free queue, and the size of one terminal status block. OWAIT is the suspension of the program during input/output processing to the terminal because no output buffers are available. LWAIT is the locking of the terminal's keyboard because the terminal user filled all of the available input buffers.

Record mapping

Header/Self-defining Section

This section contains the common SMF record headers fields and the triplet fields (offset/length/number), if applicable, that locate the other sections on the record.

Offsets		Name	Length	Format	Description
0	0	TTI31LEN	2	binary	Record length. This field and the next field (total of four bytes) form the RDW (record descriptor word). See "Standard and Extended SMF record headers" on page 162 for a detailed description.
2	2	TTI31SEG	2	binary	Segment descriptor (see record length field).
4	4	TTIRFLG	1	binary	System indicator: **Bit** **Meaning when set** **0-2** Reserved **3-6** Version indicators* **7** Reserved. *See "Standard and Extended SMF record headers" on page 162 for a detailed description.
5	5	TTIRCDTY	1	binary	Record type 31 (X'1F').
6	6	TTIRCDTS	4	binary	Time since midnight, in hundredths of a second, that the record was moved into the SMF buffer.
10	A	TTIRCDTE	4	packed	Date when the record was moved into the SMF buffer, in the form 0*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for a detailed description.
14	E	TTICPUID	4	EBCDIC	System identification (from the SID parameter).
18	12	TTINBF	2	binary	Number of time-sharing buffers.
20	14	TTIBUFSE	2	binary	Time-sharing buffer size, in bytes.
22	16	TTIRSVRD	2		Reserved.
24	18	TTIOMAX	2	binary	Maximum number of output buffers allowed per terminal before OWAIT.
26	1A	TTIIMAX	2	binary	Maximum number of input buffers allowed per terminal before LWAIT.
28	1C	TTIOWTH	2	binary	OWAIT threshold. The number of buffers that must be freed in order to be freed from OWAIT.
30	1E	TTIRSTH	2	binary	RESTART threshold. The number of buffers that must be freed in order to be freed from LWAIT.
32	20	TTIUSLW	2	binary	Number of buffers reserved on the free queue (less than this number results in a system-wide LWAIT).
34	22	TTIUSSL	2		Reserved.
36	24	TTITSBS	1	binary	Size of one terminal status block (TSB).
37	25	TTIUSCH	21		Reserved.

Record type 32 (X'20') — TSO/E User Work Accounting

Record type 32 is written at normal or abnormal termination of a TSO/E session. It is written at the expiration of a TSO/E accounting interval. For more information on using this information see "Transaction billing" on page 6 and "DETAIL or NODETAIL — Performing TSO/E command accounting" on page 64.

To use the type 32 record, you must have installed MVS TSO/E. Type 32 records are produced for TSO/E sessions only, TSO/E commands entered from batch jobs are not counted. You can monitor the TSO/E commands users issue and record the number of times a user issues a specific command or subcommand. For example, you can:

- Keep track of and compare how frequently certain commands at your installation are used. You may want to provide better performance for the more commonly used commands by placing them in LPALIB.
- Keep track of the number of times users issue TSO/E commands so you can bill users for their computer use.
- Audit the commands users issue to ensure they do not violate security practices at your installation.

The record contains the names of the commands and the number of times each command was used during the session and the device connect times for each command. Only those commands included in CSECT IEEMB846 (and entered at least once) are used. Aliases of commands are counted in separate entries in the record. For instance SEND and SE are counted as separate commands. Statistics for all other commands is included in '***OTHER'. Incorrect or unknown commands appear under 'EXEC'.

The subtype is indicated in the SMF32TYP field. For information on subtype selectivity see "SYS and SUBSYS with TYPE and NOTYPE — Selecting subtypes for SMF recording" on page 59.

- Subtypes 1 and 3 contain data on TSO/E activity since the start of the session or since the last interval record was produced.
- Subtypes 2 and 4 contain data on the cumulative TSO/E activity for the entire session. If there is no activity during an interval, no interval record is produced.

If DETAIL is specified in SMFPRM*xx*, the resource data found under logon represents the resources used from the start of the session to the time when the first command is obtained.

The length of the record is variable.

Record environment

The following conditions exist for the generation of each of the subtypes of this record:

Macro
SMFEWTM, BRANCH=YES (record exit: IEFU84)

Record mapping

Header/Self-defining Section

This section contains the common SMF record headers fields and the triplet fields (offset/length/number), if applicable, that locate the other sections on the record.

Offsets		Name	Length	Format	Description
0	0	SMF32LEN	2	binary	Record length. This field and the next field (total of four bytes) form the RDW (record descriptor word). See "Standard and Extended SMF record headers" on page 162 for a detailed description.
2	2	SMF32SEG	2	binary	Segment descriptor (see record length field).

Offsets		Name	Length	Format	Description
4	4	SMF32FLG	1	binary	System indicator **Bit** **Meaning when set** **0** Subsystem name follows system identification **1** Subtypes used **2** Reserved **3-6** Version indicators* **7** Reserved. *See "Standard and Extended SMF record headers" on page 162 for a detailed description.
5	5	SMF32RTY	1		Record type 32 (X'20').
6	6	SMF32TME	4	binary	Time since midnight, in hundredths of a second, that the record was moved into the SMF buffer.
10	A	SMF32DTE	4	packed	Date when the record was moved into the SMF buffer, in the form 0*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for a detailed description.
14	E	SMF32SID	4		System identification (from the SID parameter).
18	12	SMF32WID	4	EBCDIC	Subsystem identifier.
22	16	SMF32STP	2	binary	Record subtype.
24	18	SMF32POF	4	binary	Offset to product section from start of record, including the record descriptor word (RDW).
28	1C	SMF32PLN	2	binary	Length of product section.
30	1E	SMF32PON	2	binary	Number of product sections.
32	20	SMF32IOF	4	binary	Offset to the identification section from start of record, including the record descriptor word (RDW).
36	24	SMF32ILN	2	binary	Length of the identification section.
38	26	SMF32ION	2	binary	Number of identification sections.
40	28	SMF32COF	4	binary	Offset to the TSO/E command section from start of record, including the record descriptor word (RDW).
44	2C	SMF32CLN	2	binary	Length of the TSO/E command section.
46	2E	SMF32CON	2	binary	Number of TSO/E command sections.

Product Section

Offsets		Name	Length	Format	Description
0	0	SMF32TYP	2	binary	Subtype identification for the record: • 1 — TSO/E user interval record • 2 — TSO/E user session end record • 3 — TSO/E user interval record (with detail) • 4 — TSO/E user session end record (with detail).
2	2	SMF32RVN	2	EBCDIC	Record version number.
4	4	SMF32PNM	8	EBCDIC	Product name.
12	C	SMF32OSL	8	EBCDIC	MVS product name.
20	14	SMF32SYN	8	EBCDIC	System name (from the SYSNAME parameter in the IEASYSxx parmlib member).

Offsets		Name	Length	Format	Description
28	1C	SMF32SYP	8	EBCDIC	Sysplex name (from the SYSPLEX parameter in the COUPLExx parmlib member).

Identification Section

Offsets		Name	Length	Format	Description
0	0	SMF32JBN	8	EBCDIC	TSO user id session name.
8	8	SMF32PGM	8	EBCDIC	Program Name.
16	10	SMF32STM	8	EBCDIC	Step name.
24	18	SMF32UIF	8	EBCDIC	User-defined identification field (taken from common exit parameter area, not from USER=parameter on job statement).
32	20	SMF32JNM	8	EBCDIC	JES job number.
40	28	SMF32STN	2	binary	Step number.
42	2A		2		Reserved.
44	2C	SMF32PGN	2	binary	Reserved.
46	2E	SMF32JPT	2	binary	JES input priority at initiation.
48	30	SMF32AST	4	binary	Device allocation start time from midnight, in hundredths of seconds.
52	34	SMF32PPS	4	binary	Problem program start time from midnight, in hundredths of a second.
56	38	SMF32SIT	4	binary	Step initiation time from midnight, in hundredths of a second.
60	3C	SMF32STD	4	packed	Step initiation date, in the form 0*cyydddF*. See “Standard and Extended SMF record headers” on page 162 for a detailed description.
64	40	SMF32RST	4	binary	Reader start time from midnight, in hundredths of second.
68	44	SMF32RSD	4	packed	Reader start date, in the form 0*cyydddF*. See “Standard and Extended SMF record headers” on page 162 for a detailed description.
72	48	SMF32RET	4	binary	Time from midnight, in hundredths of a second, that the reader recognized the end of the job or started task. For TSO/E, this is the logon enqueue time.
76	4C	SMF32RED	4	packed	Date when the reader recognized the end of the batch job or started task, in the form 0*cyydddF*. See “Standard and Extended SMF record headers” on page 162 for a detailed description. For TSO/E, it is the logon enqueue date.
80	50	SMF32USR	20	EBCDIC	Programmer name.
100	64	SMF32GRP	8	EBCDIC	RACF group ID.
108	6C	SMF32RUD	8	EBCDIC	RACF user ID.
116	74	SMF32TID	8	EBCDIC	RACF terminal ID. This field is zero if RACF is not active or if user is not a terminal user.

TSO/E Command Segment (subtypes 1 and 2)

This section contains subtypes 1 and 2.

Offsets		Name	Length	Format	Description
0	0	SMF32CMD	8	EBCDIC	TSO/E command name. See “DETAIL or NODETAIL — Performing TSO/E command accounting” on page 64 for additional information.
8	8	SMF32CNT	4	binary	Number of TSO/E commands.

TSO/E Command Segment (subtypes 3 and 4)

This section contains subtypes 3 and 4.

Offsets		Name	Length	Format	Description
0	0	SMF32CMD	8	EBCDIC	TSO/E command name. See "DETAIL or NODETAIL — Performing TSO/E command accounting" on page 64 for additional information.
8	8	SMF32CNT	4	binary	Number of times the TSO/E command was entered.
12	C	SMF32TCB	4	binary	Total task control block (TCB) time, in hundredths of a second, for the command.
16	10	SMF32SRB	4	binary	Total service request block (SRB) time, in hundredths of a second, for the command.
20	14	SMF32TGT	4	binary	Total TGET (terminal read) count for the command.
24	18	SMF32TPT	4	binary	Total TPUT (terminal output) count for the command.
28	1C	SMF32TRN	4	binary	Total transaction count for the command. **Note:** See the *z/OS MVS Initialization and Tuning Guide* for a definition of this field.
32	20	SMF32EXP	4	binary	Total execute channel program (EXCP) count for the command. (Valid up to X'FFFFFFFE', zero and invalid when SMF32EXF is set)
36	24	SMF32TCT	4	binary	Total device connect time (in 128 micro-second units) for this command.
40	28	SMF32FLG SMF32TCF SMF32EXF	4	binary	Detail section flags **Bit** **Meaning when set** **0** Count in SMF32TRN is not valid. **1** Count in SMF32EXP is not valid.
44	2C		4		Reserved
48	30	SMF32EXX	8	binary	EXCPs for command. This is the 8-byte equivalent of SMF32EXP. This field remains valid after SMF32EXP is invalid.

Record type 33 (X'21') — APPC/MVS TP Accounting

When APPC/MVS inbound conversations create work scheduled by the APPC/MVS transaction scheduler, SMF writes a type 33 subtype 1 record. When an APPC/MVS inbound or outbound conversation is deallocated, SMF writes a type 33 subtype 2 record. See Chapter 7, "APPC/MVS accounting," on page 101 for more detailed information about APPC/MVS accounting.

The subtype is indicated in the SMF33TYP field. For information on subtype selectivity, see "SYS and SUBSYS with TYPE and NOTYPE — Selecting subtypes for SMF recording" on page 59.

Record environment

The following conditions exist for the generation of each of the subtypes of this record:

Macro

Subtype
Macro

1
SMFEWTM,BRANCH=YES (record exit: IEFU84)

2
SMFEWTM,BRANCH=YES,MODE=XMEM (record exit: IEFU85)

Record mapping

Header/Self-defining Section

This section contains the common SMF record headers fields and the triplet fields (offset/length/number), if applicable, that locate the other sections on the record.

Offsets		Name	Length	Format	Description
0	0	SMF33LEN	2	binary	Record length. This field and the next field (total of four bytes) form the RDW (record descriptor word). See “Standard and Extended SMF record headers” on page 162 for a detailed description.
2	2	SMF33SEG	2	binary	Segment descriptor (see record length field).
4	4	SMF33FLG	1	binary	System indicator: **Bit** **Meaning when set** **0** Subsystem name follows standard header **1** Subtypes used **2** Reserved **3-6** Version indicators* **7** Reserved. *See “Standard and Extended SMF record headers” on page 162 for a detailed description.
5	5	SMF33RTY	1	binary	Record type 33 (X'21')
6	6	SMF33TME	4	packed	Time since midnight, in hundredths of a second, when the record was moved into the SMF buffer.
10	A	SMF33DTE	4	packed	Date that the record was moved into the SMF buffer, in the form 0*cyydddF*. See “Standard and Extended SMF record headers” on page 162 for a detailed description.
14	E	SMF33SID	4	EBCDIC	System identification (from the SID parameter).
18	12	SMF33WID	4	EBCDIC	Subsystem identifier (ASCH for APPC/MVS-scheduled TPs).
22	16	SMF33STP	2	binary	Record subtype • 1 — APPC/MVS transaction record. • 2 — APPC/MVS conversation record.
Self-Defining Section:					
24	18	SMF33SDL	4	binary	Length of Self-defining Section.
28	1C	SMF33POF	4	binary	Offset to Product section.
32	20	SMF33PLN	2	binary	Length of Product section.
34	22	SMF33PON	2	binary	Number of Product Sections in this record.
36	24	SMF33IOF	4	binary	Offset to TP Identification Section.
40	28	SMF33ILN	2	binary	Length of TP Identification Section.
42	2A	SMF33ION	2	binary	Number of TP Identification Sections in this record.
44	2C	SMF33UOF	4	binary	Offset to TP Usage Section.
48	30	SMF33ULN	2	binary	Length of TP Usage Section.
50	32	SMF33UON	2	binary	Number of TP Usage Sections in this record.

Offsets		Name	Length	Format	Description
52	34	SMF33SOF	4	binary	Offset to Address Space ID Section.
56	38	SMF33SLN	2	binary	Length of Address Space ID Section.
58	3A	SMF33SON	2	binary	Number of Address Space ID Sections in this record.
60	3C	SMF33COF	4	binary	Offset to Conversation ID Section.
64	40	SMF33CLN	2	binary	Length of Conversation ID Section.
66	42	SMF33CON	2	binary	Number of Conversation ID Sections in this record.
68	44	SMF33FOF	4	binary	Offset to User Data Field Section.
72	48	SMF33FLN	2	binary	Length of User Data Field Section.
74	8A	SMF33FON	2	binary	Number of User Data Field Sections in this record.

Product Section

This section contains the product that generated the record.

Offsets		Name	Length	Format	Description
0	0	SMF33TYP	2	binary	Record Subtype • 1 — APPC/MVS transaction record. • 2 — APPC/MVS conversation record.
2	2	SMF33RVN	2	EBCDIC	Record version number — 01.
4	4	SMF33PNM	8	EBCDIC	Product name — ASCH for APPC/MVS-scheduled TPs. APPC for APPC/MVS Conversion Records. If you use your own scheduler, you will not have access to IBM's APPC/MVS accounting support.
12	C	SMF33OSL	8	EBCDIC	MVS operating system name.
20	14	SMF33SYN	8	EBCDIC	System name (from the SYSNAME parameter in the IEASYSxx parmlib member).
28	1C	SMF33SYP	8	EBCDIC	Sysplex name (from the SYSPLEX parameter in the COUPLExx parmlib member).

Address space ID section

Offsets		Name	Length	Format	Description
0	0	SMF33JID	8	EBCDIC	Job or session name.
8	8	SMF33RST	4	binary	Time since midnight, in hundredths of a second, reader recognized this job.
12	C	SMF33RSD	4	binary	Date when the reader recognized this job, in the form 0*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for a detailed description.
16	10	SMF33STN	8	EBCDIC	Step name (taken from the name on the EXEC card).

Subtype 1

TP Identification Section

Offsets		Name	Length	Format	Description
0	0	SMF33TPO	4	binary	Offset to TP name section.
4	4	SMF33TPC	8	EBCDIC	TP Class — a general grouping of TPs with related scheduling properties (like the MVS Job Class — CPU Time limit, shift execution requirements, etc).

Offsets		Name	Length	Format	Description
12	C	SMF33TSC	4	binary	APPC/MVS TP schedule type **Value** **Schedule Type** **0** Standard **1** Multi-trans.
16	10	SMF33TPF	8	EBCDIC	TP profile name.

TP Program Name Section

Offsets		Name	Length	Format	Description
0	0	SMF33TPL	2	binary	Length of TP name in SMF33TPN field.
2	2	SMF33TPN	255 (max)	binary	TP name.

TP Usage Section

This section identifies the user requesting the TP being reported on. This section contains the general user identification information.

Offsets		Name	Length	Format	Description
0	0	SMF33UID	8	EBCDIC	RACF user ID (of the requesting user).
8	8	SMF33GRP	8	EBCDIC	RACF group ID (of the requesting user).
16	10	SMF33UST	4	binary	Type of user **Value** **User** **0** Standard **1** Multi-trans shell.
20	14	SMF33AOF	4	binary	Offset to Accounting Section.
24	18	SMF33ALN	2	binary	Length of Accounting Section.
26	1A	SMF33AON	2	binary	Number of Accounting Sections in this record.
28	1C	SMF33UCT	4	binary	Count of uses of this TP (by this user).
32	20	SMF33TDO	4	binary	Offset to TP Usage Detail Section.
36	24	SMF33TDL	2	binary	Length of TP Usage Detail Section.
38	26	SMF33TDN	2	binary	Number of TP Usage Detail Sections.

TP Usage Accounting Section

This section identifies the variable length accounting information for the user requesting the TP being reported on.

Offsets		Name	Length	Format	Description
0	0	SMF33ACL	1	binary	First accounting sub-field length (this field is set to zero for no accounting data).
1	1	SMF33ACT	175 (max)	EBCDIC	Accounting sub-fields.

TP Usage Detail Section

This section identifies detailed information about the specific execution of TP that is being reported on:

Offsets		Name	Length	Format	Description
0	0	SMF33TSO	4	binary	Offset to TP Usage Scheduler Section.
4	4	SMF33TSL	2	binary	Length of TP Usage Scheduler Section.
6	6	SMF33TSN	2	binary	Number of TP Usage Scheduler Sections.
8	8	SMF33CN	4	binary	Total number of conversations for this request.
12	C	SMF33CNA	4	binary	Total number of conversations allocated by this request.
16	10	SMF33SEN	4	binary	Total number of sends issued by this request.
20	14	SMF33DAS	8	long floating point hex	Total number of bytes sent by this request.
28	1C	SMF33REC	4	binary	Total number of receives issued by this request.
32	20	SMF33DAR	8	long floating point hex	Total number of bytes received by this request.
40	28	SMF33TCB	4	binary	Task control block (TCB) time for this request, in hundredths of a second.
44	2C	SMF33SRB	4	binary	Service request block (SRB) time for this request, in hundredths of a second.
48	30	SMF33EXP	4	binary	Execute channel programs (EXCP) for this request. Valid up to X'FFFFFFFE', zero and invalid when SMF33EXF is set.
52	34	SMF33DCT	4	binary	Total accumulated device connect time for the address during the life of the transaction. The field reported (in 128 micro-second units) of I/O activity in the address space by some chargeback schemes. See SMF30TCN in the 'I/O Activity' section of SMF type 30 record.
56	38	SMF33DSF SFM33EXF	1	binary	Detail section flags **Bit** **Meaning when set** **0** Count in SMF32EXP is not valid.
57	39		7		Reserved
64	40	SMF33EXF	8	binary	EXCPs for this request. This is the 8-byte equivalent of SMF33EXP. This field remains valid after SMF33EXP is invalid.

TP Usage Scheduler Section

This section identifies scheduler data about the specific execution of TP that is being reported on. This section does not appear for a multi-trans shell.

Offsets		Name	Length	Format	Description
0	0	SMF33LLU	17	EBCDIC	Local logical unit (LU) name for the TP.
17	11	SMF33PLU	17	EBCDIC	Partner logical unit (LU) name for this user's use of this TP (format = node.LUname).
34	22	SMF33RV2	2		Reserved.
36	24	SMF33FMT	4	binary	Time since midnight, in hundredths of a second, request recognized by functional manager header (FMH) 5.
40	28	SMF33FMD	4	packed	Date request recognized by functional manager header (FMH) 5, in the form 0*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for a detailed description.

Offsets		Name	Length	Format	Description
44	2C	SMF33TQT	4	binary	Time since midnight, in hundredths of a second, that the request was placed on scheduler work queue.
48	30	SMF33TQD	4	packed	Date that the request was placed on scheduler work queue, in the form 0*cyydddF*. See “Standard and Extended SMF record headers” on page 162 for a detailed description.
52	34	SMF33TST	4	binary	Time since midnight, in hundredths of a second, that the request started execution.
56	38	SMF33TSD	4	packed	Date that the request started execution, in the form 0*cyydddF*. See “Standard and Extended SMF record headers” on page 162 for a detailed description.
60	3C	SMF33TET	4	binary	Time since midnight, in hundredths of a second, that the request ended execution.
64	40	SMF33TED	4	packed	Date that the request ended execution, in the form 0*cyydddF*. See “Standard and Extended SMF record headers” on page 162 for a detailed description.

Subtype 2

Conversation ID section

Offsets		Name	Length	Format	Description
0	0	SMF33CID	8	binary	The conversation ID. This ID uniquely identifies a particular conversation.
8	8	SMF33CCO	8	binary	The conversation correlator. This field contains zeroes when there is no conversation correlator.
16	10	SMF33CLO	4	binary	Offset to the logical unit of work ID (LUWID) section.
20	14	SMF33CIO	1	binary	Conversation inbound / outbound indicator. Possible values are: **0** When conversation is outbound **1** When conversation is inbound.
21	15	SMF33CLR	1	binary	Conversation partner LU location. Possible values are: **0** When partner LU is local **1** When partner LU is remote.
22	16	SMF33CKD	1	binary	Conversation kind. For inbound conversations, this field indicates whether this conversation was processed by an APPC/MVS transaction scheduler or an APPC/MVS server. Possible values are: **0** Transaction scheduler **1** APPC/MVS server For outbound conversations, this field is always set to zero.

Offsets		Name	Length	Format	Description
23	17	SMF33CSL	1		Sync level of the conversation. Possible values are: **0** None - Specifies that the programs will not perform confirmation processing on this conversation. The programs will not call any services and will not recognize any returned parameters relating to confirmation. **1** Confirm - Specifies that the programs can perform confirmation processing on this conversation. The programs can call services and will recognize returned parameters relating to confirmation. **2** Syncpt - Specifies that the programs can perform sync point processing on this conversation. The programs can call services and will recognize returned parameters relating to sync point processing.
24	18	SMF33CLL	17	EBCDIC	Conversation local LU name (not fully qualified).
41	29	SMF33CPL	17	EBCDIC	Conversation partner LU name (fully qualified).
58	3A	SMF33RS2	2		Reserved.
60	3C	SMF33CSH	8	EBCDIC	Conversation scheduler name (for example, 'ASCH'). When there is no scheduler for this conversation (because an APPC/MVS server is processing the conversation), this field contains blanks.
68	44	SMF33CPO	4	binary	Offset (from beginning of record) to Partner TP Name Section.
72	48	SMF33CTO	4	binary	Offset (from beginning of record) to Local TP Name Section.
76	4C	SMF33RS1	10	EBCDIC	Reserved.
86	56	SMF33CPU	10	EBCDIC	Partner user ID.
96	60	SMF33CRT	8	binary	Date/Time (in STCK format) allocate request was received for the conversation. The field is zero for outbound requests.
104	68	SMF33CQT	8	binary	Date/Time (in STCK format) conversation was put on allocate queue. The field is zero for outbound requests and for scheduled inbound requests.
112	6C	SMF33CST	8	binary	Inbound Requests: Date/Time (in STCK format) when the conversation was associated with a new address space for processing. If an APPC/MVS server processed this conversation, this field shows the time when the server received the conversation through the Receive_Allocate service. Outbound Requests: Date/Time (in STCK format) when the local program called the Allocate service.
120	78	SMF33CET	8	binary	Date/time (in STCK format) when the conversation was deallocated.
128	80	SMF33CMN	8	EBCDIC	Mode name of the conversation.
136	88	SMF33CSN	4	binary	Number of Send calls issued during the conversation.
140	88	SMF33CDS	8	long floating point hex	Amount of data (in bytes) sent through the conversation.
148	90	SMF33CRE	4	binary	Number of Receive calls issued during the conversation.
152	98	SMF33CDR	8	long floating point hex	Amount of data (in bytes) received during the conversation.
160	A0	SMF33CVB	4	binary	Number of callable service requests issued during the conversation.
164	A4	SMF33CRC	4	binary	Return code from the last callable service on this conversation (Possible return codes are documented in the APPC/MVS publications.)

Offsets		Name	Length	Format	Description
168	A8	SMF33CRS	4	binary	Last reason code from a callable service in this conversation (Possible reason codes are documented in the APPC/MVS publications.)
172	AC	SMF33CSA	4	binary	Conversation state. Possible values are: **1** Reset **2** Initialize **3** Send **4** Receive **5** Send pending **6** Confirm **7** Confirm send **8** Confirm deallocate
176	B0	SMF33CSS	8	binary	Date/Time (in STCK format) when the last APPC/MVS callable service was requested during the conversation.
184	B8	SMF33CSE	8	binary	Date/Time (in STCK format) when the last APPC/MVS callable service completed during the conversation.

Partner TP Program Name Section

Offsets		Name	Length	Format	Description
0	0	SMF33TPL	2	binary	Length of the partner TP name field (SMF33TPN).
2	2	SMF33TPN	64 (max)	binary	Partner transaction program name. If this conversation is inbound, this field contains the name of the program that initiated the conversation (through the Allocate service). If this conversation is outbound, this field contains the name of the program that was attached on this LU as a result of an Allocate call.

Local TP Program Name Section

Offsets		Name	Length	Format	Description
0	0	SMF33TPL	2	binary	Length of the local TP name field (SMF33TPN).
2	2	SMF33TPN	64 (max)	binary	Local transaction program name. If this conversation is inbound, this field contains the name of the program that was attached on this LU in response to an Allocate call. If this conversation is outbound, this field contains the name of the program that initiated the conversation (that is, issued the Allocate call).

Logical Unit of Work ID (LUWID) Section

Offsets		Name	Length	Format	Description
0	0	SMF33LUL	2	binary	Length of logical unit of work ID (SMF33LUW).
2	2	SMF33LUW	26 (max)	binary	Logical unit of work ID (LUW_ID).

User Data Field Section

Offsets		Name	Length	Format	Description
0	0	SMF33UDL	2	binary	Length of data in user data field (SMF33UDF).
2	2	SMF33UDF	255 (max)	binary	User data field. This is user-defined data that one of the partner programs wrote to this record, through the Set_Conversation_Accounting_Information service.

Record type 34 (X'22') — TS-Step termination

Reference information:

For more information on service, transaction active time, and performance group number, see *z/OS MVS Initialization and Tuning Guide*.

Record type 34 is written when the TSO/E logoff function processes a job step termination.

Note: IBM recommends that you use record type 30 rather than record types 4, 5, 20, 34, 35, and 40. Use of this record may cause missing key workload indicators.

This record identifies the job by job name, logon time and date, user identification, program name, and performance group number. If accounting numbers (which can be alphameric) were specified on the EXEC card, they are included.

This record contains operating information such as:

- Initiator start time
- Number of TPUTs issued
- Number of TGETs satisfied
- Termination status
- Device allocation start time
- Problem program start time
- Step CPU time
- Step service
- Storage protect key
- Number of page-ins
- Number of page-outs
- Number of swap-ins
- Number of swap-outs (for both VIO and non-VIO data sets).

Record type 34 has an entry for each non-spooled data set that was defined by a DD statement. Each entry lists the device class, unit type, device number, and execute channel program (EXCP) count for the data set.

Note:

1. Data sets are recorded in order of the step DD statements; they are not identified by name. (An installation-written IEFUJV exit routine can record this order as each statement is validated.)
2. For data sets that are dynamically unallocated, the data set entry information is in record type 40 — not in record type 34.
3. For more information on EXCP count and CPU time, see Chapter 10, “EXCP count,” on page 119 and Chapter 11, “CPU time,” on page 121 respectively.

Record environment

The following conditions exist for the generation of this record:

Macro
SMFEWTM(1), BRANCH=YES (record exit: IEFU84)

Record mapping

Header/Self-defining Section

This section contains the common SMF record header fields and the triplet fields (offset/length/number), if applicable, that locate the other sections on the record.

Offsets		Name	Length	Format	Description
0	0	TIVRLEN	2	binary	Record length. This field and the next field (total of four bytes) form the RDW (record descriptor word). See “Standard and Extended SMF record headers” on page 162 for a detailed description.
2	2	TIVRSEG	2	binary	Segment descriptor (see record length field).
4	4	TIVRFLG	1	binary	System indicator: **Bit** **Meaning when set** **0-2** Reserved **3-6** Version indicators* **7** Reserved. *See “Standard and Extended SMF record headers” on page 162 for a detailed description.
5	5	TIVRCDTY	1	binary	Record type 34 (X'22').
6	6	TIVRCDTS	4	binary	Time since midnight, in hundredths of a second, that the record is passed to the SMF writer. This is the time the step ended.
10	A	TIVRCDTE	4	packed	Date when the record was moved into the SMF buffer, in the form 0*cyydddF*. See “Standard and Extended SMF record headers” on page 162 for a detailed description. This is the date the step ended.
14	E	TIVCPUID	4	EBCDIC	System identification (from the SID parameter).
18	12	TIVUIF	8	EBCDIC	Job name.
26	1A	TIVONTME	4	binary	Logon time, in hundredths of a second.
30	1E	TIVONDTE	4	packed	Logon date, in the form 0*cyydddF*. See “Standard and Extended SMF record headers” on page 162 for a detailed description.
34	22	TIVUDATA	8	EBCDIC	User-defined identification field (taken from common exit parameter area, not from USER=parameter on job statement).
42	2A	TIVINVSQ	1	binary	Step number (this field always equals 1).
43	2B	TIVSIT	4	binary	Time since midnight, in hundredths of a second, that the initiator selected this step.
47	2F	TIVOUTCT	4	binary	Number of lines of terminal output, that is, number of TPUTs issued.
51	33	TIVINCT	4	binary	Number of lines of terminal input, that is, number of TGETs satisfied.

Offsets		Name	Length	Format	Description
55	37	TIVSTAT	2	binary	Step completion code: X'0ccc' indicates system ABEND where *ccc* is the system ABEND code. (See *z/OS MVS System Codes*.) X'8ccc' indicates user ABEND where *ccc* is the user ABEND code. X'nnn' indicates normal completion where *nnn* is the contents of the two low-order bytes in register 15 at end. X'000' indicates either: (1) the job step was flushed (not processed) because of an error during allocation, or (2) normal job completion with a return code of 0. Use this field in conjunction with the step-termination indicator field (offset 87).
57	39	TIVPRI	1	binary	Address space dispatching priority (taken from DPTRTY=parameter on the EXEC card or the default APG value).
58	3A	TIVPRGNM	8	EBCDIC	Program name (taken from PGM=parameter on EXEC card). If a backward reference was used, then this field contains *.DD.
66	42	TIVINVNM	8	EBCDIC	Step name (taken from name on EXEC card).
74	4A	TIVRSV5	2		Reserved. Note that TIVEFRGN, formerly a two-byte field at this offset, has been increased to four bytes and moved to offset 82.
76	4C	TIVSYST	2	binary	Largest amount of storage used from top of private area, in 1K units. This storage area includes the local system queue area (LSQA) and SWA (subpools 229, 230, 236, 237, 249, and 253-255). If ADDRSPC=REAL is specified, this field equals the amount of storage used that was *not* from this contiguous real storage reserved for the program. See offsets 82 and 102.
78	4E	TIVMCRE	2	binary	Largest amount of storage used from bottom of private area, in 1K units. This storage area includes sub-pool 0-127, 129-132, 244, 251 and 252. If ADDRSPC=REAL is specified, this field equals the amount of contiguous real storage that was used. See offsets 82 and 102. If storage was not allocated (job step was flushed), these fields equal zero.
80	50	TIVRVC	2		Reserved.
82	52	TIVEFRGN	4	binary	Region size established, in 1K units taken from the REGION=parameter in the JCL, and rounded up to a four K boundary. If ADDRSPC=REAL is specified, this field equals the amount of contiguous real storage reserved for the program. If the region requested was greater than 16 megabytes, the region established resides above 16 megabytes, and this field will contain a minimum value of 32 megabytes.
86	56	TIVSPK	1	binary	Storage protect key, in the form *xxxx*0000 where *xxxx* is the key.

Offsets		Name	Length	Format	Description
87	57	TIVSTI	1	binary	Step termination indicator **Bit** **Meaning when set** **0** Reserved. **1** Canceled by exit IEFUJV. **2** Canceled by exit IEFUJI. Job steps canceled by IEFUJI and IEFUSI will not be processed; therefore bit 7 will be on. **3** Canceled by exit IEFUSI Job steps canceled by IEFUJI and IEFUSI will not be processed; therefore bit 7 will be on. **4** Reserved **5** Step is to be restarted. **6** If zero, then normal completion. If 1, then and abnormal end of task (abend) will occur. If step completion code (offset 55) equals 0322 or 0522, IEFUTL caused the abend. If step completion code equals 0722, IEFUSO caused the abend. **7** If zero, then normal completion. If 1, step was flushed.
88	58	TIVRV1	2		Reserved.
90	5A	TIVAST	4	binary	Device allocation start time, in hundredths of a second.
94	5E	TIVPPST	4	binary	Problem program start time, in hundredths of a second.
98	62	TIVRV2	1		Reserved.
99	63	TIVSRBT	3	binary	Step CPU time under SRBs, in hundredths of a second. This field includes the CPU time for various supervisory routines that are dispatched from SRBs: locking routines, page resolution, swap control, cross-memory communications (WAIT, POST, I/O POST), and TQE scheduling. CPU time is not expected to be constant between different runs of the same job step. (See Chapter 11, “CPU time,” on page 121.)

Offsets		Name	Length	Format	Description
102	66	TIVRIN	2	binary	Record indicator **Bit** **Meaning when set** **0-3** Reserved. **4** Field TIVCPUTM is not valid. An overflow condition is when the length of the value for the step CPU time under TCBs is greater than 3 bytes. This condition is not recorded in the type 34 record (TIVCPUTM). The time is available in the type 30 record (SMF30CPT). If your installation uses an accounting program that does not use the type 30 record to gather step CPU time, you must update that program. Only the type 30 record should be considered valid. **5** Device data not recorded. When there are more than 1635 DD statements, device data is not collected for the type 34 record. The data is available in the type 30 record. **6** EXCP count may be wrong. For more information on EXCP count, see Chapter 10, “EXCP count,” on page 119. **7** If zero, storage is virtual (if 1, storage is real). **8-15** Reserved.
104	68	TIVRLCT	2	binary	Offset from the beginning of the record header to relocate section.
106	6A	TIVVAR	2	binary	Length of execute channel program (EXCP) count fields.

Execute Channel Program (EXCP) Section

For each device assigned to each *non-spooled* data set, there is an eight-byte entry with the following format:

Offsets		Name	Length	Format	Description
0	0	TIVEXCP	8	Structure	Data set access information. **Note:** Virtual I/O devices are identified by the following: **Device Class** 0 **Unit Type** 0 **Device Number** X'7FFF' It is important to understand the following: Allocation messages for VIO data sets will show VIO ALLOCATED TO ddname. SMF records will show VIO unit addresses as X'7FFF'. The actual in-storage UCB built for VIO will show address X'3FFF'. For example, the messages: • IEF237I X'3FFF' ALLOCATED TO ddname • IEF237I X'7FFF' ALLOCATED TO ddname indicate that ddname is not allocated to a Virtual I/O device, but is instead allocated to a real device whose unit address is X'3FFF' or X'7FFF' respectively.

Offsets		Name	Length	Format	Description
0	0	TIVDEVC	1	binary	Device class.
1	1	TIVUTYP	1	binary	Unit type.
2	2	TIVCUAD	2	binary	Device number.
4	4	TIVNEXCP	4	binary	Execute channel program (EXCP) count. See offset 102 — TIVRIN.

Accounting section

Offsets		Name	Length	Format	Description
0	0	TIVVARA	1	binary	Length of accounting section (excluding this field).
1	1	TIVCPUTM	3		Step CPU time under task control blocks (TCB), in hundredths of a second. This field includes the CPU time for all tasks that are dispatched from TCBs below the level of RCT. CPU time is not expected to be constant between different runs of the same job step. (See Chapter 11, “CPU time,” on page 121.)
4	4	TIVNBRAC	1	binary	Number of accounting fields.
5	5	TIVACFLD	*variable*	EBCDIC	Accounting fields. Each entry for an accounting field contains the length of the field (one byte, binary) followed by the field (EBCDIC). A zero indicates an omitted field.

Relocate Section

Offsets		Name	Length	Format	Description
0	0	TIVPGIN	4	binary	Number of non-VIO (virtual input/output) page-ins for this step. This field includes page-ins required through page faults, specific page requests, and page fixes. It does not include page reclaims, page-ins for VIO data sets, and page-ins for the common area.
4	4	TIVPGOUT	4	binary	Number of non-VIO (virtual input/output) page-outs for this step. This field includes page-outs required through specific page requests including those pages “stolen” by the paging supervisor through infrequent use. It does not include page-outs for VIO data sets, and page-outs for the common area.
8	8	TIVRGNS	4	binary	Number of address space swap sequences. A swap sequence consists of a swap-out and swap-in of an address space.
12	C	TIVSIN	4	binary	Number of pages swapped in. This field includes: local system queue area (LSQA), fixed pages, and those pages that the real storage manager determined to be active when the address space was swapped out. It does not include page reclaims nor pages found in storage during the swap-in process (such as pages brought in from SRBs started after completion of swap-in Stage 1 processing).
16	10	TIVSOUT	4	binary	Number of pages swapped out. This field includes: local system queue area (LSQA), private area fixed pages, and private area non-fixed changed pages.
20	14	TIVVPI	4	binary	Number of virtual input/output (VIO) page-ins for this step. This field includes page-ins resulting from page faults or specific page requests on a VIO window. It does not include VIO swap-ins or page-ins for the common area.
24	18	TIVVPO	4	binary	Number of virtual input/output (VIO) page-outs for this step. This field includes page-outs resulting from specific page requests on a VIO window, and includes those pages “stolen” by the paging supervisor through infrequent use. It does not include VIO swap-outs or page-outs for the common area.

Offsets		Name	Length	Format	Description
28	1C	TIVSST	4	binary	Step service, in service units. This field is calculated as total job service minus the accumulated job service before this step's initialization.
32	20	TIVACT (TIVTAT)	4	binary	Step transaction active time, in 1024-microsecond units. Calculated as total job transaction active time minus the accumulated transaction active time before this step's initialization.
36	24	TIVPGNO	2	binary	Beginning with z/OS V1R3, this field is always zero.
38	26	TIVTRANT	4	binary	Step transaction residency time, in 1024-microsecond units. That is the amount of time the transaction was in real storage.
42	2A	TIVCPM	4	binary	Number of attempts to read data from an ESO hiperspace that were not satisfied because the data has been deleted.
46	2E	TIVRCLAM	4	binary	Number of virtual input/output (VIO) reclaims for this step.
50	32	TIVCPGIN	4	binary	Number of common area page-ins for this step (link pack area (LPA) + CSA).
54	36	TIVHSPI	4	binary	Number of hiperspace page-ins from auxiliary to processor storage.
58	3A	TIVPGSTL	4	binary	Number of pages “stolen” from the storage for this step.
62	3E	TIVPGSEC	8	binary	Number of page seconds for this step, in page millisecond units. Calculated as: the number of pages used by this step times the processing time it held that number of pages.
70	46	TIVLPAI	4	binary	Number of link pack area (LPA) page-ins for the step.
74	4A	TIVHSPO	4	binary	Number of hiperspace page-outs from processor to auxiliary storage.
78	4E	TIVCPUS	4	binary	Step CPU service, in service units.
82	52	TIVIOCS	4	binary	Step I/O service, in service units.
86	56	TIVMSOS	4	binary	Step main storage service, in service units.
90	5A	TIVSRBS	4	binary	Step SRB service, in service units.
94	5E	TIVTSN	8	EBCDIC	Terminal symbolic name.

Record type 35 (X'23') — LOGOFF

Reference information:

For information on service, transaction active time and performance group number, see *z/OS MVS Initialization and Tuning Guide*.

For information on ABEND codes, see *z/OS MVS System Codes*.

Record type 35 is written when a TSO logoff process is completed.

Note: IBM recommends that you use record type 30 rather than record types 4, 5, 20, 34, 35, and 40. Use of this record may cause missing key workload indicators.

This record identifies the job by job name, logoff time and date, logon time and date, user identification, and performance group number. If accounting numbers (which can be alphameric) were specified on the JOB card, they are included.

This record contains operating information such as number of TPUTs issued, number of TGETs satisfied, termination status, storage protect key, job service, transaction active time, number of transactions, and job CPU time. For more information on CPU time, see Chapter 11, “CPU time,” on page 121.

Note: If the terminal I/O controller (TIOC) does not attempt to send output (for example, a message) to a terminal whose line has been disconnected, it will not detect a line disconnect. To SMF, a terminal session interrupted by a line disconnect is considered to be executing and a type 35 record will not be issued until:

- The disconnect situation is detected, the reconnect time limit expires, and the system cancels the session (with a completion code of 622); or
- The disconnect situation is detected, the user reconnects, and subsequently issues a LOGOFF command.

Record environment

The following conditions exist for the generation of this record:

Macro
SMFEWTM(1), BRANCH=YES (record exit: IEFU84)

Record mapping

Header/Self-defining Section

This section contains the common SMF record headers fields and the triplet fields (offset/length/number), if applicable, that locate the other sections on the record.

Offsets		Name	Length	Format	Description
0	0	TLGRLEN	2	binary	Record length. This field and the next field (total of four bytes) form the RDW (record descriptor word). See "Standard and Extended SMF record headers" on page 162 for a detailed description.
2	2	TLGRSEG	2	binary	Segment descriptor.
4	4	TLGRFLG	1	binary	System indicator: **Bit** **Meaning when set** **0-2** Reserved **3-6** Version indicators* **7** Reserved. *See "Standard and Extended SMF record headers" on page 162 for a detailed description.
5	5	TLGRCDTY	1	binary	Record type 35 (X'23').
6	6	TLGRCDTS	4	binary	Time since midnight, in hundredths of a second, that the record was moved to the SMF writer. This is the logoff time.
10	A	TLGRCDTE	4	packed	Date when the record was moved into the SMF buffer, in the form 0*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for a detailed description. This is the logoff date.
14	E	TLGPUID	4	EBCDIC	System identification (taken from SID parameter).
18	12	TLGUIF	8	EBCDIC	Job name.
26	1A	TLGONTME	4	binary	Logon time, in hundredths of a second.
30	1E	TLGONDTE	4	packed	Logon date, in the form 0*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for a detailed description.
34	22	TLGUDATA	8	EBCDIC	User-defined identification field (taken from common exit parameter area, not from USER=parameter on job statement).
42	2A	TLGSTPCT	1	binary	Number of steps in session. (This field always equals 1.)
43	2B	TLGCRTME	4		Reserved.

Offsets		Name	Length	Format	Description
47	2F	TLGOUTCT	4	binary	Number of lines of terminal output, that is, number of TPUTs issued.
51	33	TLGINCT	4	binary	Number of lines of terminal input, that is, number of TGETs satisfied.
55	37	TLGSTAT	2	binary	Job completion code: X‘0ccc’ indicates system ABEND where ccc is the system (See *z/OS MVS System Codes*.) X‘8ccc’ indicates user ABEND where ccc is the user ABEND code. X‘nnnn’ indicates normal completion where nnnn is the contents of the two low-order bytes in register 15 at termination. X‘0000’ indicates normal job completion with return code of 0. Use this field in conjunction with the job termination indicator field (offset 66).
57	39	TLGPRI	1	binary	Logon priority. This field normally equals the user-assigned priority of 0-13, but if the job fails while being scheduled, this field equals 14 (taken from the PRTY parameter on the JOB card). If no value is specified for the PRTY parameter on the JOB card, this field contains: • For JES3, the default priority specified on the JES3 STANDARDS initialization card • For JES2, a zero JES2 does not use the priority value reported in this field. (The JES2 job selection priority is requested by the JES2 /*PRIORITY control statement.)
58	3A	TLGNQTME	4	binary	Logon enqueue time, in hundredths of a second.
62	3E	TLGNQDTE	4	packed	Logon enqueue date, in the form 0*cyydddF*. See “Standard and Extended SMF record headers” on page 162 for a detailed description.
66	42	TLGTRMI	1	binary	Job termination indicator **Bit** **Meaning when set** **0** Reserved **1** Canceled at exit IEFUJV **2** Canceled at exit IEFUJI **3** Canceled at exit IEFUSI **4-5** Reserved **6** If 0, normal completion. If 1, abnormal termination **7** Reserved
67	43	TLGOUTCL	1		Reserved.
68	44	TLGTRANT	4	binary	Job transaction residency time, in 1024-microsecond units. That is the total amount of time all transactions were in central storage.
72	48	TLGRVC	4		Reserved.
76	4C	TLGSPK	1	binary	Storage protect key, in the form xxxx0000 where xxxx is the key.

Offsets		Name	Length	Format	Description
77	4D	TLGSRBT	3	binary	Job CPU time under SRBs, in hundredths of a second. This field includes the CPU time for various supervisory routines that are dispatched from SRB: locking routines, page resolution, swap control, cross-memory communications (WAIT, POST, I/O POST), and TQE scheduling. CPU time may not be constant between different runs of the same job.
80	50	TLGTJS	4	binary	Job service, in service units.
84	54	TLGTTAT	4	binary	Job transaction active time, in 1024-microsecond units.
88	58	TLGNTSN	4	binary	Number of transactions.
92	5C	TLGPGNO	2	binary	Beginning with z/OS V1R3, this field is always zero.
94	5E	TLGRV2	2		Reserved.
96	60	TLGVAR	1	binary	Length of rest of record, excluding this field.
97	61	TLGRVB	20		Reserved.
117	75	TLGCPUTM	3	binary	Job CPU time under TCBs, in hundredths of a second. This field includes the CPU time for all tasks that are dispatched from TCBs below the level of RCT.
120	78	TLGNBRAC	1	binary	Number of accounting fields.
121	79	TLGACFLD	variable	EBCDIC	Accounting fields. Each entry for an accounting field contains the length of the field (one byte, binary) followed by the field (EBCDIC). A zero indicates an omitted field.

Relocate Section

Offsets		Name	Length	Format	Description
0		TLGCPUS	4	binary	Job CPU service, in service units.
4	4	TLGIOCS	4	binary	Job I/O service, in service units.
8	8	TLGMSOS	4	binary	Job main storage service, in service units.
12	12	TLGSRBS	4	binary	Job SRB service, in service units.
16	10	TLGTSN	8	EBCDIC	Terminal symbolic name.

Record type 36 (X'24') — Integrated Catalog Facility Catalog

Record type 36 is partially built when an integrated catalog facility catalog is exported; it is then compiled and written. The record contains information to identify the catalog being exported, the time of export, and information necessary to allocate the portable data set for subsequent import. It identifies the job-by-job log identification and user identification.

The SMF record is only written upon successful completion of the EXPORT command. The record contains the standard header and is formatted for the product and data sections.

Macro to Symbolically Address Record Type 36: The SMF record mapping macro for record types 36, 60, 61, 65, and 66 is IFASMFI6. The mapping macro, IFASMF16, resides in SYS1.MACLIB.

Record mapping

Header/Self-defining Section

This section contains the common SMF record headers fields and the triplet fields (offset/length/number), if applicable, that locate the other sections on the record.

Offsets		Name	Length	Format	Description
0	0	SMF36LEN	2	binary	Record length. This field and the next field (total of four bytes) form the RDW (record descriptor word). See "Standard and Extended SMF record headers" on page 162 for a detailed description.
2	2	SMF36SEG	2	binary	Segment descriptor (see record length field).
4	4	SMF36SYS	1	binary	System indicator: **Bit** **Meaning when set** **0-2** Reserved **3-6** Version indicators* **7** Reserved. *See "Standard and Extended SMF record headers" on page 162 for a detailed description.
5	5	SMF36RTY	1	binary	Record type 36 (X'24').
6	6	SMF36TME	4	binary	Time since midnight, in hundredths of a second, that the record was moved into the SMF buffer.
10	A	SMF36DTE	4	packed	Date when the record was moved into the SMF buffer, in the form 0*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for a detailed description.
14	E	SMF36CPU	4	EBCDIC	System identification.
18	12	SMF36SBS	4	EBCDIC	Subsystem identification.
22	16	SMF36SUB	2	EBCDIC	Record subtype '00' — Export integrated catalog facility catalog.
24	18	SMF36NOT	2	binary	Number of triplets.
26	1A		2		Reserved.
28	1C	SMF36POF	4	binary	Offset to product section.
32	20	SMF36PLN	2	binary	Length of product section.
34	22	SMF36PNO	2	binary	Number of product sections.
36	24	SMF36DOF	4	binary	Offset to data section.
40	28	SMF36DLN	2	binary	Length of data section.
42	2A	SMF36DNO	2	binary	Number of data sections.

Product Section

Offsets		Name	Length	Format	Description
44	2C	SMF36PVN	2	EBCDIC	Product version.
46	2E	SMF36PNM	8	EBCDIC	Product name.
54	36	SMF36PRL	2	EBCDIC	Record type 36 level.

Data Section

Offsets		Name	Length	Format	Description
56	38	SMF36JNM	8	EBCDIC	Job name.
64	40	SMF36RST	4	binary	Time from midnight, in hundredths of a second, that the reader recognized the JOB card (for this job).

Offsets		Name	Length	Format	Description
68	44	SMF36RDT	4	packed	Date when the reader recognized the JOB card (for this job), in the form 0*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for a detailed description.
72	48	SMF36UID	8	EBCDIC	User-defined identification field (taken from common exit parameter area, not from USER=parameter on job statement).
80	50	SMF36PGM	8	EBCDIC	Program name.
88	58	SMF36CNM	44	EBCDIC	Integrated catalog facility catalog name.
132	84	SMF36CVS	6	EBCDIC	Catalog volume serial, if available.
138	8A	SMF36CDT	4	binary	Catalog UCB device type, if available.
142	8E	SMF36EDT	8	EBCDIC	Date of export (*mm/dd/yy*).
150	96	SMF36ETM	8	EBCDIC	Time of export (*hh*:*mm*:*ss*).
158	9E	SMF36PDS	44	EBCDIC	Portable data set name.
202	CA	SMF36PVS	6	EBCDIC	Portable data set volume.
208	D0	SMF36PDT	4	binary	Portable data set UCB device type (associated with the first/only volume), if available.
212	D4	SMF36EIN	2	EBCDIC	Export Indicator. 'AE' — Aliases were exported. 'NE' — No aliases exported.

Record type 37 (X'25') — NetView Hardware Monitor

Record type 37 is written by NetView whenever the NPDA REPORTS option is invoked and each time a NetView Problem Determination Application (NPDA) input record passes the NPDA recording filters. For more information, see *NetView Administration Reference*.

Record type 38 (X'26') — NetView Health Check and User Authorization Monitor

Record type 38 is written by NetView to record system utilization data for NetView itself and for user authorization checking. Record type 38 contains the following subtype information:

- **Subtype 1** — NetView command authorization table external log record

  The NetView command authorization table external log record (SMF type 38 subtype 1) is generated when auditing the NetView command authorization table. It includes information such as the name of the command authorization table, the time when it was loaded, the name of the NetView domain, the command in question, the user ID whose authority is being checked, etc. Auditing is controlled globally by the CATAUDIT keyword of the NetView DEFAULTS command or specifically by using the AUDIT keyword on the PROTECT and EXEMPT statements in the NetView command authorization table. For more information about the PROTECT and EXEMPT statements, see *IBM Tivoli NetView Security Reference*.

- **Subtype 2** — NetView task resource-utilization-data external log record

  The NetView task resource-utilization-data external log record (SMF type 38 subtype 2) logs data on utilization of system resources by specific NetView tasks. These records contain CPU, storage, message queuing, and DASD I/O utilization statistics. Records are made for logoff, task abend, and NetView ending events, and for interval requests when the LOGTSTAT command is used. Logging is determined by the LOGTSTAT command and the LOGTSTAT option of the DEFAULTS command and the OVERRIDE command. NetView initially starts with a value of YES.

- **Subtype 3** — NetView span authorization table external log record

The NetView span authorization table external log record (SMF type 38 subtype 3) is generated by auditing NetView span of control authorization checking. This record subtype provides information about successful and unsuccessful access attempts for both commands and NMC resources and views. The type of auditing that is performed is controlled by the LOGSPNCF, LOGSPNCP, LOGSPNVF and LOGSPNVP keywords of the DEFAULTS command and can be changed with the OVERRIDE command.

For more information, see *NetView Security Reference* and *NetView Command Reference*.

Record type 39 (X'27') — NetView (NLDM) Response Time

Record type 39 is written by NetView's network logical data manager (NLDM) component. NLDM writes to the external log if the response time data function (RTM) or the network accounting and availability measurement function is active.

The response time data function writes record type 39 when the COLLECT command with the LOG parameter is issued or at session end for an logical unit (LU) attached to a 3274 with the RTM feature.

The network accounting and availability measurement data function writes record type 39 when a session is started, a session ends, or when a RECORD command with the SESSTATS parameter is issued.

For more information, see *NetView Administration Reference*.

Record type 40 (X'28') — Dynamic DD

Tip: IBM suggests that you use record type 30, rather than record types 4, 5, 20, 34, 35, and 40.

Record type 40 is written when an unallocation, concatenation, or deconcatenation request is processed. For an unallocation request, this record contains a device entry only for the data set unallocated. For a concatenation or deconcatenation request, this record contains a device entry for each DD entry.

Record type 40 contains the job log identification, user identification, step number, functional indicator, and device entries. Each device entry consists of the device class, unit type, device number, and execute channel program (EXCP) count for the data set.

For more information on EXCP count and CPU time, see Chapter 10, “EXCP count,” on page 119 and Chapter 11, “CPU time,” on page 121 respectively.

Record environment

The following conditions exist for the generation of this record:

Macro
SMFWTM (record exit: IEFU83)

Mode
Task

Storage Residency
24-bit

Record mapping

Header/Self-defining Section

This section contains the common SMF record headers fields and the triplet fields (offset/length/number), if applicable, that locate the other sections on the record.

Offsets		Name	Length	Format	Description
0	0	TDDRLEN	2	binary	Record length. This field and the next field (total of four bytes) form the RDW (record descriptor word). See “Standard and Extended SMF record headers” on page 162 for a detailed description.

Offsets		Name	Length	Format	Description
2	2	TDDRSEG	2	binary	Segment descriptor (see record length field).
4	4	TDDRFLG	1	binary	System indicator: **Bit** **Meaning when set** **0-2** Reserved **3-6** Version indicators* **7** Reserved. *See “Standard and Extended SMF record headers” on page 162 for a detailed description.
5	5	TDDRCDTY	1	binary	Record type 40 (X'28').
6	6	TDDRCDTS	4	binary	Time since midnight, in hundredths of a second, that the record was moved into the SMF buffer.
10	A	TDDRCDTE	4	packed	Date when the record was moved into the SMF buffer, in the form 0*cyydddF*. See “Standard and Extended SMF record headers” on page 162 for a detailed description.
14	E	TDDCPUID	4	EBCDIC	System identification (from the SID parameter).
18	12	TDDUIF	8	EBCDIC	Job name.
26	1A	TDDONTME	4	binary	Logon time, in hundredths of a second. (If a background job, this field contains the time the reader recognized the JOB card.)
30	1E	TDDONDTE	4	packed	Logon date, in the form 0*cyydddF*. See “Standard and Extended SMF record headers” on page 162 for a detailed description. (If a background job, this field contains the date the reader recognized the JOB card.)
34	22	TDDUDATA	8	EBCDIC	User-defined identification field (taken from common exit parameter area, not from USER=parameter on job statement).
42	2A	TDDINVSQ	1	binary	Step number (first step = 1, etc).
43	2B	TDDFLG	1	binary	Functional indicator **Value** **Meaning** **2** Unallocation **3** Concatenation **4** Deconcatenation.
44	2C	TDDRIN	2	binary	Record indicator **Bit** **Meaning when set** **0-6** Reserved **7** EXCP count may be wrong **8-15** Reserved.
46	2E	TDDRCIND	2	binary	Index of record in sequence of records. **Note:** In releases prior to 4.2.2, this field is zero.
48	30	TDDRCTOT	2	binary	Total number of records in sequence of records. **Note:** In releases prior to 4.2.2, this field is zero.

Offsets		Name	Length	Format	Description
50	32	TDDRVA	14		Reserved.
64	40	TDDVAR	2	binary	Length of device entry portion of this record. Calculated as: (8 times the number of devices) + 2.

Execute Channel Program (EXCP) Section

For each device, there is an eight-byte entry with the following format:

Offsets		Name	Length	Format	Description
0	0	TDDEXCP	8	Structure	Data set access information. **Note:** Virtual I/O devices are identified by the following: **Device Class** 0 **Unit Type** 0 **Device Number** X'7FFF' It is important to understand the following: Allocation messages for VIO data sets will show VIO ALLOCATED TO ddname. SMF records will show VIO unit addresses as X'7FFF'. The actual in-storage UCB built for VIO will show address X'3FFF'. For example, the messages: • IEF237I X'3FFF' ALLOCATED TO ddname • IEF237I X'7FFF' ALLOCATED TO ddname indicate that ddname is not allocated to a Virtual I/O device, but is instead allocated to a real device whose unit address is X'3FFF' or X'7FFF' respectively.
0	0	TDDDEVC	1	binary	Device class.
1	1	TDDUTYP	1	binary	Unit type.
2	2	TDDCUAD	2	binary	Device number.
4	4	TDDNEXCP	4	binary	EXCP count (see offset 44).

Record type 41 (X'29') — DIV objects and VLF statistics

Reference information:

COFVLF*xx* parmlib member is described in *z/OS MVS Initialization and Tuning Reference*.

Record type 41 provides resource usage information regarding data-in-virtual (DIV) objects and VLF statistics. This record is written when a DIV object is accessed, and when the object is unaccessed.

Note: ACCESS and UNACCESS is similar to OPEN and CLOSE. This record is also written to record VLF statistics.

Record type 41 has the following subtypes; each contains a common section with header and product information portions, and a subtype section unique for each record. The subtypes are:

- **Subtype 1** — ACCESS record. The ACCESS data section is written when a DIV object is accessed.
- **Subtype 2** — UNACCESS record. The counts for the I/O Activity Section are accumulated by data-in-virtual while the object is in use and are reported at the time of the UNACCESS request. The subtype 2 record is written whenever a data-in-virtual object is unaccessed.

- **Subtype 3 —** collects virtual lookaside facility (VLF) statistics. It is written every 15 minutes. The data is repeated for each VLF class defined in the COFVLF*xx* parmlib member.

Record environment

The following conditions exist for the generation of each of the subtypes of this record:

Macro

- **Subtype 1, 2:** SMFEWTM,BRANCH=YES (record exit: IEFU84)
- **Subtype 3:** SMFEWTM,BRANCH=NO (record exit: IEFU83)

Mode

Task

Storage residency

- **Subtype 1, 2:** 24-bit
- **Subtype 3:** 31-bit

Record mapping

Header/Self-defining Section

This section contains the common SMF record headers fields and the triplet fields (offset/length/number), if applicable, that locate the other sections on the record.

Offsets		Name	Length	Format	Description
0	0	SMF41LEN	2	binary	Record length. This field and the next field (total of four bytes) form the RDW (record descriptor word). See “Standard and Extended SMF record headers” on page 162 for a detailed description.
2	2	SMF41SEG	2	binary	Segment descriptor (see record length field).
4	4	SMF41FLG	1	binary	System indicator: **Bit** **Meaning when set** **0** Subsystem identification follows system identification **1** Subtypes used **2** Reserved **3-6** Version indicators* **7** Reserved. *See “Standard and Extended SMF record headers” on page 162 for a detailed description.
5	5	SMF41RTY	1	binary	Record type 41 (X'29').
6	6	SMF41TME	4	binary	Time since midnight, in hundredths of a second, when the record was written.
10	A	SMF41DTE	4	packed	Date when the record was moved into the SMF buffer, in the form 0*cyydddF*. See “Standard and Extended SMF record headers” on page 162 for a detailed description.
14	E	SMF41SID	4	EBCDIC	System identification (from the SID parameter).
18	12	SMF41SSI	4	EBCDIC	Subsystem identification (EBCDIC blanks).

Offsets		Name	Length	Format	Description
22	16	SMF41STY	2	binary	Record subtype **Value** **Meaning** **1** ACCESS **2** UNACCESS **3** VLF statistics.
24	18	SMF41TRP	2	binary	Number of triplets. A triplet is a set of offset/length/number values that defines a section of the record.
26	1A	SMF41*xxx*	2		Reserved.
28	1C	SMF41OPD	4	binary	Offset to product section.
32	20	SMF41LPD	2	binary	Length of product section.
34	22	SMF41NPD	2	binary	Number of product sections.
36	24	SMF41OD1	4	binary	Offset of object ACCESS data section.
40	28	SMF41LD1	2	binary	Length of object ACCESS data section.
42	2A	SMF41ND1	2	binary	Number of object ACCESS data sections.
44	2C	SMF41OD2	4	binary	Offset of object UNACCESS data section.
48	30	SMF41LD2	2	binary	Length of object UNACCESS data section.
50	32	SMF41ND2	2	binary	Number of object UNACCESS data sections.
52	34	SMF41OD3	4	binary	Offset of I/O activity section.
56	38	SMF41LD3	2	binary	Length of I/O activity section.
58	3A	SMF41ND3	2	binary	Number of I/O activity sections.
60	3C	SMF41OD4	4	binary	Offset to the VLF statistics section.
64	40	SMF41LD4	2	binary	Length of the VLF statistics section.
66	42	SMF41ND4	2	binary	Number of VLF statistics sections.

Product Section

Offsets		Name	Length	Format	Description
0	0	SMF41PL	8	EBCDIC	Product level.
8	2	SMF41PN	16	EBCDIC	Product name (‘DATA-IN-VIRTUAL’).

Object ACCESS Data Section

This section is present for record subtypes 1 and 2 only.

Offsets		Name	Length	Format	Description
0	0	SMF41DDA	8	EBCDIC	Object data definition name (ddname).
8	8	SMF41AZA	4	binary	Object size, in units of blocks, when accessed.
12	C	SMF41ATA	4	binary	Time since midnight, in seconds, when the object was accessed.
16	10	SMF41TYA	1	binary	Object type **Code** **Meaning** **1** DA.

Offsets		Name	Length	Format	Description
17	11	SMF41AMA	1	binary	ACCESS mode **Code** **Meaning** **1** Read **2** Update.
18	12	SMF41JBN	8	EBCDIC	Job name (initiator or started task).

Object UNACCESS Data Section

This section is present for record subtype 2 only.

Offsets		Name	Length	Format	Description
0	0	SMF41UZU	4	binary	Object size, in units of blocks, when unaccessed.
4	4	SMF41UTU	4	binary	Time since midnight, in seconds, when the object was unaccessed.

Object I/O Activity Section

This section is present for record subtype 2 only.

Offsets		Name	Length	Format	Description
0	0	SMF41BRD	4	binary	Total reads, including re-reads (number of blocks read from object).
4	4	SMF41BWR	4	binary	Total writes (number of blocks written to object).
8	8	SMF41BRR	4	binary	Total re-reads (number of blocks re-read from object).
12	C	SMF41NC	4	binary	Total I/O calls for reads.
16	10	SMF41OUC	4	binary	Total I/O calls for writes.

VLF Statistics Section

This section is present for record subtype 3 only.

Offsets		Name	Length	Format	Description
0	0	SMF41CLS	8	EBCDIC	Class name.
8	8	SMF41MVT	4	binary	MAXVIRT specified, in 4K blocks. MAXVIRT is a VLF parameter specified in the COFVLF*xx* parmlib member.
12	C	SMF41USD	4	binary	Amount of virtual storage currently being used, in 4K blocks.
16	10	SMF41SRC	4	binary	Number of times the cache was searched in this interval.
20	14	SMF41FND	4	binary	Number of objects found in the cache in this interval.
24	18	SMF41ADD	4	binary	Number of objects added to the cache in this interval.
28	1C	SMF41DEL	4	binary	Number of objects deleted from the cache in this interval.
32	20	SMF41TRM	4	binary	Number of objects trimmed from the cache in this interval.
36	24	SMF41LRG	4	binary	Largest object attempted to put in the cache.
40	28	SMF41TIM	8	binary	Timestamp of last successful COFDEFIN in STCK format. Contains zero if the class is not currently active.
48	30	SMF41AAG	4	binary	Current ALERTAGE value in seconds.
52	34	SMF41YAG	4	binary	Age of the youngest trimmed object in seconds since the last COFDEFIN for this class. A value of 'FFFFFFFF'X means that no trimming has occurred.

Offsets		Name	Length	Format	Description
56	38	SMF41MAG	4	binary	Age of the youngest trimmed object in seconds since the VLF_MAXVIRT health check last ran. A value of 'FFFFFFFF'X means that no trimming has occurred.
60	3C	SMF41CAG	4	binary	Number of age exceptions raised by the VLF_MAXVIRT health check since the last COFDEFIN for this class.

Record type 42 (X'2A') — DFSMS statistics and configuration

Reference information:

- For information about the IGDSMS*xx* parmlib member, see *z/OS MVS Initialization and Tuning Reference*.
- For information about the SETSMS and VARY SMS commands, see *z/OS MVS System Commands*.

Record type 42 contains the following subtype information:

- **Subtype 1** is created on a timed interval to collect device statistics. The time interval is specified in the IGDSMS*xx* parmlib member. Subtype 1 summarizes, on a storage-class basis, the buffer manager hits (number of page-read requests handled by the buffer manager). A Buffer Manager Facility (BMF) totals section (64 bytes) enables analysis of overall BMF performance. There is one storage-class summary section (64 bytes) for each storage class.
- **Subtype 2** has one section (88 bytes) for each DASD control unit having at least one storage management subsystem (SMS)-managed device attached. There is one section (16 bytes) for each SMS-managed volume attached to such a control unit.
- **Subtype 3** is written each time the SMS configuration is changed. The following events cause subtype 3 to be generated:
  - The operator issued one of the following VARY SMS commands:
    - VARY SMS,VOLUME
    - VARY SMS,STORGRP
    - VARY SMS,LIBRARY (tape or optical)
    - VARY SMS,DRIVE (optical only)
  - An ACTIVATE occurred, either by issuing an ACTIVATE command in ISMF or a SETSMS command on the console.
  - An event notification facility (ENF) event occurred because the operator issued a VARY command to an SMS-managed volume.
  - The status of a LIBRARY or DRIVE has been UPDATED by the Object Access Method (OAC).
- **Subtype 4** is written to collect System Data Mover session statistics for a concurrent copy session or for an extended sequential data set when interfacing with the backup program. Concurrent copy records contain the identifier "CC"; extended sequential data set records contain "EXT".
  - The CC SMF record is issued when the concurrent copy session completes.
  - The EXT SMF record is issued at the close of the processing for the extended sequential data set as follows:
    - If the backup program requested that the extended sequential data set is dumped to tape, one EXT SMF record is issued for reading the entire extended sequential data set.
    - If the backup program requested that the extended sequential data set is copied to DASD, one EXT SMF record is issued for reading the entire extended sequential data set and one EXT SMF record is issued for writing the entire extended sequential data set to DASD.
    - If the backup program requested that the extended sequential data set is processed using a concurrent copy session, then the CC SMF record contains the statistics for reading the extended sequential data set and no EXT SMF record is issued for reading the extended sequential data set.

If the concurrent copy session was for a copy to DASD, one EXT SMF record is issued for writing each extended sequential data set to DASD.

For additional information about SMF record 42 subtype 4, see *Implementing Concurrent Copy*.

- **Subtype 5** includes storage class, VTOC and INDEX, VVDS, system, and disk background I/O statistics. Subtype 5 is written when the global SMF interval expires. The global SMF interval is specified from the INTVAL parameter in the SMF parmlib member.

  Note: Record type 30 records can also be synchronized to the global interval. See "Record type 30 (X'1E') — Common address space work" on page 292 for more information.

- **Subtype 6** records DASD data set level I/O statistics. There are two events that cause subtype 6 to be generated:
  - Close, or
  - Immediately after the recording of the type 30 interval record. There is one type 42 subtype 6 record for each type 30 interval record.

    For the SMSPDSE and SMSPDSE1 address spaces, type 42 subtype 6 records are recorded at the BMFTIME interval immediately after the type 42 subtype 1 records.

    Type 42 subtype 6 records are not recorded when there are no I/O statistics.
- **Subtype 7** is used by Network file system (NFS). See *z/OS Network File System Guide and Reference* for additional information.
- **Subtype 8** is used by NFS. See *z/OS Network File System Guide and Reference* for additional information.
- **Subtype 9** is written each time a B37/D37/E37 abend is issued. It includes information about the data set, UCB, JFCB and job that is abending.
- **Subtype 10** is written at the time of volume selection failure because of insufficient space when allocating a data set.
- **Subtype 11** is written for extended remote copy (XRC) session statistics whenever the SMF timer interval ends.
- **Subtype 14** is written to report ADSTAR Distributed Storage Manager (ADSM) accounting for server resources used during a session.

  Note: This subtype is not mapped using the IFASMFR macro.
- **Subtype 15** can be created on a timed interval or whenever the SMF timer ends to collect data about VSAM record-level sharing (RLS) storage class response time. This data includes information for each system and a sysplex-wide summary.
- **Subtype 16** can be created on a timed interval or whenever the SMF timer ends to collect data about VSAM RLS data set response time. This data includes information for each system and a sysplex-wide summary.
- **Subtype 17** can be created on a timed interval or whenever the SMF timer ends to collect data about VSAM RLS coupling facility (CF) lock structure usage. This data includes information for each system and a sysplex-wide summary.
- **Subtype 18** can be created on a timed interval or whenever the SMF timer ends to collect data about VSAM RLS CF cache partition usage. This data includes information for each system and a sysplex-wide summary.
- **Subtype 19** can be created on a timed interval or whenever the SMF timer ends to collect data about VSAM RLS Local Buffer Manager LRU Statistics Summary. This data includes information for each system and a sysplex-wide summary.

For **Subtypes 15, 16, 17, 18 and 19,** specify the time interval in the IGDSMSxx parmlib member and activate recording on one system in the sysplex. Because data is collected across the sysplex, it is unnecessary to merge SMF records from all the systems in the sysplex.

- **Subtype 20** is written when STOW INITIALIZE is used to delete all the members from a PDSE to indicate who or what (job, started task, or TSO user) issued the STOW INITIALIZE. It contains the name of the data set and the volume serial of the volume on which it resided.

- **Subtype 21** is written when a member is deleted from a PDS or a PDSE to indicate who or what (job, started task, or TSO user) deleted the member. It contains the name of the data set and the volume serial of the volume on which it resided, including all the aliases of the member that fits in the SMF record.
- **Subtype 22** is used by DFSMSrmm for audit records. Use the IBM assigned record type 42 subtypes 22 to avoid DFSMSrmm SMF records requiring record types from the user-written range.
- **Subtype 23** is used by DFSMSrmm for security records. Use the IBM assigned record type 42 subtypes 23 to avoid DFSMSrmm SMF records requiring record types from the user-written range.
- **Subtype 24** is written when a member is added or replaced from a PDS or a PDSE to indicate who or what (job, started task, or TSO user) added or replaced the member. It contains the name of the data set and the volume serial of the volume on which it resided. If the member replaced is a primary name in a PDSE, the SMF record also includes any alias names associated with the replaced member. The number of alias names included is limited to the maximum size that can be contained in an SMF record.

  Only those applications that issue STOW and DESERV calls for PDS or PDSE directory processing will generate Subtype 24 records. Some applications, such as IEBCOPY, do not issue a STOW or DESERV when updating the directory. Thus, a subtype 24 record will not be created.
- **Subtype 25** is written when a member is renamed from a PDS or a PDSE to indicate who or what (job, started task, or TSO user) renamed the member. It contains the name of the data set and the volume serial of the volume on which it resided, including the old name and new name of the member.

  Only those applications that issue STOW and DESERV calls for PDS or PDSE directory processing generates Subtype 25 records. Some applications, such as IEBCOPY, do not issue a STOW or DESERV when updating the directory. Thus, a subtype 25 record will not be created.
- **Subtype 26** is used by NFS. See *z/OS Network File System Guide and Reference* for additional information.
- **Subtype 27** is created each time the VTOC is changed. The following events cause subtype 27 to be generated:
  - Data set operations (create, extend, partial release, rename, scratch)
  - Defrag and consolidate
  - DSCB update

Record environment

Macro
SMFEWTM (2),WRKAREA=(3),BRANCH=YES (record exit: IEFU84)

Record mapping

Header/Self-defining section

This section contains the common SMF record headers fields and the triplet fields (offset/length/number), if applicable, that locate the other sections on the record.

Offsets		Name	Length	Format	Description
0	0	SMF42RCL	2	binary	Record length. This field and the next field (total of four bytes) form the record descriptor word (RDW). See “Standard and Extended SMF record headers” on page 162 for a detailed description.
2	2	SMF42SGD	2	binary	Segment descriptor (see record length field). This is zero, if the record is not spanned.

Offsets		Name	Length	Format	Description
4	4	SMF42FLG	1	binary	System indicator flags **Bit** **Meaning when set** **0** Subsystem identification follows system identification. **1** Subtypes are used **2** Reserved **3-6** Version indicators* **7** Reserved. *See “Standard and Extended SMF record headers” on page 162 for a detailed description.
5	5	SMF42RTY	1	binary	Record type 42 (X'2A').
6	6	SMF42TME	4	binary	Time since midnight, in hundredths of a second, when the record was moved into the SMF buffer.
10	A	SMF42DTE	4	packed	Date when the record was moved into the SMF buffer, in the form 0c*yydddF*. See “Standard and Extended SMF record headers” on page 162 for a detailed description.
14	E	SMF42SID	4	EBCDIC	System identification (from the SID parameter).
18	12	SMF42SSI	4	EBCDIC	Subsystem identification.

Offsets		Name	Length	Format	Description
22	16	SMF42STY	2	binary	Record subtype. **Value** **Meaning** **1** BMF cache summary **2** Cache control units having SMS-managed device(s) attached. **3** SMS configuration changed **4** System Data Mover session statistics **5** Storage class VTOC and VVDS I/O statistics **6** Data set level I/O statistics **9** B37/D37/E37 abend information **10** Volume selection failure **11** Extended remote copy session statistics **14** ADSM session resource usage **15** VSAM RLS CF storage class response time **16** VSAM RLS CF data set response time **17** VSAM RLS CF lock structure usage **18** VSAM RLS CF cache partition usage **19** VSAM RLS buffer manager LRU activity **20** STOW initialize **21** Member delete **22** DFSMSrmm audit records **23** DFSMSrmm security records **24** Member add/replace **25** Member rename **27** VTOC DSCB audit record
24	18	SMF42NT	2	binary	Number of triplets in record. A triplet is a set of offset/length/ number values that defines a section of the record. (Optional.)
26	1A		2		Reserved.
Product section triplet:					
28	1C	SMF42OPS	4	binary	Offset to product section from start of record, including record descriptor word (RDW).
32	20	SMF42LPS	2	binary	Length of product section.
34	22	SMF42NPS	2	binary	Number of product sections.

Offsets		Name	Length	Format	Description
36	24	SMF42END	0	character	Force header end on word boundary.
The following six fields are only included with subtype 1:					
36	24	SMF42BMO	4	binary	Offset to BMF totals section from start of record, including record descriptor word (RDW).
40	28	SMF42BML	2	binary	Length of BMF totals section.
42	2A	SMF42BMN	2	binary	Number of BMF totals sections.
44	2C	SMF42SCO	4	binary	Offset to storage class summary section from start of record, including record descriptor word (RDW).
48	30	SMF42SCL	2	binary	Length of storage class summary section.
50	32	SMF42SCN	2	binary	Number of storage class summary sections.
The following six fields are only included with subtype 2:					
36	24	SMF42CUO	4	binary	Offset to control unit cache section from start of record, including record descriptor word (RDW).
40	28	SMF42CUL	2	binary	Length of control unit cache section.
42	2A	SMF42CUN	2	binary	Number of control unit cache sections.
44	2C	SMF42VLO	4	binary	Offset to volume section from start of record, including record descriptor word (RDW).
48	30	SMF42VLL	2	binary	Total length of all volume sections. (Number of volume sections multiplied by the length of one volume section.)
50	32	SMF42VLN	2	binary	Number of volume sections.
The following three fields are only included with subtype 3:					
36	24	SMF42EAO	4	binary	Offset to event audit section from start of record, including record descriptor word (RDW).
40	28	SMF42EAL	2	binary	Length of event audit section.
42	2A	SMF42EAN	2	binary	Number of event audit sections.
The following nine fields are only included with subtype 4:					
36	24	SMF42CCO	4	binary	Offset to CC statistics.
40	28	SMF42CCL	2	binary	Length of CC statistics.
42	2A	SMF42CCN	2	binary	Number of CC sessions.
44	2C	SMF42EXO	4	binary	Offset to EXT statistics.
48	30	SMF42EXL	2	binary	Length of EXT statistics.
50	32	SMF42EXN	2	binary	Number of EXT data sets.
52	34	SMF42VCO	4	binary	Offset to VCC statistics.
56	38	SMF42VCL	2	binary	Length of VCC statistics.
58	3A	SMF42VCN	2	binary	Number of VCC sessions.
The following six fields are only included with subtype 5:					
36	24	SMF42SRO	4	binary	Offset to storage class response time section from start of record, including record descriptor word (RDW).
40	28	SMF42SRL	2	binary	Length of storage class response time section; however, this does not include the length of the synchronous I/O section. See S42SCSNL.
42	2A	SMF42SRN	2	binary	Number of storage class response time sections.
44	2C	SMF42VHO	4	binary	Offset to volume header section from start of record, including read descriptor word (RDW).
48	30	SMF42VHL	2	binary	Length of volume header section.

Offsets		Name	Length	Format	Description
50	32	SMF42VHN	2	binary	Number of volume header sections.
The following three fields are only included with subtype 6:					
36	24	SMF42JHO	4	binary	Offset to job header section from start of record, including record descriptor word (RDW).
40	28	SMF42JHL	2	binary	Length of job header section.
42	2A	SMF42JHN	2	binary	Number of job header sections.
The following six fields are only included with subtype 9:					
36	24	SMF42ABO	4	binary	Offset to X37 abend data section.
40	28	SMF42ABL	2	binary	Length of X37 abend data section.
42	2A	SMF42ABN	2	binary	Number of X37 abend sections (always 1).
44	2C	SMF42SMO	4	binary	Offset to SMS data section (0 if data set is not SMS managed).
48	30	SMF42SML	2	binary	Length of SMS data section (0 if data set is not SMS managed).
50	32	SMF42SMN	2	binary	Number of SMS sections (always 1 if data set is SMS managed. Otherwise, 0).
The following three fields are only included with subtype 10:					
36	24	SMF42VSF	4	binary	Offset to volume selection failure record.
40	28	SMF42VSL	4	binary	Length of volume selection failure record.
42	2A	SMF42VSN	2	binary	Number of volume selection failure records.
The following three fields are only included with subtype 11:					
36	24	SMF42XRO	4	binary	Offset to XRC service.
40	28	SMF42XRL	2	binary	Length of XRC service.
42	2A	SMF42XRN	2	binary	Number of XRC sessions.
The following three fields are only included with subtype 14:					
36	24	SMF42T14	4	binary	Offset to ADSM section.
40	28		2	binary	Length of ADSM section.
42	2A		2	binary	Number of ADSM sections, 1.
The following six fields are only included with subtype 15 for buffers below the bar:					
36	24	SMF42FC1	4	binary	Offset to sysplex-wide storage class (SC) summary data section.
40	28	SMF42FC2	2	binary	Length of sysplex-wide SC summary data section.
42	2A	SMF42FC3	2	binary	Number of sysplex-wide SC summary data sections.
44	2C	SMF42FC4	4	binary	Offset to SC, CF, SYS summary section.
48	30	SMF42FC5	2	binary	Length of SC, CF, SYS summary section.
50	32	SMF42FC6	2	binary	Number of SC, CF, SYS summary sections.
The following six fields are only included with subtype 15 for buffers above the bar:					
52	34	SMF2AFC1	4	binary	Offset to sysplex-wide storage class (SC) summary data section.
56	38	SMF2AFC2	2	binary	Length of sysplex-wide SC summary data section.
58	3A	SMF2AFC3	2	binary	Number of sysplex-wide SC summary data sections.
60	3C	SMF2AFC4	4	binary	Offset to SC, CF, SYS summary section.
64	40	SMF2AFC5	2	binary	Length of SC, CF, SYS summary section.
66	42	SMF2AFC6	2	binary	Number of SC, CF, SYS summary sections.
The following six fields are only included with subtype 16 for buffers below the bar:					

Offsets		Name	Length	Format	Description
36	24	SMF42GD1	4	binary	Offset to sysplex-wide data set summary section.
40	28	SMF42GD2	2	binary	Length of sysplex-wide data set summary section.
42	2A	SMF42GD3	2	binary	Number of sysplex-wide data set summary sections.
44	2C	SMF42GD4	4	binary	Offset to data set, CF, SYS summary section.
48	30	SMF42GD5	2	binary	Total length of all data set, CF, SYS summary sections.
50	32	SMF42GD6	2	binary	Number of data set, CF, SYS summary sections.
The following six fields are only included with subtype 16 for buffers above the bar:					
52	34	SMF2AGD1	4	binary	Offset to sysplex-wide data set summary section.
56	38	SMF2AGD2	2	binary	Length of sysplex-wide data set summary section.
58	3A	SMF2AGD3	2	binary	Number of sysplex-wide data set summary sections.
60	3C	SMF2AGD4	4	binary	Offset to data set, CF, SYS summary section.
64	40	SMF2AGD5	2	binary	Total length of all data set, CF, SYS summary sections.
66	42	SMF2AGD6	2	binary	Number of data set, CF, SYS summary sections.
The following six fields are only included with subtype 17:					
36	24	SMF42HL1	4	binary	Offset to MVS system CF lock structure activity totals section.
40	28	SMF42HL2	2	binary	Length of MVS system CF lock structure activity totals section.
42	2A	SMF42HL3	2	binary	Number of MVS system CF lock structure activity totals sections.
44	2C	SMF42HL4	4	binary	Offset to lock structure summary section.
48	30	SMF42HL5	2	binary	Length of lock structure summary section.
50	32	SMF42HL6	2	binary	Number of lock structure summary sections.
The following nine fields are only included with subtype 18:					
36	24	SMF42IM1	4	binary	Offset to CF cache partition activity totals section.
40	28	SMF42IM2	2	binary	Length of CF cache partition activity totals section.
42	2A	SMF42IM3	2	binary	Number of CF cache partition activity totals sections.
44	2C	SMF42IM4	4	binary	Offset to single CF cache partition summary section.
48	30	SMF42IM5	2	binary	Length of single CF cache partition summary section.
50	32	SMF42IM6	2	binary	Number of single CF cache partition summary sections.
52	34	SMF42IM7	4	binary	Offset to directory/element ratio data sections.
56	38	SMF42IM8	2	binary	Length of directory/element ratio data sections.
58	3A	SMF42IM9	2	binary	Number of directory/element ratio data sections.
The following six fields are only included with subtype 19 for buffers below the bar:					
36	24	SMF42JN1	4	binary	Offset to Sysplex Buffer Manager LRU activity totals section.
40	28	SMF42JN2	2	binary	Length of Sysplex Buffer Manager LRU activity totals section.
42	2A	SMF42JN3	2	binary	Number of Sysplex Buffer Manager LRU activity totals sections.
44	2C	SMF42JN4	4	binary	Offset to Local Buffer Manager LRU activity section.
48	30	SMF42JN5	2	binary	Length of Local Buffer Manager LRU activity section.
50	32	SMF42JN6	2	binary	Number of Local Buffer Manager LRU activity sections.
The following six fields are only included with subtype 19 for buffers above the bar:					
52	34	SMF2AJN1	4	binary	Offset to Sysplex Buffer Manager LRU activity totals section.
56	38	SMF2AJN2	2	binary	Length of Sysplex Buffer Manager LRU activity totals section.

Offsets		Name	Length	Format	Description
58	3A	SMF2AJN3	2	binary	Number of Sysplex Buffer Manager LRU activity totals sections.
60	3C	SMF2AJN4	4	binary	Offset to Local Buffer Manager LRU activity section.
64	40	SMF2AJN5	2	binary	Length of Local Buffer Manager LRU activity section.
66	42	SMF2AJN6	2	binary	Number of Local Buffer Manager LRU activity sections.
The following six fields are only included with subtype 20:					
36	24	SMF42KN1	4	binary	Offset to STOW Initialize section.
40	28	SMF42KN2	2	binary	Length of STOW Initialize section.
42	2A	SMF42KN3	2	binary	Number of STOW Initialize sections.
44	2C	SMF42KN4	4	binary	Offset to STOW Initialize additional information section.
48	30	SMF42KN5	2	binary	Length of STOW Initialize additional information section.
50	32	SMF42KN6	2	binary	Number of STOW Initialize additional information section.
The following nine fields are only included with subtype 21:					
36	24	SMF42LN1	4	binary	Offset to Member Delete section.
40	28	SMF42LN2	2	binary	Length of Member Delete section.
42	2A	SMF42LN3	2	binary	Number of Member Delete sections.
44	2C	SMF42LN4	4	binary	Offset to Deleted Alias Names section.
48	30	SMF42LN5	2	binary	Length of Deleted Alias Names section.
50	32	SMF42LN6	2	binary	Number of Deleted Alias Names sections.
52	34	SMF42LN7	4	binary	Offset to Member Delete additional information section.
56	38	SMF42LN8	2	binary	Length of Member Delete additional information section.
58	3A	SMF42LN9	2	binary	Number of Member Delete additional information section.
The following six fields are only included with subtype 22:					
36	24	SMF42AUD	4	binary	Offset to audit section
40	28	SMF42LAD	2	binary	Length of audit section.
42	2A	SMF42NAD	2	binary	Number of audit sections.
44	2C	SMF42REC	4	binary	Offset to record section.
48	30	SMF42LRC	2	binary	Length of record section.
50	32	SMF42NRC	2	binary	Number of record sections.
The following three fields are only included with subtype 23:					
36	24	SMF42SEC	4	binary	Offset to security section.
40	28	SMF42LSC	2	binary	Length of security section.
42	2A	SMF42NSC	2	binary	Number of security sections.
The following nine fields are only included with subtype 24:					
36	24	SMF42PN1	4	binary	Offset to Member add/replace header section.
40	28	SMF42PN2	2	binary	Length of Member add/replace header section.
42	2A	SMF42PN3	2	binary	Number of Member add/replace header section.
44	2C	SMF42PN4	4	binary	Offset to Alias names section.
48	30	SMF42PN5	2	binary	Length of Alias names section.
50	32	SMF42PN6	2	binary	Number of Alias names section.
52	34	SMF42PN7	4	binary	Offset to Member add/replace additional information section.

Offsets		Name	Length	Format	Description
56	38	SMF42PN8	2	binary	Length of Member add/replace additional information section.
58	3A	SMF42PN9	2	binary	Number of Member add/replace additional information section.
The following nine fields are only included with subtype 25:					
36	24	SMF42QN1	4	binary	Offset to Member rename section.
40	28	SMF42QN2	2	binary	Length of Member rename section.
42	2A	SMF42QN3	2	binary	Number of Member rename sections.
44	2C	SMF42QN4	4	binary	Offset to old member name section.
48	30	SMF42QN5	2	binary	Length of old member name section.
50	32	SMF42QN6	2	binary	Number of old member name sections.
52	34	SMF42QN7	4	binary	Offset to Member rename additional information section.
56	38	SMF42QN8	2	binary	Length of Member rename additional information section.
58	3A	SMF42QN9	2	binary	Number of Member rename additional information section.
The following nine fields are only included with subtype 27:					
36	24	SMF4227R1	4	binary	Offset to VTOC update header section from start of record, including record descriptor word (RDW).
40	28	SMF4227R2	2	binary	Length of VTOC update header section.
42	2A	SMF4227R3	2	binary	Number of VTOC update header sections.
44	2C	SMF4227R4	4	binary	Offset to old DSCB change section from start of record, including RDW.
48	30	SMF4227R5	2	binary	Length of old DSCB change section.
50	32	SMF4227R6	2	binary	Number of old DSCB change sections.
52	34	SMF4227R7	4	binary	Offset to new DSCB change section from start of record, including RDW.
56	38	SMF4227R8	2	binary	Length of new DSCB change section.
58	3A	SMF4227R9	2	binary	Number of new DSCB change sections.

Product section

Offsets		Name	Length	Format	Description
0	0	SMF42PDL	8	EBCDIC	Product level.
8	8	SMF42PDN	10	EBCDIC	Product name.
18	12	SMF42PSV	1	binary	Subtype version number **0** Volume header section does not exist. **1** Volume header section exists. **2** For subtype 27, all DSCBs affected by the following DADSM/CVAF activities will be recorded: DCRE, DCVF, DDEL, DEXT, DPAR, and DREN. See “Subtype 27 — VTOC audit log” on page 478.
19	13	*	1		Reserved.
20	14	SMF42PTS	8	binary	Interval Start or OPEN time of day. This is zero if not available. These values are in time-of-day (TOD) clock format, and reflect GMT time, not local time.

Offsets		Name	Length	Format	Description
28	1C	SMF42PTE	8	binary	Interval End or CLOSE time of day. This is zero if not available. These values are in time-of-day (TOD) clock format, and reflect GMT time, not local time.
36	24	*	4	EBCDIC	Reserved.

Subtype 1

BMF totals section

Offsets		Name	Length	Format	Description
0	0	SMF42TNA	4	binary	Total number of storage classes.
4	4	SMF42TMT	4	binary	Interval length. This is the elapsed time of the measurement period in seconds.
8	8	SMF42TRT	4	binary	Total number of member data page reads.
12	C	SMF42TRH	4	binary	Total number of member data page read hits handled by BMF.
16	10	SMF42TDT	4	binary	Total number of directory data page reads.
20	14	SMF42TDH	4	binary	Total number of directory data page read hits handled by BMF.
24	18	SMF42BUF	4	binary	Total number of active BMF 4K buffers.
28	1C	SMF42BMX	4	binary	High water mark of BMF buffers.
32	20	SMF42LRU	2	binary	BMF LRU interval time.
34	22	SMF42UIC	2	binary	BMF LRU cycles until inactive buffers are cast out.

Storage class summary section

Offsets		Name	Length	Format	Description
0	0	SMF42PNL	2	binary	Length of storage class name.
2	2	SMF42PNN	30	EBCDIC	Storage class name.
32	20	SMF42SRT	4	binary	Total number of member data page reads.
36	24	SMF42SRH	4	binary	Total number of member data page read hits handled by BMF.
40	28	SMF42SDT	4	binary	Total number of directory data page reads.
44	2C	SMF42SDH	4	binary	Total number of directory data page read hits handled by BMF.

Subtype 2

Control unit cache section

Offsets		Name	Length	Format	Description
0	0	SMF42SCS	1	binary	Storage director caching status **Format** **Meaning** **000***xxxxx* Caching is active. **001***xxxxx* Caching is pending active. **010***xxxxx* Internal subsystem error. Caching has ended. **100***xxxxx* Caching deactivated due to explicit host system request. **110***xxxxx* Pending off is in progress. Command to deactivate cache received, but de-stage is still in progress. **111***xxxxx* Pending off destage has failed. *xxx***1***xxxx* Subsystem storage disabled for maintenance. *xxxx***XX***xx* Reserved. *xxxxxx***1***x* IML device is not available. *xxxxxxx***1** Non-retentive data is deactivated.
1	1	SMF42NCS	1	binary	Subsystem non-volatile storage status **Format** **Meaning** **00***xxxxxx* Non-volatile cache is active. **01***xxxxxx* Internal subsystem error. Non-volatile cache availability is ended. **10***xxxxxx* Non-volatile cache has been deactivated due to explicit host system request. **11***xxxxxx* Pending non-volatile unavailable has been received, but destage is still in progress. *xxXxxXXX* Reserved. *xxx***1***xxxx* Non-volatile storage disabled for maintenance. *xxxx***1***xxx* Non-volatile storage disabled due to error.
2	2	SMF42CID	2	binary	Subsystem identifier.
4	4	SMF42CSS	4	binary	Configured subsystem storage capacity, in bytes. F‘1’ means the capacity could not be determined.
8	8	SMF42SSA	4	binary	Subsystem storage available, in bytes, for allocation as cache space.
12	C	SMF42SAP	4	binary	Subsystem storage allocated, in bytes, for pinned data.

Offsets		Name	Length	Format	Description
16	10	SMF42SSU	4	binary	Subsystem storage unavailable, in bytes, due to subsystem failures.
20	14	SMF42NSZ	4	binary	Configured non-volatile cache capacity, in bytes. F'1' means the capacity could not be determined.
24	18	SMF42SPR	4	binary	Non-volatile cache allocated, in bytes, for pinned data.
28	1C		4		Reserved.
Statistics gathered from last update period:					
32	20	SMF42LCT	4	binary	I/O count for the subsystem.
36	24	SMF42LFW	4	binary	Fast write bypass count.
40	28	SMF42LRH	4	binary	Cache normal read hit percent, between 0 and 100.
44	2C	SMF42LWM	4	binary	Fast write bypasses per minute (an integer).
48	30	SMF42LYY	2	binary	Year, in the form 0*cyy*, where *c* is 0 for 19xx and 1 for 20xx, and *yy* is the current year (0-99).
50	32	SMF42LDD	2	binary	Day of year, in the form *dddF*, where *ddd* is the current day (1-366), and *F* is the sign.
52	34	SMF42LTM	4	binary	Time since midnight, in seconds.
Statistics gathered from current update period:					
56	38	SMF42CCT	4	binary	I/O count for the subsystem.
60	3C	SMF42CFW	4	binary	Fast write bypass count.
64	40	SMF42CRH	4	binary	Cache normal read hit percent, between 0 and 100.
68	44	SMF42CWM	4	binary	Fast write bypasses per minute (an integer).
72	48	SMF42CYY	2	binary	Year, in the form 0*cyy*, where *c* is 0 for 19xx and 1 for 20xx, and *yy* is the current year (0-99).
74	4A	SMF42CDD	2	binary	Day of year, in the form *dddF*, where *ddd* is the current day (1-366), and *F* is the sign.
76	4C	SMF42CTM	4	binary	Time since midnight, in seconds.
Statistical averages:					
80	50	SMF42IHR	2	binary	Average hit ratio, between 0 and 100.
82	52	SMF42IFW	2	binary	Average fast-write bypasses per minute (an integer).
84	54		4	EBCDIC	Reserved.

Volume status section

Offsets		Name	Length	Format	Description
0	0	SMF42VOL	6	EBCDIC	Volume serial number.
6	6		2		Reserved.
8	8	SMF42DEV	4	binary	Device number.

Offsets		Name	Length	Format	Description
12	C	SMF42DB1	1	binary	Device status flags, byte 1 **Bit** **Indicates** **0-1** Device cache status **Format** **Meaning** **00***xxxxxx* Caching is activated. **01***xxxxxx* Unused. **10***xxxxxx* Deactivate pending by explicit host system request. Transfer of modified data to DASD has failed. **11***xxxxxx* Caching deactivated is unavailable. **2-3** Fast write status **Format** **Meaning** *xx***00***xxxx* Fast write is activated. *xx***01***xxxx* Unused. *xx***10***xxxx* Fast-write deactivate pending. Transfer of data to DASD has failed. *xx***11***xxxx* Fast write deactivated. **4-7** Duplex pair flags **Format** **Meaning** *xxxx***1***xxx* Primary of duplex pair. *xxxxx***1***xx* Secondary of duplex pair. *xxxxxx***00** Duplex pair available. *xxxxxx***01** Duplex pair is pending (copy to establish duplex pair is in progress or failed). *xxxxxx***10** Failed duplex by command. *xxxxxx***11** Failed duplex by subsystem.

Offsets		Name	Length	Format	Description
13	D	SMF42DB2	1	binary	Device status flags, byte 2 **Format** **Meaning** **00*xxxxxx*** No pinned data exists for the device, and fast write was not suspended. **01*xxxxxx*** Pinned data exists for the device, but fast write was not suspended. **10*xxxxxx*** Reserved. **11*xxxxxx*** Pinned data exists for the device, and fast write was suspended. ***xxXXXXXX*** Channel connect address for other device in duplex pair.
14	E		2		Reserved.

Subtype 3

Event audit section

Offsets		Name	Length	Format	Description
0	0	SMF42EAC	8	EBCDIC	The action that caused the record to be created, ACTIVATE, ENF, or VARY SMS.
8	8	SMF42ERC	4	binary	Return code from resulting event.
12	C	SMF42ERS	4	binary	Reason code from resulting event.
Fields filled in for ENF event:					
16	10	SMF42EUA	4	binary	UCB address for the device.
20	14	SMF42EVO	6	EBCDIC	VOLSER for device is online.
26	1A		2		Reserved.
28	1C	SMF42EOS	1	binary	Old MVS volume status. **Value** **Meaning** **1** Online. **2** Offline. **3** Pending offline. **4** Boxed. **5** Not ready.
29	1D	SMF42ENS	1	binary	New MVS volume status.
30	1E		2		Reserved.
Fields filled in for VARY SMS command:					
32	20	SMF42ETY	8	EBCDIC	Type of VARY or UPDATE request: STORGRP, LIBRARY, DRIVE or VOLUME.
40	28	SMF42ESL	2	binary	Name length.
42	2A	SMF42ENM	30	EBCDIC	STORAGE name or LIBRARY name or DRIVE name.

Offsets		Name	Length	Format	Description
72	48	SMF42EVL	6	EBCDIC	Volume serial.
78	4E		2		Reserved.
80	50	SMF42ESY	8	EBCDIC	System name (up to 8 systems, separated by commas) or '(ALL)'.
88	58	SMF42EST	12	EBCDIC	Resulting status: ENABLE or ENABLE,NEW or QUIESCE or QUIESCE,NEW or DISABLE or DISABLE,NEW.
100	64		4		Reserved.
Fields filled in for ACTIVATE command:					
104	68	SMF42ESD	44	EBCDIC	Source control data set name.
148	94	SMF42EAD	44	EBCDIC	Active control data set name.

Subtype 4

Concurrent copy session section

Offsets		Name	Length	Format	Description
0	0	S42CCID	4	binary	Logical session ID.
4	4	S42CCRQS	2	EBCDIC	Request type: 'CC' = Concurrent Copy.
6	6	S42CCTS	1	EBCDIC	Termination status: 'N' = normal 'A' = abnormal.
7	7	*	1		Reserved.
8	8	S42CCJNM	8	EBCDIC	Invoking jobname.
16	10	S42CCJNO	8	EBCDIC	Invoking job number.
24	18	S42CCSST	8	binary	Session start TOD.
32	20	S42CCEIT	8	binary	Initialization end TOD.
40	28	S42CCSET	8	binary	Session end TOD.
48	30	S42CCSSO	4	binary	Offset to first SSID (storage subsystem identifier) header.
52	34	S42CCSSN	2	binary	Number of SSIDs for session.
54	36	S42CCSSL	2	binary	Length of SSID header.
56	38	*	8		Reserved.

Concurrent copy SSID header section

Offsets		Name	Length	Format	Description
0	0	S42CSNXT	4	binary	Offset to next SSID header (0 if last SSID).
4	4	S42CSID	2	binary	SSID.
6	6	S42CSIDP	1	binary	Controller session ID.
7	7	*	1		Reserved.
8	8	S42CSMSF	4	binary	Maximum track threshold reached in storage control buffers.
12	C	S42CSVLO	4	binary	Offset to first volume section for this SSID.
16	10	S42CSVLN	2	binary	Number of volume sections.
18	12	S42CSVLL	2	binary	Length of each volume section.

Offsets		Name	Length	Format	Description
20	14	*	4		Reserved.

Concurrent copy volume section

Offsets		Name	Length	Format	Description
0	0	S42CVLNX	4	binary	Offset to next volume (0 if last volume).
4	4	S42CVLSR	6	EBCDIC	Volume serial number.
10	A		2	*	Reserved.
12	C	S42CVLDV	1	binary	Device type.
13	D	S42CVLUA	3	EBCDIC	Unit address.
16	10	S42CVLTK	4	binary	Number of tracks to be processed on the volume.
20	14	S42CVLRD	4	binary	Number of tracks read directly from DASD.
24	18	S42CVLRS	4	binary	Number of tracks read from the storage control buffers.
28	1C	S42CVLEP	4	binary	Number of concurrent copy I/Os for the volume for the session.
32	20	*	4		Reserved.

Extended format data set section

Offsets		Name	Length	Format	Description
0	0	S42EXID	4	binary	Logical ID.
4	4	S42EXRQS	3	EBCDIC	Request type: ‘EXT’ = Extended format data set.
7	7		1	*	Reserved.
8	8	S42EXJNM	8	EBCDIC	Invoking jobname.
16	10	S42EXJNO	8	EBCDIC	Invoking job number.
24	18	S42EXSTM	8	binary	Start TOD.
32	20	S42EXETM	8	binary	End TOD.
40	28	S42EXTS	1	EBCDIC	Termination status: ‘N’ = normal ‘A’ = abnormal
41	29		3	*	Reserved.
44	2C	S42EVLRT	8	binary	Number of tracks read.
52	34	S42EVLWT	8	binary	Number of tracks written.
60	3C		12	*	Reserved.

Virtual concurrent copy (VCC) session section

Offsets		Name	Length	Format	Description
0	0	S42VCID	4	binary	VCC Logical session ID.
4	4	S42VCRQS	3	EBCDIC	Request type: ‘VCC’ = Virtual Concurrent Copy.
7	7	S42VCTS	1	EBCDIC	Termination status: ‘N’ = normal ‘A’ = abnormal.

Offsets		Name	Length	Format	Description
8	8	S42VCJNM	8	EBCDIC	Invoking jobname.
16	10	S42VCJNO	8	EBCDIC	Invoking job number.
24	18	S42VCSST	8	binary	Session start TOD.
32	20	S42VCEIT	8	binary	Initialization end TOD.
40	28	S42VCSET	8	binary	Session end TOD.
48	30	S42VCCTK	8	binary	Total number of tracks processed using concurrent copy.
56	38	S42VCVTK	8	binary	Total number of tracks processed using virtual concurrent copy.
64	40	S42VCDSP	8	binary	Total number of tracks stored in dataspace.
72	48	S42VCSSO	4	binary	Offset to first SSID (storage subsystem identifier) header.
76	4C	S42VCSSN	2	binary	Number of SSIDs for session.
78	4E	S42VCSSL	2	binary	Length of SSID header.
80	50	*	8		Reserved

Subtype 5

Storage class response time section

- Time components are recorded in multiples of 128 microseconds unless otherwise specified.
- Times and count components include synchronous I/O operations unless otherwise specified
- On systems with zHPF I/O, cache hit information is reported by the hardware.

Offsets		Name	Length	Format	Description
0	0	S42SCRNL	2	binary	Storage class name length.
2	2	S42SCRNN	30	EBCDIC	Storage class name.
32	20	S42SCIOR	4	binary	Response time.
36	24	S42SCIOC	4	binary	Average I/O connect time.
40	28	S42SCIOP	4	binary	Average I/O pending time.
44	2C	S42SCIOD	4	binary	Average I/O disconnect time.
48	30	S42SCIOQ	4	binary	Average control unit queue time.
52	34	S42SCION	4	binary	Total number of I/Os.
3990 Control Unit Cache Statistics:					
56	38	S42SCCND	4	binary	Number of cache candidates.
60	3C	S42SCHIT	4	binary	Number of cache hits.
64	40	S42SCWCN	4	binary	Number of write candidates.
68	44	S42SCWHI	4	binary	Number of write hits.
72	48	S42SCSEQ	4	binary	Number of sequential I/O operations.
76	4C	S42SCRLC	4	binary	Number of record level cache I/O operations.
80	50	S42SCICL	4	binary	Number of inhibit cache load I/O operations.
84	54	S42SCDA0	4	binary	Average I/O device-active-only time.
88	58	S42SCRDD	4	binary	Average disconnect time for reads.
92	5C	S42SCRDT	4	binary	Total number of read operations.
96	60	S42SCHRD	4	binary	Number of zHPF read operations, but does not include synchronous I/O operations.

Offsets		Name	Length	Format	Description
100	64	S42SCHWR	4	binary	Number of zHPF write operations, but does not include synchronous I/O operations.
104	68	S42SCR1U	4	binary	Response time in microseconds.
108	6C	S42SCC1U	4	binary	Average I/O connect time in microseconds.
112	70	S42SCP1U	4	binary	Average I/O pending time in microseconds.
116	74	S42SCD1U	4	binary	Average I/O disconnect time in microseconds.
120	78	S42SCQ1U	4	binary	Average control unit queue time in microseconds.
124	7C	S42SCA1U	4	binary	Average I/O device-active-only time in microseconds.
128	80	S42SCT1U	4	binary	Average disconnect time for reads in microseconds.
132	84	S42SCB1U	4	binary	Average device busy time in microseconds.
136	88	S42SCM1U	4	binary	Average initial command response time in microseconds.
140	8C	S42SCSNO	4	binary	Offset to synchronous I/O section
144	90	S42SCSNL	2	binary	Length of synchronous I/O section
146	92	*	2	binary	Reserved
148	94	S42SCRRU	4	binary	Average random read cache hit response time in microseconds
152	98	S42SCRSU	4	binary	Average random read cache hit service time in microseconds

Volume header section

Offsets to the volume component sections are zero if there are no statistics available to the component.

Offsets		Name	Length	Format	Description
0	0	S42VTNXT	4	binary	Offset to next volume header section from start of record, including record descriptor word (RDW).
4	4	S42VTSER	6	EBCDIC	Volume serial identification.
10	A	S42VTADR	2	binary	Binary device number.
12	C	S42VTFL1	1	binary	Device descriptor flags.
		S42VTONL S42VTSMS			**Bit** **Meaning** **1... ....** Device is online **.1.. ....** Device is SMS managed **..xx xxxx** Reserved
13	D		7	EBCDIC	Reserved.
20	14	S42VTUNC	4	binary	Count of I/O to this volume that is not included in SMF type 42 subtype 5 or 6 records. With APAR OA55709 applied, this count is zero.
24	18	S42VTVDO	4	binary	Offset to VTOC data component section.
28	1C	S42VTVDL	2	binary	Length of VTOC data component section.
30	1E	*	2	EBCDIC	Reserved.
32	20	S42VTVXO	4	binary	Offset to VTOC index component section.
36	24	S42VTVXL	2	binary	Length of VTOC index component section.
38	26	*	2	EBCDIC	Reserved.
40	28	S42VTVVO	4	binary	Offset to VVDS component section.

Offsets		Name	Length	Format	Description
44	2C	S42VTVVL	2	binary	Length of VVDS component section.
46	2E	*	2	binary	Reserved.
48	30	S42VTMCO	4	binary	Offset to volume metrics section. This field is zero when there are no SSCH instructions for this volume.
52	34	S42VTMCL	2	binary	Length of volume metrics section. This field is zero when there are no SSCH instructions for this volume.
54	36	S42VTMCN	2	binary	Number of volume metrics sections. This field is zero when there are no SSCH instructions for this volume.
56	38	S42VTSYO	4	binary	Offset to system I/O section. This field is zero when there is no system I/O to this volume.
60	3C	S42VTSYL	2	binary	Length of system I/O section. This field is zero when there is no system I/O to this volume.
62	3E	S42VTSYN	2	binary	Number of system I/O sections. This field is zero when there is no system I/O to this volume.
64	40	S42VTBGO	4	binary	Offset to background activity section. This field is zero when there is no background activity.
68	44	S42VTBGL	2	binary	Length of background activity section. This field is zero when there is no background activity.
70	46	S42VTBGN	2	binary	Number of background activity sections. This field is zero when there is no background activity.

Volume header section - VTOC data component I/O statistics

Time components are recorded in multiples of 128 microseconds unless otherwise specified.

Offsets		Name	Length	Format	Description
0	0	S42VDIOR	4	binary	Response time.
4	4	S42VDIOC	4	binary	Average I/O connect time.
8	8	S42VDIOP	4	binary	Average I/O pending time.
12	C	S42VDIOD	4	binary	Average I/O disconnect time
16	10	S42VDIOQ	4	binary	Average control unit queue time.
20	14	S42VDION	4	binary	Total number of I/Os.
3990 Control Unit Cache Statistics:					
24	18	S42VDCND	4	binary	Number of cache candidates.
28	1C	S42VDHIT	4	binary	Number of cache hits.
32	20	S42VDWCN	4	binary	Number of write candidates.
36	24	S42VDWHI	4	binary	Number of write hits.
40	28	S42VDSEQ	4	binary	Number of sequential I/O operations.
44	2C	S42VDRLC	4	binary	Number of record level cache I/O operations.
48	30	S42VDICL	4	binary	Number of inhibit cache load I/O operations.
52	34	S42VDDA0	4	binary	Average I/O device-active-only time.
56	38	S42VDRDD	4	binary	Average disconnect time for reads.
60	3C	S42VDRDT	4	binary	Total number of read operations.
64	40	S42VDHRD	4	binary	Number of zHPF read operations.
68	44	S42VDHWR	4	binary	Number of zHPF write operations
72	48	S42VDR1U	4	binary	Response time in microseconds.

Offsets		Name	Length	Format	Description
76	4C	S42VDC1U	4	binary	Average I/O connect time in microseconds.
80	50	S42VDP1U	4	binary	Average I/O pending time in microseconds.
84	54	S42VDD1U	4	binary	Average I/O disconnect time in microseconds.
88	58	S42VDQ1U	4	binary	Average control unit queue time in microseconds.
92	5C	S42VDA1U	4	binary	Average I/O device-active-only time in microseconds.
96	60	S42VDT1U	4	binary	Average disconnect time for reads in microseconds.
100	64	S42VDB1U	4	binary	Average device busy time in microseconds.
104	68	S42VDM1U	4	binary	Average initial command response time in microseconds.
108	6C	*	4	–	Reserved.

Volume header section - VTOC index component I/O statistics

Time components are recorded in multiples of 128 microseconds unless otherwise specified.

Offsets		Name	Length	Format	Description
0	0	S42VXIOR	4	binary	Response time.
4	4	S42VXIOC	4	binary	Average I/O connect time.
8	8	S42VXIOP	4	binary	Average I/O pending time.
12	C	S42VXIOD	4	binary	Average I/O disconnect time.
16	10	S42VXIOQ	4	binary	Average control unit queue time.
20	14	S42VXION	4	binary	Total number of I/Os.
3990 Control Unit Cache Statistics:					
24	18	S42VXCND	4	binary	Number of cache candidates.
28	1C	S42VXHIT	4	binary	Number of cache hits.
32	20	S42VXWCN	4	binary	Number of write candidates.
36	24	S42VXWHI	4	binary	Number of write hits.
40	28	S42VXSEQ	4	binary	Number of sequential I/O operations.
44	2C	S42VXRLC	4	binary	Number of record level cache I/O operations.
48	30	S42VXICL	4	binary	Number of inhibit cache load I/O operations.
52	34	S42VXDA0	4	binary	Average I/O device-active-only time.
56	38	S42VXRDD	4	binary	Average disconnect time for reads.
60	3C	S42VXRDT	4	binary	Total number of read operations.
64	40	S42VXHRD	4	binary	Number of zHPF read. operations.
68	44	S42VXHWR	4	binary	Number of zHPF write operations
72	48	S42VXR1U	4	binary	Response time in microseconds.
76	4C	S42VXC1U	4	binary	Average I/O connect time in microseconds.
80	50	S42VXP1U	4	binary	Average I/O pending time in microseconds.
84	54	S42VXD1U	4	binary	Average I/O disconnect time in microseconds.
88	58	S42VXQ1U	4	binary	Average control unit queue time in microseconds.
92	5C	S42VXA1U	4	binary	Average I/O device-active-only time in microseconds.
96	60	S42VXT1U	4	binary	Average disconnect time for reads in microseconds.
100	64	S42VXB1U	4	binary	Average device busy time in microseconds.

Offsets		Name	Length	Format	Description
104	68	S42VXM1U	4	binary	Average initial command response time in microseconds.
108	6C	*	20	–	Reserved.

Volume header section - VVDS component I/O statistics

Time components are recorded in multiples of 128 microseconds unless otherwise specified.

Offsets		Name	Length	Format	Description
0	0	S42VVIOR	4	binary	Response time.
4	4	S42VVIOC	4	binary	Average I/O connect time.
8	8	S42VVIOP	4	binary	Average I/O pending time.
12	C	S42VVIOD	4	binary	Average I/O disconnect time.
16	10	S42VVIOQ	4	binary	Average control unit queue time.
20	14	S42VVION	4	binary	Total number of I/Os
3990 Control Unit Cache Statistics:					
24	18	S42VVCND	4	binary	Number of cache candidates.
28	1C	S42VVHIT	4	binary	Number of cache hits.
32	20	S42VVWCN	4	binary	Number of write candidates.
36	24	S42VVWHI	4	binary	Number of write hits.
40	28	S42VVSEQ	4	binary	Number of sequential I/O operations.
44	2C	S42VVRLC	4	binary	Number of record level cache I/O operations.
48	30	S42VVICL	4	binary	Number of inhibit cache load I/O operations.
52	34	S42VVDA0	4	binary	Average I/O device-active-only time.
56	38	S42VVRDD	4	binary	Average disconnect time for reads.
60	3C	S42VVRDT	4	binary	Total number of read operations.
64	40	S42VVHRD	4	binary	Number of zHPF read operations.
68	44	S42VVHWR	4	binary	Number of zHPF write operations.
72	48	S42VVR1U	4	binary	Response time in microseconds.
76	4C	S42VVC1U	4	binary	Average I/O connect time in microseconds.
80	50	S42VVP1U	4	binary	Average I/O pending time in microseconds.
84	54	S42VVD1U	4	binary	Average I/O disconnect time in microseconds.
88	58	S42VVQ1U	4	binary	Average control unit queue time in microseconds.
92	5C	S42VVA1U	4	binary	Average I/O device-active-only time in microseconds.
96	60	S42VVT1U	4	binary	Average disconnect time for reads in microseconds.
100	64	S42VVB1U	4	binary	Average device busy time in microseconds.
104	68	S42VVM1U	4	binary	Average initial command response time in microseconds.
108	6C	*	20	–	Reserved.

Synchronous I/O Section 1

Note: This section is shared between subtype 5 and subtype 6, except where otherwise indicated in the following table.

Offsets		Name	Length	Format	Description
0	0	S42SNERD	4	binary	Number of read requests eligible for synchronous I/O but not attempted.
4	4	S42SNERH	4	binary	Number of read hits eligible for synchronous I/O but not attempted.
8	8	S42SNEWR	4	binary	Number of write requests eligible for synchronous I/O but not attempted.
12	C	S42SNRDT	4	binary	Number of synchronous I/O read attempts.
16	10	S42SNROS	4	binary	Number of synchronous I/O read successes.
20	14	S42SNWTT	4	binary	Number of synchronous I/O write attempts.
24	18	S42SNWOS	4	binary	Number of synchronous I/O write successes.
28	1C	S42SNSEQ	4	binary	Number of synchronous I/O sequential operations.
32	20	S42SNCND	4	binary	Number of synchronous I/O cache candidates.
36	24	S42SNHTS	4	binary	Number of synchronous I/O cache hits.
40	28	S42SNWCN	4	binary	Number of synchronous I/O write candidates.
44	2C	S42SNWHI	4	binary	Number of synchronous I/O write hits.
48	30	S42SNRMS	4	binary	Number of synchronous I/O read misses.
52	34	S42SNWMS	4	binary	Number of synchronous I/O write misses.
56	38	S42SNMXR	4	binary	Maximum response time, in microseconds, for synchronous I/O cache read operation. **Note:** Subtype 6 only.
60	3C	S42SNMXW	4	binary	Maximum response time, in microseconds, for synchronous I/O cache write operation. **Note:** Subtype 6 only.
64	40	S42SNRDU	4	binary	Average response time, in microseconds, per synchronous I/O cache read operation.
68	44	S42SNWTU	4	binary	Average response time, in microseconds, per synchronous I/O cache write operation.
72	48	S42SNCONC	4	binary	Number of concurrent synchronous I/O operations initiated to satisfy a read or write request (S42SNRDT and S42SNWTT).
76	4C	*	4	binary	Reserved.

Volume metrics section

The following statistics include all start sub-channel (SSCH) instructions to user data and system data (VTOC, catalog, device reserves, and so on) on the DASD volume. This includes PAV alias usage on behalf of this base device. It does not include zHyperLink I/O.

I/O interrupt delay time (IIDT) is calculated as elapsed time between start subchannel and test subchannel (TSCH), minus device service time, as:

$$IIDT = (TSCH_{TimeOfDay} - SSCH_{TimeOfDay}) - service\ time$$

The total number of SSCH instructions to the volume is the sum of S42VRID1 through S42VRID6. All time values are reported in microseconds, unless otherwise noted.

Offsets		Name	Length	Format	Description
0	0	S42VRID1	4	binary	Count of interrupt delay time within 1 - 10 microseconds.
4	4	S42VRID2	4	binary	Count of interrupt delay time within 10 - 100 microseconds.
8	8	S42VRID3	4	binary	Count of interrupt delay time within 100 - 1000 microseconds.
12	0C	S42VRID4	4	binary	Count of interrupt delay time within 1 - 10 milliseconds.
16	10	S42VRID5	4	binary	Count of interrupt delay time within 10 - 100 milliseconds.

Offsets		Name	Length	Format	Description
20	14	S42VRID6	4	binary	Count of interrupt delay time over 100 milliseconds.
24	18	*	4	binary	Reserved.
28	1C	S42VRIDM	4	binary	Maximum I/O interrupt delay time.
32	20	S42VRIDT	8	binary	Date/time (in STCK format) of the maximum I/O interrupt delay (S42VRIDM).
40	28	S42VRIDA	4	binary	Average I/O interrupt delay time.
44	2C	S42VRBSY	2	binary	Total time that device is long busy, in seconds.
46	2E	*	2	binary	Reserved.
48	30	S42VRRSP	4	binary	Count of commands to the HyperPAV alias device that could not start because the base device is reserved to another system.
52	34	S42VRRSN	4	binary	Count of channel programs that include a RESERVE command.
56	38	S42VRRES	4	binary	Sum of time that device is reserved during the interval.
60	3C	S42VRREX	4	binary	Longest continuous time device is reserved.
64	40	S42VRRSR	4	binary	Average response time for channel programs with RESERVE command.
68	44	*	4	binary	Reserved.

System I/O section

System I/O requests to the volume. These are I/O requests to system data sets or to the volume (such as RESERVE command). VTOC, INDEX, VVDS, and DASD data set level I/O statistics (SMF record type 42 subtype 6) are not included.

Offsets		Name	Length	Format	Description
0	0	S42VSYO1	4	binary	Offset to system I/O statistics section.
4	4	S42VSYL1	2	binary	Length of system I/O statistics section.
6	6	S42VSYN1	2	binary	Number of system I/O statistics sections.
8	8	S42VSYO2	4	binary	Offset to system I/O high response time section.
12	0C	S42VSYL2	2	binary	Length of system I/O high response time section.
14	0E	S42VSYN2	2	binary	Number of system I/O high response time sections.

System I/O statistics section

I/O response times are recorded in units of 1 microsecond, unless noted otherwise.

Offsets		Name	Length	Format	Description
0	0	S42VSION	4	binary	SSCH count. This is the number of physical requests for system I/O to this device.
4	4	S42VSIOR	4	binary	Average response time.
8	8	S42VSIOC	4	binary	Average connect time.
12	0C	S42VSIOP	4	binary	Average pend time.
16	10	S42VSIOD	4	binary	Average disconnect time.
20	14	S42VSIOQ	4	binary	Average control unit queue time.
24	18	S42VSDAO	4	binary	Average device-active-only time.
28	1C	S42VSDBT	4	binary	Average device busy time.
32	20	S42VSICR	4	binary	Average initial command response time.

Offsets		Name	Length	Format	Description
36	24	*	4	binary	Reserved.

System I/O high response time section

An array of system I/O jobs with the highest response time. Each job is reported only once.

Offsets		Name	Length	Format	Description
0	0	S42VSXNJ	2	binary	Number of jobs included with highest response time.
2	2	*	2	binary	Reserved.
4	4	S42VSXAA	(varies)	binary	System I/O high response time array. Contains S42VSXNJ number of entries. See "System I/O high response time array" on page 390.

System I/O high response time array

Response time metrics are reported in units of one microsecond.

Offsets		Name	Length	Format	Description
0	0	S42VSXJN	8	EBCDIC	Invoking job name.
8	8	S42VSXRT	4	binary	Response time.
12	0C	S42VSXST	4	binary	Service time.
16	10	S42VSXID	4	binary	I/O interrupt delay time.
20	14	S42VSXDV	1	binary	I/O driver ID.
21	15	S42VSXOP	1	binary	Operation code of the first CCW in the channel program.
22	16	*	2	binary	Reserved.
24	18	S42VSXTM	8	binary	Date/time (in STCK format) when I/O completed.

Volume background activity

The following statistics are generated based on background disk activity. These statistics are not reported elsewhere in type 42 subtype 5 or 6 records.

Offsets		Name	Length	Format	Description
0	0	S42VBGO1	4	binary	Offset to volume cloud activity section.
4	4	S42VBGL1	2	binary	Length of volume cloud activity section.
6	6	S42VBGN1	2	binary	Number of volume cloud activity sections.

Volume cloud activity section

Offsets		Name	Length	Format	Description
0	0	S42VBCRN	4	binary	Number of requests to retrieve cloud data.
4	4	S42VBCWN	4	binary	Number of requests to store cloud data.
8	8	S42VBCRT	4	binary	Number of tracks retrieved from the cloud.
12	0C	S42VBCWT	4	binary	Number of tracks stored to the cloud.
16	10	S42VBCRE	4	binary	Total elapsed time to retrieve cloud data, in milliseconds.
20	14	S42VBCWE	4	binary	Total elapsed time to store cloud data, in milliseconds.

Subtype 6

Job header section (data set statistics)

Offsets		Name	Length	Format	Description
0	0	S42JDJNM	8	EBCDIC	Job name.
8	8	S42JDRST	4	binary	Time since midnight, in hundreds of a second, reader recognized the JOB card for this job.
12	0C	S42JDRSD	4	packed	Date reader recognized the JOB card for this job, in the form 0*cyyddd*F.
16	10	S42JDUID	8	EBCDIC	User-defined identification field (taken from common exit parameter area, not from USER=parameter on job statement).
24	18	S42JDDSO	4	binary	Offset to first data set header section.
28	1C	S42JDDSL	2	binary	Length of data set header section.
30	1E	S42JDCOD	1	binary	0=Close, 1=Interval record.
31	1F	*			Reserved.
32	20	S42JDPGN	2	binary	Job performance group number.
34	22	S42JDIOL	2	binary	Length of data set I/O statistics section.
36	24	S42JDAML	2	binary	Length of access method statistics section.
38	26	*	2	EBCDIC	Reserved.
40	28	S42JDGMO	4	binary	Greenwich Mean Time (GMT) offset represented in 1.048576 seconds.
44	2C	S42JDWSC	8	EBCDIC	Workload Manager (WLM) Service Class Name.
52	32	S42JDWLD	8	EBCDIC	Workload Manager (WLM) workload name.
60	3C	*	4	EBCDIC	Reserved.

Data set header section

Offsets		Name	Length	Format	Description
0	0	S42DSNXT	4	binary	Offset to the next data set header section (0 if the last data set).
4	4	S42DSN	44	EBCDIC	Data set name.

Offsets		Name	Length	Format	Description
48	30	S42DSTYP	1	binary	Data set type. **Value** **Meaning** **0** Other **1** Physical sequential **2** PDS **3** PDSE **4** Direct access **5** ISAM **6** EXCP **7** Extended physical sequential data set **10** HFS **16** KSDS data component **17** KSDS index component **18** Variable RRDS data component **19** Variable RRDS index component **20** Fixed length RRDS **21** Linear data set **22** ESDS
49	31	S42DSCOD S42FIRST *	1	binary	Entry descriptor flag **Bit** **Meaning** **1... ....** First data set entry since Open. **.xxx xxxx** Reserved.

Offsets		Name	Length	Format	Description
50	32	**S42DSFL1** **S42DSGSR** **S42DSLSR** **S42DSRLS** **S42DSNSR** **S42DSEXC** **S42DSFXD** **S42DSPL** **S42DSEF** **S42DSEFC**	1	binary	Data set descriptor flags **Bit** **Meaning** **11xx xxxx** VSAM buffer flags **11.. ....** GSR **10.. ....** LSR **01.. ....** RLS **00.. ....** NSR **..x. ....** Reserved **....1 ....** Open for EXCP processing **..... 1...** Non-VSAM fixed length records **..... .1..** Program library **..... ..1.** Extended format **..... ...1** Compressed format
51	33	*	1	EBCDIC	Reserved.
52	34	S42DSIOO	4	binary	Offset to data set I/O statistics section.
56	38	S42DSAMO	4	binary	Offset to access method statistics section.
60	3C	S42DSVOL	6	EBCDIC	Volume serial number.
66	42	S42DSDEV	2	binary	Device number.
68	44	S42DSSC	8	EBCDIC	Storage class name.
76	4C	S42DSBSZ	4	binary	Block size. For concatenated data sets, this data is taken from the first data set.
80	50	S42DSTRP	2	binary	Number of stripes
82	52	S42DSENT	2	binary	Encryption type **Value** **Meaning** **0100x** AES-256
84	54	S42DSCMT	1	binary	Data Set Compression type **Value** **Meaning** **0** No Compression **1** Generic Compression **2** Tailored Compression **3** ZEDC Compression
88	58	S42DSSNO	4	binary	Offset to synchronous section. See synchronous I/O section in Subtype 5

Offsets		Name	Length	Format	Description
92	5C	S42DSSNL	2	binary	Length of synchronous I/O section.
94	5E	*	2		Reserved.
96	60	S42DSS2O	4	binary	Offset to synchronous I/O section 2.
100	64	S42DSS2L	2	binary	Length of synchronous I/O section 2.
102	66	S42DS2FL	1	bitstring	Sync_IO section 2 descriptor flags.
		S42DS2DL		1...	Media Manager dual logging is installed on this system, and the newly defined dual logging sync_IO SMF fields are valid if S42DSS2O is not 0.
103	67	*	1	binary	Reserved.
104	68	S42DSS3O	4	binary	Offset to synchronous I/O section 3.
108	6C	S42DSS3L	2	binary	Length of synchronous I/O section 3.
110	6E	*	2		Reserved.

Data set I/O statistics section

The following statistics provide I/O response and service metrics for each data set.

- On systems with zHPF, cache hits are reported by the hardware.
- Time components are recorded in multiples of 128 microseconds unless otherwise noted.
- All time and count fields include I/O that uses FICON, zHPF, and zHyperLink, unless otherwise noted.
- All time and count fields include zHyperWrite requests issued to a Metro Mirror secondary device.

Offsets		Name	Length	Format	Description
0	0	S42DSIOR	4	binary	Average response time.
4	4	S42DSIOC	4	binary	Average I/O connect time.
8	8	S42DSIOP	4	binary	Average I/O pending time.
12	C	S42DSIOD	4	binary	Average I/O disconnect time.
16	10	S42DSIOQ	4	binary	Average control unit queue time.
20	14	S42DSION	4	binary	Total number of I/Os.
24	18	S42DSCND	4	binary	Number of cache candidates.
28	1C	S42DSSHTS	4	binary	Number of cache hits.
32	20	S42DSWCN	4	binary	Number of write candidates.
36	24	S42DSWHI	4	binary	Number of write hits.
40	28	S42DSSEQ	4	binary	Number of sequential I/O operations. Operations counted here are not accumulated in S42DSCND and S42DSWCN.
44	2C	S42DSRLC	4	binary	Number of record level cache I/O operations.
48	30	S42DSICL	4	binary	Number of inhibit cache load I/O operations.
52	34	S42DSDA0	4	binary	Average I/O device-active-only time.
56	38	S42DSMXR	4	binary	Maximum data set I/O response time.
60	3C	S42DSMXS	4	binary	Service time associated with maximum I/O response time (S42DSMXR).
64	40	S42DSRDD	4	binary	Average disconnect time for reads.
68	44	S42DSRDT	4	binary	Total number of read operations.
72	48	S42DSHRD	4	binary	Number of zHPF read operations. **Note:** Does not include synchronous I/O operations.

Offsets		Name	Length	Format	Description
76	4C	S42DSHWR	4	binary	Number of zHPF write operations. **Note:** Does not include synchronous I/O operations.
80	50	S42DSR1U	4	binary	Average response time in microseconds.
84	54	S42DSC1U	4	binary	Average I/O connect time in microseconds.
88	58	S42DSP1U	4	binary	Average I/O pending time in microseconds.
92	5C	S42DSD1U	4	binary	Average I/O disconnect time in microseconds.
96	60	S42DSQ1U	4	binary	Average control unit queue time in microseconds.
100	64	S42DSA1U	4	binary	Average I/O device-active-only time in microseconds.
104	68	S42DST1U	4	binary	Average disconnect time for reads in microseconds.
108	6C	S42DSB1U	4	binary	Average device busy time in microseconds.
112	70	S42DSM1U	4	binary	Average initial command response time in microseconds.
116	74	S42DSIOS	4	binary	Number of zHyperWrite requests issued to a Metro Mirror secondary device.
120	78	*	4		Reserved.
124	7C	S42DSRRU	4	binary	Average random read cache hit response time.
128	80	S42DSRSU	4	binary	Average random read cache hit service time.
132	84	S42SNAvgARDelay	4	binary	Average application resume delay.
136	88	S42SNARDelayCount	4	binary	Number of application resume delays accumulated.
140	8C	S42DSMXI	2	binary	Storage subsystem ID of device for S42DSMXR.
142	8E	*	10	binary	Reserved.

Data access method statistics section

This section contains information as seen by the access methods.

Notes:

- All delay values are in units of 128 microseconds.
- The I/O delay is calculated by the access method when the access method checks whether an I/O buffer is available to be reused. For example, when an access method has issued an I/O request to commit the buffer. The timer starts when the access method makes the check request; it does not start when the I/O is requested. The timer ends when the I/O request completes. Thus, the delay value that is reported is the amount of time that the caller had to wait to reuse a buffer. These delay times do not reflect delays for EXCP, EXCPVR, or XDAP macros issued by a user program.

Offsets		Name	Length	Format	Description
0	0	S42AMSRB	4	binary	Sequential read: number of blocks
4	4	S42AMSRR	4	binary	Sequential read: I/O delay
8	8	S42AMSWB	4	binary	Sequential write: number of blocks
12	0C	S42AMSWR	4	binary	Sequential write: I/O delay
16	10	S42AMDRB	4	binary	Direct read: number of blocks
20	14	S42AMDRR	4	binary	Direct read: total I/O delay
24	18	S42AMDWB	4	binary	Direct write: number of blocks
28	1C	S42AMDWR	4	binary	Direct write: total I/O delay
32	20	S42AMZRB	4	binary	Number of directory reads (currently unused and set to zero)
36	24	S42AMZRR	4	binary	Directory read: I/O delay

Offsets		Name	Length	Format	Description
40	28	S42AMZWB	4	binary	Number of directory writes (currently unused and set to zero)
44	2C	S42AMZWR	4	binary	Directory write: I/O delay
The following fields are set for VSAM (including linear data sets), sequential, partitioned, and zFS. These count only bytes and control intervals (CI) within channel programs that transfer user data (with the exception of preformat channel programs that are included in the bytes written and CI written).					
48	30	S42AMRIB	8	binary	Number of bytes read.
56	38	S42AMWIB	8	binary	Number of bytes written.
64	40	S42AMRBD	8	binary	For encrypted data sets, number of bytes decrypted when reading. For non-encrypted data sets, number of bytes that would be eligible for decryption when reading if the data set was allocated as encrypted.
72	48	S42AMWBE	8	binary	For encrypted data sets, number of bytes encrypted when writing. For non-encrypted data sets, number of bytes that would be eligible for encryption when writing if the data set was allocated as encrypted.
80	50	S42AMRCI	4	binary	Number of VSAM CIs read. For non-VSAM, this is the number of physical blocks.
84	54	S42AMWCI	4	binary	Number of VSAM CIs written. For non-VSAM, this is the number of physical blocks.

Synchronous I/O Section 2

Offsets		Name	Length	Format	Description
0	0	S42SNTWR	4	binary	Number of SyncIO write requests.
4	4	S42SNTWO	4	binary	Number of SyncIO write requests that were completed synchronously.
8	8	S42SNTWS	4	binary	Number of SyncIO write requests that are skipped for zHyperLink because of a previous asynchronous write.
12	C	S42SNTWB	4	binary	Number of SyncIO write requests that went asynchronous because of a busy link condition.
16	10	S42SNTWM	4	binary	Number of SyncIO write requests that went asynchronous because of a cache miss.
20	14	S42SNTWP	4	binary	Number of SyncIO write requests that went asynchronous because of an operation delay.
24	18	S42SNTWE	4	binary	Number of SyncIO write requests that went asynchronous because of not having a complete write token set.
28	1C	S42SNTWI	4	binary	Number of SyncIO write requests that went asynchronous because of an invalid write token.
32	20	S42SNTWC	4	binary	Number of SyncIO write requests that went asynchronous because of inconsistent writes.
36	24	S42SNTWD	4	binary	Number of SyncIO write requests that went asynchronous because of zHyperLink writes being disabled on a device.
40	28	S42SNTWA	4	binary	Number of read requests to a data set open for SyncIO writes.
44	2C	S42SNTWK	4	binary	Number of SyncIO write requests where zHyperLink might not be performed.
48	30	S42SNTWV	4	binary	Number of SyncIO write requests where a device is reserved to another system.
52	34	S42SNTWL	4	binary	Number of SyncIO write requests where zHyperLink write is disabled because of not being opened for SyncIO writes.

Offsets		Name	Length	Format	Description
56	38	S42SNTWT	4	binary	Number of SyncIO write requests where zHyperLink write is disabled because of the data set being extended after Open.
60	3C	S42SNTWN	4	binary	Number of SyncIO write requests where zHyperLink write is disabled because of the data set being ineligible for SyncIO writes, such as a multivolume data set, or CI size is not 4K.
64	40	S42SNTWG	4	binary	Number of SyncIO write requests where zHyperLink write is disabled because of storage class or operator setting.
68	44	S42SNTWY	4	binary	Number of SyncIO write requests where zHyperLink writes are disabled because of a token array error.
72	48	S42SNTWU	4	binary	Number of SyncIO write requests where zHyperLink writes are disabled because of an unsupported copy relationship.
76	4C	S42SNTWF	4	Binary	Number ofSyncIO write requests where zHyperLink writes are disabled because of buffers not being on a page boundary.
80	50	S42SNTWQ	4	binary	Number of SyncIO write requests where zHyperLink writes are disabled because of invalid zHyperLink write requests.
84	54	S42SNTWZ	4	binary	Number of SyncIO write requests where zHyperLink writes are disabled because of zHPF being disabled.
88	58	S42SNTWW	4	binary	Number of SyncIO write requests where zHyperLink writes are disabled because of an internal error.
92	5C	S42SNTWX	4	binary	Number of SyncIO write requests where zHyperLink writes are disabled because of miscellaneous reasons.
96	60	S42SNTWH	4	binary	Number of SyncIO write requests where zHyperLink writes are disabled because of the other data set in a dual logging request being disabled for zHyperLink writes. Valid when S42DS2DL is ON.
100	64	S42SNTDR	4	binary	Number of SyncIO write requests where dual logging is specified. Valid when S42DS2DL is ON.
104	68	S42SNTDX	4	binary	Number of dual logging SyncIO write requests where all I/O to this data set is completed synchronously, but the I/O to the other data set is completed asynchronously, resulting in the entire request being completed asynchronously. Valid when S42DS2DL is ON.
108	6C	*	4	binary	Reserved.

Synchronous I/O Section 3

Offsets		Name	Length	Format	Description
0	0	*	2	binary	Reserved.
2	2	S42SNDWH	2	binary	Storage subsystem ID for this device.
4	4	*	1	binary	Reserved.
5	5	S42SNDWJ	1	binary	Subchannel Set ID for this device.
6	6	S42SNDWN	2	binary	Device Number for this device.
8	8	S42SNDWT	4	binary	Number of SyncIO writes for this device (attempts and skips).
12	C	S42SNDWO	4	binary	Number of SyncIO writes for this device that were successful.
16	10	S42SNDWS	4	binary	Number of SyncIO writes for this device that went asynchronous due to a previous asynchronous write.
20	14	S42SNDWB	4	binary	Number of SyncIO writes for this device that went asynchronous due to a busy link condition.
24	18	S42SNDWM	4	binary	Number of SyncIO writes for this device that went asynchronous due to a cache miss.
28	1C	S42SNDWP	4	binary	Number of SyncIO writes for this device that went asynchronous due to an operation delay.

Offsets		Name	Length	Format	Description
32	20	S42SNDWE	4	binary	Number of SyncIO writes for this device that went asynchronous due to not having a write token.
36	24	S42SNDWI	4	binary	Number of SyncIO writes for this device that went asynchronous due to an invalid write token.
40	28	S42SNDWC	4	binary	Number of SyncIO writes for this device that went asynchronous due to an inconsistent write pattern.
44	2C	S42SNDWD	4	binary	Number of SyncIO writes for this device that went asynchronous due to zHyperLink writes being disabled on this device.
48	30	S42SNDWU	4	binary	Number of SyncIO writes for this device that went asynchronous due to an unsupported copy relationship.
52	34	S42SNDWK	4	binary	Number of SyncIO writes for this device that went asynchronous because zHyperLink could not be performed.
56	38	S42SNDWV	4	binary	Number of SyncIO writes for this device that went asynchronous because this device was reserved to another system.
60	3C	S42SNDWX	4	binary	Number of SyncIO writes for this device that went asynchronous due to miscellaneous reasons.

Subtype 9

B37/D37/E37 abend data section

Offsets		Name	Length	Format	Description
0	0	S42ASYID	4	EBCDIC	System ID.
4	4	S42JOBN	8	EBCDIC	Job Name.
12	C	S42RDST	4	binary	Reader start time.
16	10	S42RDSD	4	packed	Reader start date (0cyyddf).
20	14	S42AAUID	8	EBCDIC	User identification.
28	1C	S42ASTPN	1	binary	Job step number.
29	1D	S42FLAGS	1	binary	Flags: **Bit (Name)** **Meaning when set** **0 (S42B37)** B37 abend **1 (S42D37)** D37 abend **2 (S42E37)** E37 abend **3-7** Reserved
30	1E	*	4		Reserved.
34	22	S42DSORG	2	binary	DSORG (data set organization).
36	24	S42ADISP	1	binary	Disposition.
37	25	S42DSNME	44	EBCDIC	Data set name.
81	51	S42VOLSR	6	EBCDIC	Volume serial number of current volume.
87	57	S42UCBTP	4	binary	UCB type information.
91	5B	S42NEXT	1	binary	Number of extends on the current volume for this data set.
92	5C	S42TNTRK	4	binary	Total number of tracks for data set on this volume.
96	60	S42ASSAT	4	binary	Secondary allocation amount from the JFCB.

Offsets		Name	Length	Format	Description
100	64	S42ADRLH	3	binary	Average block length if specified.
103	67	*	5		Reserved.

SMS Data Section

Offsets		Name	Length	Format	Description
0	0	S42MCNME	30	EBCDIC	Management class name.
30	1E	S42SCNME	30	EBCDIC	Storage class name.
60	3C	S42DCNME	30	EBCDIC	Data class name.

Subtype 10

Volume Selection Failure Section

Offsets		Name	Length	Format	Description
0	0	SMF42JBN	8	EBCDIC	Job name.
8	8	SMF42PGN	8	EBCDIC	Program name.
16	10	SMF42STN	8	EBCDIC	Step name
24	18	SMF42DDN	8	EBCDIC	DD name.
32	20	SMF42DSN	44	EBCDIC	Data set name.
76	4C	SMF42RSP	4	binary	Requested space quantity.
80	50	SMF42UNT	2	EBCDIC	Unit of space quantity.
82	52	SMF42DCL	2	binary	Length of data class.
86	56	SMF42DCN	30	EBCDIC	Data class name.
116	74	SMF42MCL	2	binary	Length of management class.
118	76	SMF42MCN	30	EBCDIC	Management class name.
148	94	SMF42SLN	2	binary	Length of storage class.
150	96	SMF42SNM	30	EBCDIC	Storage class name.
180	B4	SMF42SGL	2	binary	Length of storage group.
182	B6	SMF42SGN	30	EBCDIC	Storage group name.
210	D2		4	binary	Length of volume {name | list}.
212	D4		30	EBCDIC	Volume {name | list}.

Subtype 11

Extended Remote Copy (XRC) Session Section

Offsets		Name	Length	Format	Description
0	0	S42XRID	8	EBCDIC	Logical session ID.
8	8	S42XRTYP	8	EBCDIC	Session type 'XRC' = Extended Remote Copy
16	10	S42XRSSO	4	binary	Offset to first storage subsystem identifier (SSID) data section.
20	14	S42XRSSN	2	binary	Number of SSIDs in the XRC session.
22	16	S42XRSSL	2	binary	Length of SSID data section.

Offsets		Name	Length	Format	Description
24	18		8		Reserved.

XRC SSID Data Section

Offsets		Name	Length	Format	Description
0	0	S42XRSNX	4	binary	Offset to next SSID data section (0 if last SSID).
4	4	S42XRSID	2	binary	SSID.
6	6	S42XRIDP	1	binary	Controller session ID.
7	7	*	1		Reserved.
8	8	S42XRVSH	4	binary	Number of volumes being shadowed for this SSID that are still active in the XRC session at the end of the SMF interval.
12	C	S42XRTPR	4	binary	Total number of primary data mover reads.
16	10	S42XRNWD	4	binary	Number of data mover reads with data.
20	14	S42XRNND	4	binary	Number of data mover reads with no data.
24	18	S42XRNLR	4	binary	Number of data mover reads left to be read.
28	1C	S42XRNFW	4	binary	Number of format writes.
32	20	S42XRNUW	4	binary	Number of update writes.
36	24	S42XRARS	4	binary	Average record size.
40	28	*	4		Reserved.

Subtype 14

ADSTAR distributed storage manager (ADSM) accounting section

Offsets		Name	Length	Format	Description
0	0	SMF42T14	2	EBCDIC	Product level.
2	2		8	EBCDIC	Product name, ADSM.
10	A		2	N/A	Reserved.
12	C		30	EBCDIC	Node name of ADSM client. If the node name does not fit completely within 30 characters, the client node name is listed as: `first...last` where *first* is the first 17 characters of the node name and *last* is the last 10 characters of the node name.
42	2A		14	EBCDIC	Data and time of accounting (yyyymmddhhmmss).
56	38		4	binary	Duraction of session, in seconds.
60	3C		4	binary	Number of archive database objects inserted during session.
64	40		4	binary	Number of backup database objects inserted during session.
68	44		4	binary	Amount of archived files, in kilobytes, sent by the client to the server.
72	48		4	binary	Amount of backed up files, in kilobytes, sent by the client to the server
76	4C		4	binary	Amount of data, in kilobytes, communicated between a client node and the server during this session.
80	50		8	EBCDIC	Client owner name (UNIX).
88	58		8	EBCDIC	Node type.

Offsets		Name	Length	Format	Description
96	60		8	EBCDIC	Communication method used for session.
104	68		4	binary	Number of archive database objects retrieved during session.
108	6C		4	binary	Number of backup database objects retrieved during session.
112	70		4	binary	Amount of space, in kilobytes, retrieved by archived objects.
116	74		4	binary	Amount of space, in kilobytes, retrieved by backed up objects.
120	78		4	binary	Amount of Idle Wait time, in seconds, during the session.
124	7C		4	binary	Amount of Communications Wait time, in seconds, during the session.
128	80		4	binary	Amount of Media Wait time, in seconds, during the session.
132	84		4	binary	Amount of CPU time, in seconds, used by the server for basic client activity. This amount includes CPU time to send or receive data from the client but does not include CPU time to place data on, or retrieve it from database storage.
136	88		1	binary	Authentication method used.
137	89		1	binary	Normal termination indicator (Normal=X'01').
138	8A		2	N/A	Reserved.
140	8C		4	binary	Number of space managed database objects inserted during session.
144	90		4	binary	Amount of space managed data, in kilobytes, sent by the client to the server.
148	94		4	binary	Number of space managed database objects retrieved during session.
152	98		4	binary	Amount of space, in kilobytes, retrieved by space managed objects.

Subtype 15 — VSAM RLS Storage Class Response Time Summary

Sysplex-wide storage class summary data section for below the bar

Offsets		Name	Length	Format	Description
0	0	SMF42FAA	4	binary	Interval length. This is the total length, in seconds, of the measurement period.
4	4	SMF42F00	12	EBCDIC	Indicates if DFSMS greater than 4K CF caching is active. Value is GT4KACTIVE or GT4KNOTACT.
16	10	SMF42FAB	2	binary	Length of the storage class name.
18	12	SMF42FAC	30	EBCDIC	Storage class name.
48	30	SMF42F01	2	binary	Length of DFSMS cache set name.
50	32	SMF42FAD	30	EBCDIC	DFSMS cache set name.
80	50	SMF42FAE	4	binary	Number of lock requests processed.
84	54	SMF42FAF	4	binary	Number of true contention lock requests.
88	58	SMF42FAG	4	binary	Number of false contention lock requests.
92	5C	SMF42F02	2	binary	DFSMS direct weight
94	5E	SMF42F12	2	binary	DFSMS sequential weight
96	60	SMF42FAH	7	EBCDIC	Reserved.

Offsets		Name	Length	Format	Description
103	67	SMF42FY3	1	binary	**Bit (Name)** **Meaning when set** **0 (SMF42FSC)** CA and CI count valid **1 (SMF42FST)** Local contention fields valid
104	68	SMF42FSA	4	binary	Total number of CI splits for this interval (across the sysplex)
108	6C	SMF42FSB	4	binary	Total number of CA splits for this interval (across the sysplex)
Sysplex-wide direct access summary section:					
112	70	SMF42FCA	4	binary	Coupling facility cache partition number.
116	74	SMF42FCB	4	binary	Total number of direct access requests.
120	78	SMF42FCC	4	binary	Total number of Read requests - no read integrity.
124	7C	SMF42FCD	4	binary	Total number of Read Requests - Consistent reads.
128	80	SMF42FCE	4	binary	Total number of Write requests.
132	84	SMF42FCF	4	binary	Number of direct access BMF requests.
136	88	SMF42FCG	4	binary	Number of direct access BMF Read Requests.
140	8C	SMF42FCH	4	binary	Number of direct access BMF Write requests.
144	90	SMF42FCI	4	binary	Number of direct access BMF Read hits.
148	94	SMF42FCJ	4	binary	Number of BMF valid Read hits.
152	98	SMF42FCK	4	binary	Number of BMF false invalids.
156	9C	SMF42FCL	4	binary	Number of requests processed by the sysplex cache manager.
160	A0	SMF42FCM	4	binary	Number of CF Read requests.
164	A4	SMF42FCN	4	binary	Number of CF Write requests.
168	A8	SMF42FCO	4	binary	Number of CF Read hits
172	AC	SMF42FCP	4	binary	Number of Read castins
176	B0	SMF42FCQ	8	binary	Number of bytes transferred into the DFSMS cache structure.
184	B8	SMF42FCR	4	binary	Number of READ real I/O requests to DASD.
188	BC	SMF42FCS	4	binary	Number of WRITE real I/O requests to DASD.
192	C0	SMF42FCT	8	binary	Total number of bytes transferred for all direct access requests where the data was retrieved from DASD.
200	C8	SMF42FCU	8	binary	Number of DASD for the write requests.
208	D0	SMF42FCV	16	EBCDIC	Reserved.
224	E0	SMF42FCW	8	binary	Total amount of time, in milli seconds, for all the direct access requests in this interval.
232	E8	SMF42FCX	4	binary	Average response time for all of the requests in this interval (total time/number of requests).
236	EC	SMF42FCY	4	binary	Normalized response time for all of the requests in this interval (total time/number of bytes transferred/4K).
240	F0	SMF42FCZ	8	EBCDIC	Reserved.
248	F8	SMF42FC7	32	EBCDIC	Reserved.
Sysplex-wide direct access record merge (RE-DO) summary section:					
280	118	SMF42FDA	4	binary	Coupling facility Cache partition number (RE-DO).
284	11C	SMF42FDB	4	binary	Total number of requests to DASD (RE-DO).

Offsets		Name	Length	Format	Description
288	120	SMF42FDC	4	binary	Number of read requests - NRI protocol (No Read Integrity) (RE-DO).
292	124	SMF42FDD	4	binary	Number of read requests - Consistent read protocol (RE-DO).
296	128	SMF42FDE	4	binary	Number of WRITE requests (RE-DO).
300	12C	SMF42FDF	4	binary	Number of direct access BMF requests (RE-DO).
304	130	SMF42FDG	4	binary	Number of direct access BMF Read requests (RE-DO).
308	134	SMF42FDH	4	binary	Number of direct access BMF Write requests (RE-DO).
312	138	SMF42FDI	4	binary	Number of direct access BMF read hits (RE-DO).
316	13C	SMF42FDJ	4	binary	Number of direct access BMF valid read hits (RE-DO).
320	140	SMF42FDK	4	binary	Number of BMF false invalids (RE-DO).
324	144	SMF42FDL	4	binary	Number of requests processed by the Sysplex Cache Manager
328	148	SMF42FDM	4	binary	Number of CF cache structure Read requests (RE-DO).
332	14C	SMF42FDN	4	binary	Number of CF cache structure Write requests (RE-DO).
336	150	SMF42FDO	4	binary	Number of CF cache structure read hits (RE-DO).
340	154	SMF42FDP	4	binary	Number of CF cache structure read castins (RE-DO).
344	158	SMF42FDQ	8	binary	Number of bytes transferred into DFSMS cache structure (RE-DO).
352	160	SMF42FDR	4	binary	Number of READ real I/O direct requests to DASD (RE-DO).
356	164	SMF42FDS	4	binary	Number of WRITE real I/O direct requests to DASD (RE-DO).
360	168	SMF42FDT	8	binary	Total number of bytes transferred to DASD for the read requests.
368	170	SMF42FDU	8	binary	Total number of bytes transferred to DASD for the write requests.
376	178	SMF42FDV	16	EBCDIC	Reserved. (RE-DO)
392	188	SMF42FDW	8	binary	Total amount of time, in milli seconds, for all direct access requests in this interval (RE-DO).
400	190	SMF42FDX	4	binary	Average response time for all of the direct access requests in this interval (total time/number of requests) (RE-DO).
404	194	SMF42FDY	4	binary	Normalized response time for all of the requests in this interval (total time/number of bytes transferred/4K) (RE-DO).
408	198	SMF42FDZ	8	EBCDIC	Reserved.
416	1A0	SMF42FD7	32	EBCDIC	Reserved.
Sysplex-wide sequential access summary section:					
448	1C0	SMF42FEA	4	binary	Coupling facility cache partition number.
452	1C4	SMF42FEB	4	binary	Total number of requests.
456	1C8	SMF42FEC	4	binary	Total number of read requests - NRI protocol (No Read Integrity).
460	1CC	SMF42FED	4	binary	Total number of read requests - Consistent read protocol.
464	1D0	SMF42FEE	4	binary	Total number of WRITE requests.
468	1D4	SMF42FEF	4	binary	Number of sequential access BMF requests.
472	1D8	SMF42FEG	4	binary	Total number of sequential access BMF Read requests.
476	1DC	SMF42FEH	4	binary	Total number of sequential access BMF Write requests.
480	1E0	SMF42FEI	4	binary	Number of sequential access BMF read hits.
484	1E4	SMF42FEJ	4	binary	Number of sequential access BMF valid read hits.
488	1E8	SMF42FEK	4	binary	Number of sequential access BMF false invalids.
492	1EC	SMF42FEL	4	binary	Number of sequential access requests processed by the Sysplex Cache Manager

Offsets		Name	Length	Format	Description
496	1F0	SMF42FEM	4	binary	Number of sequential access CF cache structure read requests.
500	1F4	SMF42FEN	4	binary	Number of sequential access CF cache structure Write requests.
504	1F8	SMF42FEO	4	binary	Number of sequential access CF cache structure read hits.
508	1FC	SMF42FEP	4	binary	Number of sequential access CF cache structure read castins.
512	200	SMF42FEQ	8	binary	Number of bytes transferred into the DFSMS CF cache structure.
520	208	SMF42FER	4	binary	Number of READ real I/O sequential requests to DASD.
524	20C	SMF42FES	4	binary	Number of WRITE real I/O sequential requests to DASD.
528	210	SMF42FET	8	binary	Total number of bytes transferred to DASD for the read requests.
536	218	SMF42FEU	8	binary	Total number of bytes transferred to DASD for the write requests.
544	220	SMF42FEV	16	EBCDIC	Reserved.
560	230	SMF42FEW	8	binary	Total amount of time, in milli seconds, for all sequential access requests in this interval.
568	238	SMF42FEX	4	binary	Average response time for all of the sequential access requests in this interval (total time/number of requests).
572	23C	SMF42FEY	4	binary	Normalized response time for all of the requests in this interval (total time/number of bytes transferred/4K).
576	240	SMF42FEZ	8	EBCDIC	Reserved.
584	248	SMF42FE7	32	EBCDIC	Reserved.
Sysplex-wide sequential access record merge (RE-DO) summary section:					
616	268	SMF42FFA	4	binary	Coupling facility cache partition number.
620	26C	SMF42FFB	4	binary	Total number of sequential access requests. (RE-DO)
624	270	SMF42FFC	4	binary	Number of read requests - NRI protocol (No Read Integrity) (RE-DO).
628	274	SMF42FFD	4	binary	Number of read requests - Consistent read protocol. (RE-DO)
632	278	SMF42FFE	4	binary	Number of sequential access Write requests. (RE-DO)
636	27C	SMF42FFF	4	binary	Number of sequential access BMF requests. (RE-DO)
640	280	SMF42FFG	4	binary	Number of sequential access BMF Read requests. (RE-DO)
644	284	SMF42FFH	4	binary	Number of sequential access BMF Write requests. (RE-DO)
648	288	SMF42FFI	4	binary	Number of sequential access BMF read hits. (RE-DO)
652	28C	SMF42FFJ	4	binary	Number of sequential access BMF valid read hits. (RE-DO)
656	290	SMF42FFK	4	binary	Number of sequential access BMF false invalids. (RE-DO)
660	294	SMF42FFL	4	binary	Number of sequential access requests processed by the Sysplex Cache Manager. (RE-DO)
664	298	SMF42FFM	4	binary	Number of sequential access CF cache structure Read requests. (RE-DO)
668	29C	SMF42FFN	4	binary	Number of sequential access CF cache structure Write requests. (RE-DO)
672	2A0	SMF42FFO	4	binary	Number of sequential access CF cache structure read hits. (RE-DO)
676	2A4	SMF42FFP	4	binary	Number of sequential access CF cache structure read castins. (RE-DO)
680	2A8	SMF42FFQ	8	binary	Number of bytes transferred into the DFSMS cache structure (RE-DO).
688	2BO	SMF42FFR	4	binary	Total number of READ real I/O sequential requests to DASD. (RE-DO)

Offsets		Name	Length	Format	Description
692	2B4	SMF42FFS	4	binary	Total number of WRITE real I/O sequential requests to DASD. (RE-DO)
696	2B8	SMF42FFT	8	binary	Total number of bytes transferred to DASD for the read requests.
704	2C0	SMF42FFU	8	binary	Total number of bytes transferred to DASD for the write requests.
712	2C8	SMF42FFV	16	EBCDIC	Reserved.
728	2D8	SMF42FFW	8	binary	Total amount of time, in milli seconds, for all sequential access (RE-DO) requests in this interval.
736	2E0	SMF42FFX	4	binary	Average response time for all of the sequential access (RE-DO) requests in this interval (total time/number of requests).
740	2E4	SMF42FFY	4	binary	Normalized response time for all of the requests in this interval (total time/number of bytes transferred/4K). (RE-DO)
744	2E8	SMF42FFZ	8	EBCDIC	Reserved.
752	2F0	SMF42FF7	32	EBCDIC	Reserved.
Sysplex-wide sequential access read ahead summary section:					
784	310	SMF42FGA	4	binary	Coupling facility cache partition number.
788	314	SMF42FGB	4	binary	Total number of real I/O sequential requests to DASD. (read ahead)
792	318	SMF42FGC	4	binary	Number of read requests - NRI protocol (No Read Integrity) (READ-AHEAD).
796	31C	SMF42FGD	4	binary	Number of read requests - Consistent read protocol (READ-AHEAD).
800	320	SMF42FGE	4	binary	Number of Write requests. (READ-AHEAD)
804	324	SMF42FGF	4	binary	Number of sequential access BMF requests. (READ-AHEAD)
808	328	SMF42FGG	4	binary	Number of sequential access BMF Read requests. (READ-AHEAD)
812	32C	SMF42FGH	4	binary	Number of sequential access BMF Write requests. (READ-AHEAD)
816	330	SMF42FGI	4	binary	Number of sequential access BMF read hits. (read ahead)
820	334	SMF42FGJ	4	binary	Number of sequential access BMF valid read hits. (read ahead)
824	338	SMF42FGK	4	binary	Number of BMF false invalids. (read ahead)
828	33C	SMF42FGL	4	binary	Number of requests processed by the sysplex cache manager. (read ahead)
832	340	SMF42FGM	4	binary	Number of sequential access CF cache structure Read requests. (read ahead)
836	344	SMF42FGN	4	binary	Number of sequential access CF cache structure Write requests. (read ahead)
840	348	SMF42FGO	4	binary	Number of sequential access CF cache structure read hits. (read ahead)
844	34C	SMF42FGP	4	binary	Number of sequential access CF cache structure read castins. (read ahead)
848	350	SMF42FGQ	8	binary	Total number of bytes transferred into the DFSMS cache structure for all sequential access requests. (read ahead)
856	358	SMF42FGR	4	binary	Total number of READ real I/O sequential requests to DASD (READ-AHEAD).
860	35C	SMF42FGS	4	binary	Total number of WRITE real I/O sequential requests to DASD (READ-AHEAD).
864	360	SMF42FGT	8	binary	Total number of bytes transferred to DASD for the read requests.
868	368	SMF42FGU	8	binary	Total number of bytes transferred to DASD for the write requests.
880	370	SMF42FGV	16	EBCDIC	Reserved.

Offsets		Name	Length	Format	Description
896	380	SMF42FGW	8	binary	Total amount of time, in milli seconds, for all sequential access (read ahead) requests in this interval.
904	388	SMF42FGX	4	binary	Average response time for all of the sequential access (read ahead) requests in this interval. (total time/number of requests)
908	38C	SMF42FGY	4	binary	Normalized response time for all of the requests in this interval (total time/number of bytes transferred/4K). (read ahead)
912	390	SMF42FGZ	8	EBCDIC	Reserved.
920	398	SMF42FG7	32	EBCDIC	Reserved.
Sysplex-wide sequential access pre-format summary section:					
952	3B8	SMF42FHA	4	binary	Coupling facility cache partition number.
956	3BC	SMF42FHB	4	binary	Total number of real I/O sequential requests to DASD. (pre-format)
960	3C0	SMF42FHC	4	binary	Number of read requests - NRI protocol (No Read Integrity) (PRE-FORMAT).
964	3C4	SMF42FHD	4	binary	Number of read requests - Consistent read protocol (PRE-FORMAT).
968	3C8	SMF42FHE	4	binary	Number of Write requests. (PRE-FORMAT)
972	3CC	SMF42FHF	4	binary	Number of sequential access BMF requests. (PRE-FORMAT)
976	3D0	SMF42FHG	4	binary	Number of sequential access BMF Read requests. (PRE-FORMAT)
980	3D4	SMF42FHH	4	binary	Number of sequential access BMF Write requests. (PRE-FORMAT)
984	3D8	SMF42FHI	4	binary	Number of sequential access BMF read hits. (pre-format)
988	3DC	SMF42FHJ	4	binary	Number of sequential access BMF valid read hits. (pre-format)
992	3E0	SMF42FHK	4	binary	Number of BMF false invalids. (pre-format)
996	3E4	SMF42FHL	4	binary	Number of sequential access CF Cache structure Requests. (pre-format)
1000	3E8	SMF42FHM	4	binary	Number of sequential access CF Cache structure Read Requests. (pre-format)
1004	3EC	SMF42FHN	4	binary	Number of sequential access CF Cache structure Write Requests. (pre-format)
1008	3F0	SMF42FHO	4	binary	Number of sequential access CF cache structure read hits. (pre-format)
1012	3F4	SMF42FHP	4	binary	Number of sequential access CF cache structure read castins. (pre-format)
1016	3F8	SMF42FHQ	8	binary	Number of sequential access CF cache structure bytes transferred. (pre-format)
1024	400	SMF42FHR	4	binary	Total number of READ real I/O sequential requests to DASD. (pre-format)
1028	404	SMF42FHS	4	binary	Total number of WRITE real I/O sequential requests to DASD. (pre-format)
1032	408	SMF42FHT	8	binary	Total number of bytes transferred to DASD for the read requests.
1040	410	SMF42FHU	8	binary	Total number of bytes transferred to DASD for the write requests.
1048	418	SMF42FHV	16	EBCDIC	Reserved.
1064	428	SMF42FHW	8	binary	Total amount of time, in milli seconds, for all sequential access (pre-format) requests in this interval.
1072	430	SMF42FHX	4	binary	Average response time for all of the sequential access (pre-format) requests in this interval (total time/number of requests).
1076	434	SMF42FHY	4	binary	Normalized response time for all of the requests in this interval (total time/number of bytes transferred/4K). (pre-format)

Offsets		Name	Length	Format	Description
1080	438	SMF42FHZ	8	EBCDIC	Reserved.
1088	440	SMF42FH7	32	EBCDIC	Reserved.
1120	460	SMF42FOA	4	binary	Number of record lock requests (obtain/alter/promote).
1124	464	SMF42FOB	4	binary	Number of record lock requests that cause true contention.
1128	468	SMF42FOC	4	binary	Number of record lock requests that cause false contention.
1132	46C	SMF42FOD	4	binary	Number of record lock release requests.
1136	470	SMF42FOE	4	binary	Number of component_1 type lock requests.
1140	474	SMF42FOF	4	binary	Number of component_1 type release lock requests.
1144	478	SMF42FUA	4	binary	Accumulation of waiters for record lock.
1148	44C	SMF42FUB	4	binary	Number of record locks hashed to the same hash table entry.
1152	480	SMF42FOH	4	binary	Number of component_1 class_1 (DIWA) locks (obtain/alter/ promote).
1156	484	SMF42FOI	4	binary	Number of component_1 class_1 (DIWA) locks that cause true contention.
1160	488	SMF42FOJ	4	binary	Number of component_1 class_1 (DIWA) locks that cause false contention.
1164	48C	SMF42FOK	4	binary	Number of component_1 class_1 (DIWA) release lock requests.
1168	490	SMF42FOL	4	binary	Number of component_1 class_2 (UPGRADE) locks (obtain/alter/ promote).
1172	494	SMF42FOM	4	binary	Number of component_1 class_2 (UPGRADE) locks that cause true contention.
1176	498	SMF42FON	4	binary	Number of component_1 class_2 (UPGRADE) locks that cause false contention.
1180	49C	SMF42FOO	4	binary	Number of component_1 class_2 (UPGRADE) release lock requests.
1184	4A0	SMF42FOP	4	binary	Number of component_1 class_3 (PREFORMAT) locks (obtain/ alter/promote).
1188	4A4	SMF42FOQ	4	binary	Number of component_1 class_3 (PREFORMAT) locks that cause true contention.
1192	4A8	SMF42FOR	4	binary	Number of component_1 class_3 (PREFORMAT) locks that cause false contention.
1196	4AC	SMF42FOS	4	binary	Number of component_1 class_3 (PREFORMAT) release lock requests.
1200	4B0	SMF42FOT	4	binary	Number of component_2 lock requests (obtain/alter/promote).
1204	4B4	SMF42FOU	4	binary	Number of component_2 locks that cause true contention.
1208	4B8	SMF42FOV	4	binary	Number of component_2 locks that cause false contention.
1212	4BC	SMF42FOW	4	binary	Number of component_2 release lock requests.
1216	4C0	SMF42FUD	4	binary	Accumulation of waiters for DIWA lock.
1220	4C4	SMF42FUE	4	binary	Accumulation of waiters for upgrade lock.
1224	4C8	SMF42FUF	4	binary	Accumulation of waiters for COMP2 lock.
1228	4CC	SMF42FUG	4	binary	Number of locks (DIWA, UPGRADE, and COMP2) hashed to the same hash table entry.
1232	4D0	SMF42FPH	4	binary	Number of component_1 class 4 (Index Record) locks (obtain/ alter/promote).
1236	4D4	SMF42FPI	4	binary	Number of component_1 class 4 (Index Record) locks that cause true contention.

Offsets		Name	Length	Format	Description
1240	4D8	SMF42FPJ	4	binary	Number of component_1 class 4 (Index Record) locks that cause false contention.
1244	4DC	SMF42FPK	4	binary	Number of component_1 class 4 (Index Record) release lock requests.
1256	4E8	SMF42FPS	4	binary	Total number of all thread requests.
1260	4EC	SMF42FPT	4	binary	Reserved.
1264	4F0	SMF42FPU	4	binary	Average response time for all of the thread requests in the interval. (Total time/number of thread requests).
1268	4F4	SMF42FPV	4	binary	Normalized response time for all of the thread requests in the interval. (Total time/number of bytes transferred/4K).
1272	4F8	SMF42FPW	8	EBCDIC	Reserved.
1280	500	SMF42FAI	16	EBCDIC	Lock structure name.
1296	510	SMF42FAJ	8	EBCDIC	Lock set.

SC, CF, SYS summary section for below the bar

Offsets		Name	Length	Format	Description
0	0	SMF42FBA	4	binary	Interval length. This is the total length, in seconds, of the measurement period.
4	4	SMF42F03	12	EBCDIC	Indicates if DFSMS greater than 4K CF caching is active. Value is GT4KACTIVE or GT4KNOTACT.
16	10	SMF42FBB	2	binary	Length of the storage class name.
18	12	SMF42FBC	30	EBCDIC	Storage class name.
48	30	SMF42F04	2	binary	Cache Set Name Length
50	32	SMF42FBD	30	EBCDIC	DFSMS Cache Set name.
80	50	SMF42FBE	8	EBCDIC	MVS system name.
88	58	SMF42F05	8	EBCDIC	Reserved.
96	60	SMF42FBF	2	EBCDIC	Reserved.
98	62	SMF42FBG	30	EBCDIC	DFP CF cache structure name.
128	80	SMF42FBH	4	binary	Number of lock requests processed.
132	84	SMF42FBI	4	binary	Number of true contention lock requests.
136	88	SMF42FBJ	4	binary	Number of false contention lock requests.
140	8C	SMF42FB2	2	binary	SMS Direct Weight
142	8E	SMF42FB3	2	binary	SMS Sequential Weight
144	90	SMF42FBL	8	EBCDIC	Reserved.
152	98	SMF42FTA	4	binary	Total number of CI splits for this interval.
156	9C	SMF42FTB	4	binary	Total number of CA splits for this interval.
Direct access section:					
160	A0	SMF42FIA	4	binary	Coupling facility cache partition number.
164	A4	SMF42FIB	4	binary	Number of direct requests.
168	A8	SMF42FIC	4	binary	Number of read requests - NRI protocol (No Read Integrity).
172	AC	SMF42FID	4	binary	Number of read requests - Consistent read protocol.
176	B0	SMF42FIE	4	binary	Number of Write requests.
180	B4	SMF42FIF	4	binary	Number of direct access BMF requests.

Offsets		Name	Length	Format	Description
184	B8	SMF42FIG	4	binary	Number of direct access BMF Read requests.
188	BC	SMF42FIH	4	binary	Number of direct access BMF Write requests.
192	C0	SMF42FII	4	binary	Number of direct access BMF read hits.
196	C4	SMF42FIJ	4	binary	Number of direct access BMF valid read hits.
200	C8	SMF42FIK	4	binary	Number of BMF false invalids.
204	CC	SMF42FIL	4	binary	Number of direct access CF Cache structure requests.
208	D0	SMF42FIM	4	binary	Number of direct access CF cache structure Read requests.
212	D4	SMF42FIN	4	binary	Number of direct access CF cache structure Write requests.
216	D8	SMF42FIO	4	binary	Number of direct access CF cache structure read hits.
220	DC	SMF42FIP	4	binary	Number of direct access CF cache structure read castins.
224	E0	SMF42FIQ	8	binary	Number of direct access CF cache structure bytes transferred.
232	E8	SMF42FIR	4	binary	Number of READ real I/O direct requests to DASD.
236	EC	SMF42FIS	4	binary	Number of WRITE real I/O direct requests to DASD.
240	F0	SMF42FIT	8	binary	Total number of bytes transferred to DASD for the read requests.
248	F8	SMF42FIU	8	binary	Total number of bytes transferred to DASD for the write requests.
256	100	SMF42FIV	16	EBCDIC	Reserved.
272	110	SMF42FIW	8	binary	Total amount of time, in milli seconds, for all the direct access requests in this interval.
280	118	SMF42FIX	4	binary	Average response time for all of the requests in this interval (total time/number of requests).
284	11C	SMF42FIY	4	binary	Normalized response time for all of the requests in this interval (total time/number of bytes transferred/4K).
288	120	SMF42FIZ	8	EBCDIC	Reserved.
296	128	SMF42FI7	32	EBCDIC	Reserved.
Direct access record merge (RE-DO) summary section:					
328	148	SMF42FJA	4	binary	Coupling facility cache partition number.
332	14C	SMF42FJB	4	binary	Total number of direct access requests. (RE-DO)
336	150	SMF42FJC	4	binary	Number of read requests - NRI protocol (No Read Integrity). (RE-DO)
340	154	SMF42FJD	4	binary	Number of read requests - Consistent read protocol. (RE-DO)
344	158	SMF42FJE	4	binary	Number of Write requests. (RE-DO)
348	15C	SMF42FJF	4	binary	Number of direct access BMF requests. (RE-DO)
352	160	SMF42FJG	4	binary	Number of direct access BMF Read requests. (RE-DO)
356	164	SMF42FJH	4	binary	Number of direct access BMF Write requests. (RE-DO)
360	168	SMF42FJI	4	binary	Number of direct access BMF read hits. (RE-DO)
364	16C	SMF42FJJ	4	binary	Number of direct access BMF valid read hits. (RE-DO)
368	170	SMF42FJK	4	binary	Number of BMF false invalids. (RE-DO)
372	174	SMF42FJL	4	binary	Number of direct access CF cache structure requests. (RE-DO)
376	178	SMF42FJM	4	binary	Number of direct access CF cache structure Read requests. (RE-DO)
380	17C	SMF42FJN	4	binary	Number of direct access CF cache structure Write requests. (RE-DO)
384	180	SMF42FJO	4	binary	Number of direct access CF cache structure read hits. (RE-DO)

Offsets		Name	Length	Format	Description
388	184	SMF42FJP	4	binary	Number of direct access CF cache structure read castins. (RE-DO)
392	188	SMF42FJQ	8	binary	Number of direct access CF cache structure bytes transferred. (RE-DO)
400	190	SMF42FJR	4	binary	Total number of READ real I/O direct requests to DASD. (RE-DO)
404	194	SMF42FJS	4	binary	Total number of WRITE real I/O direct requests to DASD. (RE-DO)
408	198	SMF42FJT	8	binary	Total number of bytes transferred to DASD for the read requests.
416	1A0	SMF42FJU	8	binary	Total number of bytes transferred to DASD for the write requests.
424	1A8	SMF42FJV	16	EBCDIC	Reserved.
440	1B8	SMF42FJW	8	binary	Total amount of time, in milli seconds, for all direct access. (RE-DO) requests in this interval.
448	1C0	SMF42FJX	4	binary	Average response time for all of the direct access requests in this interval (total time/number of requests). (RE-DO)
452	1C4	SMF42FJY	4	binary	Normalized response time for all of the requests in this interval (total time/number of bytes transferred/4K). (RE-DO)
456	1C8	SMF42FJZ	8	EBCDIC	Reserved.
464	1D0	SMF42FJ7	32	EBCDIC	Reserved.
Sequential access section:					
496	1F0	SMF42FKA	4	binary	Coupling facility cache partition number.
500	1F4	SMF42FKB	4	binary	Total number of sequential access requests.
504	1F8	SMF42FKC	4	binary	Number of read requests - NRI protocol (No Read Integrity).
508	1FC	SMF42FKD	4	binary	Number of read requests - Consistent read protocol.
512	200	SMF42FKE	4	binary	Number of Write requests.
516	204	SMF42FKF	4	binary	Number of sequential access BMF requests.
520	208	SMF42FKG	4	binary	Number of sequential access BMF Read requests.
524	20C	SMF42FKH	4	binary	Number of sequential access BMF Write requests.
528	210	SMF42FKI	4	binary	Number of sequential access BMF read hits.
532	214	SMF42FKJ	4	binary	Number of sequential access BMF valid read hits.
536	218	SMF42FKK	4	binary	Number of sequential BMF false invalids.
540	21C	SMF42FKL	4	binary	Number of sequential access CF cache structure requests.
544	220	SMF42FKM	4	binary	Number of sequential access CF cache structure Read requests.
548	224	SMF42FKN	4	binary	Number of sequential access CF cache structure Write requests.
552	228	SMF42FKO	4	binary	Number of sequential access CF cache structure read hits.
556	22C	SMF42FKP	4	binary	Number of sequential access CF cache structure read castins.
560	230	SMF42FKQ	8	binary	Number of sequential access CF cache structure bytes transferred.
568	238	SMF42FKR	4	binary	Total number of READ real I/O sequential requests to DASD.
572	23C	SMF42FKS	4	binary	Total number of WRITE real I/O sequential requests to DASD.
576	240	SMF42FKT	8	binary	Total number of bytes transferred to DASD for the read requests.
584	248	SMF42FKU	8	binary	Total number of bytes transferred to DASD for the write requests.
592	250	SMF42FKV	16	EBCDIC	Reserved.
608	260	SMF42FKW	8	binary	Total amount of time, in milli seconds, for all sequential access requests in this interval.
616	268	SMF42FKX	4	binary	Average response time for all of the sequential access requests in this interval (total time/number of requests).

Offsets		Name	Length	Format	Description
620	26C	SMF42FKY	4	binary	Normalized response time for all of the requests in this interval (total time/number of bytes transferred/4K).
624	270	SMF42FKZ	8	EBCDIC	Reserved.
632	278	SMF42FK7	32	EBCDIC	Reserved.
Sequential access record merge (RE-DO) summary section:					
664	298	SMF42FLA	4	binary	Coupling facility cache partition number.
668	29C	SMF42FLB	4	binary	Total number of sequential access requests. (RE-DO)
672	2A0	SMF42FLC	4	binary	Number of read requests - NRI protocol (No Read Integrity). (RE-DO)
676	2A4	SMF42FLD	4	binary	Number of read requests - Consistent read protocol. (RE-DO)
680	2A8	SMF42FLE	4	binary	Number of Write requests. (RE-DO)
684	2AC	SMF42FLF	4	binary	Number of sequential access BMF requests. (RE-DO)
688	2B0	SMF42FL6	4	binary	Number of sequential access BMF Read requests. (RE-DO)
692	2B4	SMF42FLH	4	binary	Number of sequential access BMF Write requests. (RE-DO)
696	2B8	SMF42FLI	4	binary	Number of sequential access BMF read hits. (RE-DO)
700	2BC	SMF42FLJ	4	binary	Number of sequential access BMF valid read hits. (RE-DO)
704	2C0	SMF42FLK	4	binary	Number of BMF false invalids. (RE-DO)
708	2C4	SMF42FLL	4	binary	Total number of sequential access requests. (RE-DO)
712	2C8	SMF42FLM	4	binary	Number of sequential access CF cache structure Read requests. (RE-DO)
716	2CC	SMF42FLN	4	binary	Number of sequential access CF cache structure Write requests. (RE-DO)
720	2D0	SMF42FLO	4	binary	Number of sequential access CF cache structure Read hits. (RE-DO)
724	2D4	SMF42FLP	4	binary	Number of sequential access CF cache structure read castins. (RE-DO)
728	2D8	SMF42FLQ	8	binary	Number of sequential access CF cache structure bytes transferred. (RE-DO)
736	2E0	SMF42FLR	4	binary	Total number of READ real I/O sequential requests to DASD. (RE-DO)
740	2E4	SMF42FLS	4	binary	Total number of WRITE real I/O sequential requests to DASD. (RE-DO)
744	2E8	SMF42FLT	8	binary	Total number of bytes transferred to DASD for the read requests.
752	2F0	SMF42FLU	8	binary	Total number of bytes transferred to DASD for the write requests.
760	2F8	SMF42FLV	16	EBCDIC	Reserved.
776	308	SMF42FLW	8	binary	Total amount of time, in milli seconds, for all sequential access (RE-DO) requests in this interval.
784	310	SMF42FLX	4	binary	Average response time for all of the sequential access (RE-DO) requests in this interval (total time/number of requests).
788	314	SMF42FLY	4	binary	Normalized response time for all of the requests in this interval (total time/number of bytes transferred/4K). (RE-DO)
792	318	SMF42FLZ	8	EBCDIC	Reserved.
800	320	SMF42FL7	32	EBCDIC	Reserved.
Sequential access read ahead summary section:					
832	340	SMF42FMA	4	binary	Coupling facility cache partition number.

Offsets		Name	Length	Format	Description
836	344	SMF42FMB	4	binary	Total number of sequential access requests. (read ahead)
840	348	SMF42FMC	4	binary	Number of read requests - NRI protocol (No Read Integrity). (read ahead)
844	34C	SMF42FMD	4	binary	Number of read requests - Consistent read protocol. (read ahead)
848	350	SMF42FME	4	binary	Number of Write requests. (read ahead)
852	354	SMF42FMF	4	binary	Number of sequential access BMF requests. (read ahead)
856	358	SMF42FMG	4	binary	Number of sequential access BMF Read requests. (read ahead)
860	35C	SMF42FMH	4	binary	Number of sequential access BMF Write requests. (read ahead)
864	360	SMF42FMI	4	binary	Number of sequential access BMF read hits. (read ahead)
868	364	SMF42FMJ	4	binary	Number of sequential access BMF valid read hits. (read ahead)
872	368	SMF42FMK	4	binary	Number of BMF false invalids. (read ahead)
876	36C	SMF42FML	4	binary	Number of sequential access CF cache structure requests. (read ahead)
880	370	SMF42FMM	4	binary	Number of sequential access CF cache structure Read requests. (read ahead)
884	374	SMF42FMN	4	binary	Number of sequential access CF cache structure Write requests. (read ahead)
888	378	SMF42FMO	4	binary	Number of sequential access CF cache structure read hits. (read ahead)
892	37C	SMF42FMP	4	binary	Number of sequential access CF cache structure read castins. (read ahead)
896	380	SMF42FMQ	8	binary	Number of sequential access CF cache structure bytes transferred. (read ahead)
904	388	SMF42FMR	4	binary	Total number of READ real I/O sequential requests to DASD. (read ahead)
908	38C	SMF42FMS	4	binary	Total number of WRITE real I/O sequential requests to DASD. (read ahead)
912	390	SMF42FMT	8	binary	Total number of bytes transferred to DASD for the read requests.
920	398	SMF42FMU	8	binary	Total number of bytes transferred to DASD for the write requests.
928	3A0	SMF42FMV	16	EBCDIC	Reserved.
944	3B0	SMF42FMW	8	binary	Total amount of time, in milli seconds, for all sequential access (read ahead) requests in this interval.
952	3B8	SMF42FMX	4	binary	Average response time for all of the sequential access (read ahead) requests in this interval (total time/number of requests).
956	3BC	SMF42FMY	4	binary	Normalized response time for all of the requests in this interval (total time/number of bytes transferred/4K). (read ahead)
960	3C0	SMF42FMZ	8	EBCDIC	Reserved.
968	3C8	SMF42FM7	32	EBCDIC	Reserved.
Sequential access pre-format summary section:					
1000	3E8	SMF42FNA	4	binary	Coupling facility cache partition number.
1004	3EC	SMF42FNB	4	binary	Total number of sequential access requests. (Pre-format)
1008	3F0	SMF42FNC	4	binary	Number of read requests - NRI protocol (No Read Integrity). (Pre-format)
1012	3F4	SMF42FND	4	binary	Number of read requests - Consistent read protocol. (Pre-format)
1016	3F8	SMF42FNE	4	binary	Number of Write requests. (Pre-format)
1020	3FC	SMF42FNF	4	binary	Number of sequential access BMF requests. (Pre-format)

Offsets		Name	Length	Format	Description
1024	400	SMF42FNG	4	binary	Number of sequential access BMF Read requests. (Pre-format)
1028	404	SMF42FNH	4	binary	Number of sequential access BMF Write requests. (Pre-format)
1032	408	SMF42FNI	4	binary	Number of sequential access BMF read hits. (Pre-format)
1036	40C	SMF42FNJ	4	binary	Number of sequential access BMF valid read hits. (Pre-format)
1040	410	SMF42FNK	4	binary	Number of BMF false invalids. (Pre-format)
1044	414	SMF42FNL	4	binary	Number of sequential access CF cache structure requests. (Pre-format)
1048	418	SMF42FNM	4	binary	Number of sequential access CF cache structure Read requests. (Pre-format)
1052	41C	SMF42FNN	4	binary	Number of sequential access CF cache structure Write requests. (read ahead)
1056	420	SMF42FNO	4	binary	Number of sequential access CF cache structure read hits. (read ahead)
1060	424	SMF42FNP	4	binary	Number of sequential access CF cache structure read castins. (Pre-format)
1064	428	SMF42FNQ	8	binary	Number of sequential access CF cache structure bytes transferred. (Pre-format)
1072	430	SMF42FNR	4	binary	Total number of READ real I/O sequential requests to DASD. (Pre-format)
1076	434	SMF42FNS	4	binary	Total number of WRITE real I/O sequential requests to DASD. (pre-format)
1080	438	SMF42FNT	8	binary	Total number of bytes transferred to DASD for the read requests.
1088	440	SMF42FNU	8	binary	Total number of bytes transferred to DASD for the write requests.
1096	448	SMF42FNV	16	EBCDIC	Reserved.
1112	458	SMF42FNW	8	binary	Total amount of time, in milli seconds, for all sequential access (pre-format) requests in this interval.
1120	460	SMF42FNX	4	binary	Average response time for all of the sequential access (pre-format) requests in this interval (total time/number of requests).
1124	464	SMF42FNY	4	binary	Normalized response time for all of the requests in this interval (total time/number of bytes transferred/4K). (pre-format)
1128	468	SMF42FNZ	8	EBCDIC	Reserved.
1136	470	SMF42FN7	32	EBCDIC	Reserved.
1168	490	SMF42FRA	4	binary	Number of record lock requests (obtain/alter/promote).
1172	494	SMF42FRB	4	binary	Number of record lock requests that cause true contention.
1176	498	SMF42FRC	4	binary	Number of record lock requests that cause false contention.
1180	49C	SMF42FRD	4	binary	Number of record lock release requests.
1184	4A0	SMF42FRE	4	binary	Number of component_1 type lock requests.
1188	4A4	SMF42FRF	4	binary	Number of component_1 type release lock requests.
1192	4A8	SMF42FVA	4	binary	Accumulation of waiters for record lock.
1196	4AC	SMF42FVB	4	binary	Number of record locks hashed to the same hash table entry.
1200	4B0	SMF42FRH	4	binary	Number of component_1 class_1 (DIWA) locks (obtain/alter/promote).
1204	4B4	SMF42FRI	4	binary	Number of component_1 class_1 (DIWA) locks that cause true contention.
1208	4B8	SMF42FRJ	4	binary	Number of component_1 class_1 (DIWA) locks that cause false contention.

Offsets		Name	Length	Format	Description
1212	4BC	SMF42FRK	4	binary	Number of component_1 class_1 (DIWA) release lock requests.
1216	4C0	SMF42FRL	4	binary	Number of component_1 class_2 (UPGRADE) locks (obtain/alter/promote).
1220	4C4	SMF42FRM	4	binary	Number of component_1 class_2 (UPGRADE) locks that cause true contention.
1224	4C8	SMF42FRN	4	binary	Number of component_1 class_2 (UPGRADE) locks that cause false contention.
1228	4CC	SMF42FRO	4	binary	Number of component_1 class_2 (UPGRADE) release lock requests.
1232	4D0	SMF42FRP	4	binary	Number of component_1 class_3 (PREFORMAT) locks (obtain/alter/promote).
1236	4D4	SMF42FRQ	4	binary	Number of component_1 class_3 (PREFORMAT) locks that cause true contention.
1240	4D8	SMF42FRR	4	binary	Number of component_1 class_3 (PREFORMAT) locks that cause false contention.
1244	4DC	SMF42FRS	4	binary	Number of component_1 class_3 (PREFORMAT) release lock requests.
1248	4E0	SMF42FRT	4	binary	Number of component_2 lock requests (obtain/alter/promote).
1252	4E4	SMF42FRU	4	binary	Number of component_2 locks that cause true contention.
1256	4E8	SMF42FRV	4	binary	Number of component_2 locks that cause false contention.
1260	4EC	SMF42FRW	4	binary	Number of component_2 release lock requests.
1264	4F0	SMF42FVD	4	binary	Accumulation of waiters for DIWA lock.
1268	4F4	SMF42FVE	4	binary	Accumulation of waiters for UPGRADE lock.
1272	4F8	SMF42FVF	4	binary	Accumulation of waiters for COMP2 lock.
1276	4FC	SMF42FVG	4	binary	Number of locks (DIWA, UPGRADE, and COMP2) hashed to the same hash table entry.
1280	500	SMF42FSH	4	binary	Number of component_1 class 4 (Index Record) locks (obtain/alter/promote).
1284	504	SMF42FSI	4	binary	Number of component_1 class 4 (Index Record) locks that cause true contention.
1288	508	SMF42FSJ	4	binary	Number of component_1 class 4 (Index Record) locks that cause false contention.
1292	50C	SMF42FSK	4	binary	Number of component_1 class 4 (Index Record) release lock requests.
1296	510	SMF42FQR	8	EBCDIC	Total time all thread requests.
1304	518	SMF42FQS	4	binary	Total number of all thread requests.
1308	51C	SMF42FQT	4	binary	Reserved.
1312	520	SMF42FQU	4	binary	Average response time for all of the thread requests in the interval. (Total time/number of thread requests)
1316	524	SMF42FQV	4	binary	Normalized response time for all of the thread requests in the interval. (Total time/number of bytes transferred/4K)
1320	528	SMF42FQW	8	EBCDIC	Reserved.
1328	530	SMF42FBM	16	EBCDIC	Lock structure name.
1344	540	SMF42FBN	8	EBCDIC	Lock set.

Sysplex-wide storage class summary data section for above the bar

Offsets		Name	Length	Format	Description
0	0	SMF2AFAA	4	binary	Interval length. This is the total length, in seconds, of the measurement period.
4	4	SMF2AF00	12	EBCDIC	Indicates if DFSMS greater than 4K CF caching is active. Value is GT4KACTIVE or GT4KNOTACT.
16	10	SMF2AFAB	2	binary	Length of the storage class name.
18	12	SMF2AFAC	30	EBCDIC	Storage class name.
48	30	SMF2AF01	2	binary	Length of DFSMS cache set name.
50	32	SMF2AFAD	30	EBCDIC	DFSMS cache set name.
80	50	SMF2AFAE	4	binary	Number of lock requests processed.
84	54	SMF2AFAF	4	binary	Number of true contention lock requests.
88	58	SMF2AFAG	4	binary	Number of false contention lock requests.
92	5C	SMF2AF02	2	binary	DFSMS direct weight
94	5E	SMF2AF12	2	binary	DFSMS sequential weight
96	60	SMF2AFAH	8	EBCDIC	Reserved.
104	68	SMF42FSAA	4	binary	Total number of CI splits for this interval (across the sysplex).
108	6C	SMF42FSBA	4	binary	Total number of CA splits for this interval (across the sysplex).
Sysplex-wide direct access summary section:					
112	70	SMF2AFCA	4	binary	Coupling facility cache partition number.
116	74	SMF2AFCB	4	binary	Total number of direct access requests.
120	78	SMF2AFCC	4	binary	Total number of Read requests - no read integrity.
124	7C	SMF2AFCD	4	binary	Total number of Read Requests - Consistent reads.
128	80	SMF2AFCE	4	binary	Total number of Write requests.
132	84	SMF2AFCF	4	binary	Number of direct access BMF requests.
136	88	SMF2AFCG	4	binary	Number of direct access BMF Read Requests.
140	8C	SMF2AFCH	4	binary	Number of direct access BMF Write requests.
144	90	SMF2AFCI	4	binary	Number of direct access BMF Read hits.
148	94	SMF2AFCJ	4	binary	Number of BMF valid Read hits.
152	98	SMF2AFCK	4	binary	Number of BMF false invalids.
156	9C	SMF2AFCL	4	binary	Number of requests processed by the sysplex cache manager.
160	A0	SMF2AFCM	4	binary	Number of CF Read requests.
164	A4	SMF2AFCN	4	binary	Number of CF Write requests.
168	A8	SMF2AFCO	4	binary	Number of CF Read hits
172	AC	SMF2AFCP	4	binary	Number of Read castins
176	B0	SMF2AFCQ	8	binary	Number of bytes transferred into the DFSMS cache structure.
184	B8	SMF2AFCR	4	binary	Number of READ real I/O requests to DASD.
188	BC	SMF2AFCS	4	binary	Number of WRITE real I/O requests to DASD.
192	C0	SMF2AFCT	8	binary	Total number of bytes transferred for all direct access requests where the data was retrieved from DASD.
200	C8	SMF2AFCU	8	binary	Number of DASD for the write requests.
208	D0	SMF2AFCV	16	EBCDIC	Reserved.

Offsets		Name	Length	Format	Description
224	E0	SMF2AFCW	8	binary	Total amount of time, in milli seconds, for all the direct access requests in this interval.
232	E8	SMF2AFCX	4	binary	Average response time for all of the requests in this interval (total time/number of requests).
236	EC	SMF2AFCY	4	binary	Normalized response time for all of the requests in this interval (total time/number of bytes transferred/4K).
240	F0	SMF2AFCZ	8	EBCDIC	Reserved.
248	F8	SMF2AFC7	32	EBCDIC	Reserved.
Sysplex-wide direct access record merge (RE-DO) summary section:					
280	118	SMF2AFDA	4	binary	Coupling facility Cache partition number (RE-DO).
284	11C	SMF2AFDB	4	binary	Total number of requests to DASD (RE-DO).
288	120	SMF2AFDC	4	binary	Number of read requests - NRI protocol (No Read Integrity) (RE-DO).
292	124	SMF2AFDD	4	binary	Number of read requests - Consistent read protocol (RE-DO).
296	128	SMF2AFDE	4	binary	Number of WRITE requests (RE-DO).
300	12C	SMF2AFDF	4	binary	Number of direct access BMF requests (RE-DO).
304	130	SMF2AFDG	4	binary	Number of direct access BMF Read requests (RE-DO).
308	134	SMF2AFDH	4	binary	Number of direct access BMF Write requests (RE-DO).
312	138	SMF2AFDI	4	binary	Number of direct access BMF read hits (RE-DO).
316	13C	SMF2AFDJ	4	binary	Number of direct access BMF valid read hits (RE-DO).
320	140	SMF2AFDK	4	binary	Number of BMF false invalids (RE-DO).
324	144	SMF2AFDL	4	binary	Number of requests processed by the Sysplex Cache Manager
328	148	SMF2AFDM	4	binary	Number of CF cache structure Read requests (RE-DO).
332	14C	SMF2AFDN	4	binary	Number of CF cache structure Write requests (RE-DO).
336	150	SMF2AFDO	4	binary	Number of CF cache structure read hits (RE-DO).
340	154	SMF2AFDP	4	binary	Number of CF cache structure read castins (RE-DO).
344	158	SMF2AFDQ	8	binary	Number of bytes transferred into DFSMS cache structure (RE-DO).
352	160	SMF2AFDR	4	binary	Number of READ real I/O direct requests to DASD (RE-DO).
356	164	SMF2AFDS	4	binary	Number of WRITE real I/O direct requests to DASD (RE-DO).
360	168	SMF2AFDT	8	binary	Total number of bytes transferred to DASD for the read requests.
368	170	SMF2AFDU	8	binary	Total number of bytes transferred to DASD for the write requests.
376	178	SMF2AFDV	16	EBCDIC	Reserved. (RE-DO)
392	188	SMF2AFDW	8	binary	Total amount of time, in milli seconds, for all direct access requests in this interval (RE-DO).
400	190	SMF2AFDX	4	binary	Average response time for all of the direct access requests in this interval (total time/number of requests) (RE-DO).
404	194	SMF2AFDY	4	binary	Normalized response time for all of the requests in this interval (total time/number of bytes transferred/4K) (RE-DO).
408	198	SMF2AFDZ	8	EBCDIC	Reserved.
416	1A0	SMF2AFD7	32	EBCDIC	Reserved.
Sysplex-wide sequential access summary section:					
448	1C0	SMF2AFEA	4	binary	Coupling facility cache partition number.
452	1C4	SMF2AFEB	4	binary	Total number of requests.
456	1C8	SMF2AFEC	4	binary	Total number of read requests - NRI protocol (No Read Integrity).

Offsets		Name	Length	Format	Description
460	1CC	SMF2AFED	4	binary	Total number of read requests - Consistent read protocol.
464	1D0	SMF2AFEE	4	binary	Total number of WRITE requests.
468	1D4	SMF2AFEF	4	binary	Number of sequential access BMF requests.
472	1D8	SMF2AFEG	4	binary	Total number of sequential access BMF Read requests.
476	1DC	SMF2AFEH	4	binary	Total number of sequential access BMF Write requests.
480	1E0	SMF2AFEI	4	binary	Number of sequential access BMF read hits.
484	1E4	SMF2AFEJ	4	binary	Number of sequential access BMF valid read hits.
488	1E8	SMF2AFEK	4	binary	Number of sequential access BMF false invalids.
492	1EC	SMF2AFEL	4	binary	Number of sequential access requests processed by the Sysplex Cache Manager
496	1F0	SMF2AFEM	4	binary	Number of sequential access CF cache structure read requests.
500	1F4	SMF2AFEN	4	binary	Number of sequential access CF cache structure Write requests.
504	1F8	SMF2AFEO	4	binary	Number of sequential access CF cache structure read hits.
508	1FC	SMF2AFEP	4	binary	Number of sequential access CF cache structure read castins.
512	200	SMF2AFEQ	8	binary	Number of bytes transferred into the DFSMS CF cache structure.
520	208	SMF2AFER	4	binary	Number of READ real I/O sequential requests to DASD.
524	20C	SMF2AFES	4	binary	Number of WRITE real I/O sequential requests to DASD.
528	210	SMF2AFET	8	binary	Total number of bytes transferred to DASD for the read requests.
536	218	SMF2AFEU	8	binary	Total number of bytes transferred to DASD for the write requests.
544	220	SMF2AFEV	16	EBCDIC	Reserved.
560	230	SMF2AFEW	8	binary	Total amount of time, in milli seconds, for all sequential access requests in this interval.
568	238	SMF2AFEX	4	binary	Average response time for all of the sequential access requests in this interval (total time/number of requests).
572	23C	SMF2AFEY	4	binary	Normalized response time for all of the requests in this interval (total time/number of bytes transferred/4K).
576	240	SMF2AFEZ	8	EBCDIC	Reserved.
584	248	SMF2AFE7	32	EBCDIC	Reserved.
Sysplex-wide sequential access record merge (RE-DO) summary section:					
616	268	SMF2AFFA	4	binary	Coupling facility cache partition number.
620	26C	SMF2AFFB	4	binary	Total number of sequential access requests. (RE-DO)
624	270	SMF2AFFC	4	binary	Number of read requests - NRI protocol (No Read Integrity) (RE-DO).
628	274	SMF2AFFD	4	binary	Number of read requests - Consistent read protocol. (RE-DO)
632	278	SMF2AFFE	4	binary	Number of sequential access Write requests. (RE-DO)
636	27C	SMF2AFFF	4	binary	Number of sequential access BMF requests. (RE-DO)
640	280	SMF2AFFG	4	binary	Number of sequential access BMF Read requests. (RE-DO)
644	284	SMF2AFFH	4	binary	Number of sequential access BMF Write requests. (RE-DO)
648	288	SMF2AFFI	4	binary	Number of sequential access BMF read hits. (RE-DO)
652	28C	SMF2AFFJ	4	binary	Number of sequential access BMF valid read hits. (RE-DO)
656	290	SMF2AFFK	4	binary	Number of sequential access BMF false invalids. (RE-DO)
660	294	SMF2AFFL	4	binary	Number of sequential access requests processed by the Sysplex Cache Manager. (RE-DO)

Offsets		Name	Length	Format	Description
664	298	SMF2AFFM	4	binary	Number of sequential access CF cache structure Read requests. (RE-DO)
668	29C	SMF2AFFN	4	binary	Number of sequential access CF cache structure Write requests. (RE-DO)
672	2A0	SMF2AFFO	4	binary	Number of sequential access CF cache structure read hits. (RE-DO)
676	2A4	SMF2AFFP	4	binary	Number of sequential access CF cache structure read castins. (RE-DO)
680	2A8	SMF2AFFQ	8	binary	Number of bytes transferred into the DFSMS cache structure (RE-DO).
688	2B O	SMF2AFFR	4	binary	Total number of READ real I/O sequential requests to DASD. (RE-DO)
692	2B4	SMF2AFFS	4	binary	Total number of WRITE real I/O sequential requests to DASD. (RE-DO)
696	2B8	SMF2AFFT	8	binary	Total number of bytes transferred to DASD for the read requests.
704	2C0	SMF2AFFU	8	binary	Total number of bytes transferred to DASD for the write requests.
712	2C8	SMF2AFFV	16	EBCDIC	Reserved.
728	2D8	SMF2AFFW	8	binary	Total amount of time, in milli seconds, for all sequential access (RE-DO) requests in this interval.
736	2E0	SMF2AFFX	4	binary	Average response time for all of the sequential access (RE-DO) requests in this interval (total time/number of requests).
740	2E4	SMF2AFFY	4	binary	Normalized response time for all of the requests in this interval (total time/number of bytes transferred/4K). (RE-DO)
744	2E8	SMF2AFFZ	8	EBCDIC	Reserved.
752	2F0	SMF2AFF7	32	EBCDIC	Reserved.
Sysplex-wide sequential access read ahead summary section:					
784	310	SMF2AFGA	4	binary	Coupling facility cache partition number.
788	314	SMF2AFGB	4	binary	Total number of real I/O sequential requests to DASD. (read ahead)
792	318	SMF2AFGC	4	binary	Number of read requests - NRI protocol (No Read Integrity) (READ-AHEAD).
796	31C	SMF2AFGD	4	binary	Number of read requests - Consistent read protocol (READ-AHEAD).
800	320	SMF2AFGE	4	binary	Number of Write requests. (READ-AHEAD)
804	324	SMF2AFGF	4	binary	Number of sequential access BMF requests. (READ-AHEAD)
808	328	SMF2AFGG	4	binary	Number of sequential access BMF Read requests. (READ-AHEAD)
812	32C	SMF2AFGH	4	binary	Number of sequential access BMF Write requests. (READ-AHEAD)
816	330	SMF2AFGI	4	binary	Number of sequential access BMF read hits. (read ahead)
820	334	SMF2AFGJ	4	binary	Number of sequential access BMF valid read hits. (read ahead)
824	338	SMF2AFGK	4	binary	Number of BMF false invalids. (read ahead)
828	33C	SMF2AFGL	4	binary	Number of requests processed by the sysplex cache manager. (read ahead)
832	340	SMF2AFGM	4	binary	Number of sequential access CF cache structure Read requests. (read ahead)
836	344	SMF2AFGN	4	binary	Number of sequential access CF cache structure Write requests. (read ahead)
840	348	SMF2AFGO	4	binary	Number of sequential access CF cache structure read hits. (read ahead)
844	34C	SMF2AFGP	4	binary	Number of sequential access CF cache structure read castins. (read ahead)

Offsets		Name	Length	Format	Description
848	350	SMF2AFGQ	8	binary	Total number of bytes transferred into the DFSMS cache structure for all sequential access requests. (read ahead)
856	358	SMF2AFGR	4	binary	Total number of READ real I/O sequential requests to DASD (READ-AHEAD).
860	35C	SMF2AFGS	4	binary	Total number of WRITE real I/O sequential requests to DASD (READ-AHEAD).
864	360	SMF2AFGT	8	binary	Total number of bytes transferred to DASD for the read requests.
868	368	SMF2AFGU	8	binary	Total number of bytes transferred to DASD for the write requests.
880	370	SMF2AFGV	16	EBCDIC	Reserved.
896	380	SMF2AFGW	8	binary	Total amount of time, in milli seconds, for all sequential access (read ahead) requests in this interval.
904	388	SMF2AFGX	4	binary	Average response time for all of the sequential access (read ahead) requests in this interval. (total time/number of requests)
908	38C	SMF2AFGY	4	binary	Normalized response time for all of the requests in this interval (total time/number of bytes transferred/4K). (read ahead)
912	390	SMF2AFGZ	8	EBCDIC	Reserved.
920	398	SMF2AFG7	32	EBCDIC	Reserved.
Sysplex-wide sequential access pre-format summary section:					
952	3B8	SMF2AFHA	4	binary	Coupling facility cache partition number.
956	3BC	SMF2AFHB	4	binary	Total number of real I/O sequential requests to DASD. (pre-format)
960	3C0	SMF2AFHC	4	binary	Number of read requests - NRI protocol (No Read Integrity) (PRE-FORMAT).
964	3C4	SMF2AFHD	4	binary	Number of read requests - Consistent read protocol (PRE-FORMAT).
968	3C8	SMF2AFHE	4	binary	Number of Write requests. (PRE-FORMAT)
972	3CC	SMF2AFHF	4	binary	Number of sequential access BMF requests. (PRE-FORMAT)
976	3D0	SMF2AFHG	4	binary	Number of sequential access BMF Read requests. (PRE-FORMAT)
980	3D4	SMF2AFHH	4	binary	Number of sequential access BMF Write requests. (PRE-FORMAT)
984	3D8	SMF2AFHI	4	binary	Number of sequential access BMF read hits. (pre-format)
988	3DC	SMF2AFHJ	4	binary	Number of sequential access BMF valid read hits. (pre-format)
992	3E0	SMF2AFHK	4	binary	Number of BMF false invalids. (pre-format)
996	3E4	SMF2AFHL	4	binary	Number of sequential access CF Cache structure Requests. (pre-format)
1000	3E8	SMF2AFHM	4	binary	Number of sequential access CF Cache structure Read Requests. (pre-format)
1004	3EC	SMF2AFHN	4	binary	Number of sequential access CF Cache structure Write Requests. (pre-format)
1008	3F0	SMF2AFHO	4	binary	Number of sequential access CF cache structure read hits. (pre-format)
1012	3F4	SMF2AFHP	4	binary	Number of sequential access CF cache structure read castins. (pre-format)
1016	3F8	SMF2AFHQ	8	binary	Number of sequential access CF cache structure bytes transferred. (pre-format)
1024	400	SMF2AFHR	4	binary	Total number of READ real I/O sequential requests to DASD. (pre-format)
1028	404	SMF2AFHS	4	binary	Total number of WRITE real I/O sequential requests to DASD. (pre-format)

Offsets		Name	Length	Format	Description
1032	408	SMF2AFHT	8	binary	Total number of bytes transferred to DASD for the read requests.
1040	410	SMF2AFHU	8	binary	Total number of bytes transferred to DASD for the write requests.
1048	418	SMF2AFHV	16	EBCDIC	Reserved.
1064	428	SMF2AFHW	8	binary	Total amount of time, in milli seconds, for all sequential access (pre-format) requests in this interval.
1072	430	SMF2AFHX	4	binary	Average response time for all of the sequential access (pre-format) requests in this interval (total time/number of requests).
1076	434	SMF2AFHY	4	binary	Normalized response time for all of the requests in this interval (total time/number of bytes transferred/4K). (pre-format)
1080	438	SMF2AFHZ	8	EBCDIC	Reserved.
1088	440	SMF2AFH7	32	EBCDIC	Reserved.
1120	460	SMF2AFOA	4	binary	Number of record lock requests (obtain/alter/promote).
1124	464	SMF2AFOB	4	binary	Number of record lock requests that cause true contention.
1128	468	SMF2AFOC	4	binary	Number of record lock requests that cause false contention.
1132	46C	SMF2AFOD	4	binary	Number of record lock release requests.
1136	470	SMF2AFOE	4	binary	Number of component_1 type lock requests.
1140	474	SMF2AFOF	4	binary	Number of component_1 type release lock requests.
1144	478	SMF42FUAA	4	binary	Accumulation of waiters for record lock.
1148	44C	SMF42FUBA	4	binary	Number of record locks hashed to the same hash table entry.
1152	480	SMF2AFOH	4	binary	Number of component_1 class_1 (DIWA) locks (obtain/alter/promote).
1156	484	SMF2AFOI	4	binary	Number of component_1 class_1 (DIWA) locks that cause true contention.
1160	488	SMF2AFOJ	4	binary	Number of component_1 class_1 (DIWA) locks that cause false contention.
1164	48C	SMF2AFOK	4	binary	Number of component_1 class_1 (DIWA) release lock requests.
1168	490	SMF2AFOL	4	binary	Number of component_1 class_2 (UPGRADE) locks (obtain/alter/promote).
1172	494	SMF2AFOM	4	binary	Number of component_1 class_2 (UPGRADE) locks that cause true contention.
1176	498	SMF2AFON	4	binary	Number of component_1 class_2 (UPGRADE) locks that cause false contention.
1180	49C	SMF2AFOO	4	binary	Number of component_1 class_2 (UPGRADE) release lock requests.
1184	4A0	SMF2AFOP	4	binary	Number of component_1 class_3 (PREFORMAT) locks (obtain/alter/promote).
1188	4A4	SMF2AFOQ	4	binary	Number of component_1 class_3 (PREFORMAT) locks that cause true contention.
1192	4A8	SMF2AFOR	4	binary	Number of component_1 class_3 (PREFORMAT) locks that cause false contention.
1196	4AC	SMF2AFOS	4	binary	Number of component_1 class_3 (PREFORMAT) release lock requests.
1200	4B0	SMF2AFOT	4	binary	Number of component_2 lock requests (obtain/alter/promote).
1204	4B4	SMF2AFOU	4	binary	Number of component_2 locks that cause true contention.
1208	4B8	SMF2AFOV	4	binary	Number of component_2 locks that cause false contention.
1212	4BC	SMF2AFOW	4	binary	Number of component_2 release lock requests.
1216	4C0	SMF42FUDA	4	binary	Accumulation of waiters for DIWA lock.

Offsets		Name	Length	Format	Description
1220	4C4	SMF42FUEA	4	binary	Accumulation of waiters for UPGRADE lock.
1224	4C8	SMF42FUFA	4	binary	Accumulation of waiters for COMP2 lock.
1228	4CC	SMF42FUGA	4	binary	Number of locks (DIWA, UPGRADE, and COMP2) hashed to the same hash table entry.
1232	4D0	SMF42FPHA	4	binary	Number of component_1 class 4 (Index Record) locks (obtain/alter/promote).
1236	4D4	SMF42FPIA	4	binary	Number of component_1 class 4 (Index Record) locks that cause true contention.
1240	4D8	SMF42FPJA	4	binary	Number of component_1 class 4 (Index Record) locks that cause false contention.
1244	4DC	SMF42FPKA	4	binary	Number of component_1 class 4 (Index Record) release lock requests.
1248	4E0	SMF2AFPR	8	EBCDIC	Total time all thread requests.
1256	4E8	SMF2AFPS	4	binary	Total number of all thread requests.
1260	4EC	SMF2AFPT	4	binary	Reserved.
1264	4F0	SMF2AFPU	4	binary	Average response time for all of the thread requests in the interval. (Total time/number of thread requests).
1268	4F4	SMF2AFPV	4	binary	Normalized response time for all of the thread requests in the interval. (Total time/number of bytes transferred/4K).
1272	4F8	SMF2AFPW	8	EBCDIC	Reserved.
1280	500	SMF2AFAI	16	EBCDIC	Lock structure name.
1296	510	SMF2AFAJ	8	EBCDIC	Lock set.

SC, CF, SYS summary section for above the bar

Offsets		Name	Length	Format	Description
0	0	SMF2AFBA	4	binary	Interval length. This is the total length, in seconds, of the measurement period.
4	4	SMF2AF03	12	EBCDIC	Indicates if DFSMS greater than 4K CF caching is active. Value is GT4KACTIVE or GT4KNOTACT.
16	10	SMF2AFBB	2	binary	Length of the storage class name.
18	12	SMF2AFBC	30	EBCDIC	Storage class name.
48	30	SMF2AF04	2	binary	Cache Set Name Length
50	32	SMF2AFBD	30	EBCDIC	DFSMS Cache Set name.
80	50	SMF2AFBE	8	EBCDIC	MVS system name.
88	58	SMF2AF05	8	EBCDIC	Reserved.
96	60	SMF2AFBF	2	EBCDIC	Reserved.
98	62	SMF2AFBG	30	EBCDIC	DFP CF cache structure name.
128	80	SMF2AFBH	4	binary	Number of lock requests processed.
132	84	SMF2AFBI	4	binary	Number of true contention lock requests.
136	88	SMF2AFBJ	4	binary	Number of false contention lock requests.
140	8C	SMF2AFB2	2	binary	SMS Direct Weight
142	8E	SMF2AFB3	2	binary	SMS Sequential Weight
144	90	SMF2AFBL	8	EBCDIC	Reserved.
152	98	SMF42FTAA	4	binary	Total number of CI splits for this interval.

Offsets		Name	Length	Format	Description
156	9C	SMF42FTBA	4	binary	Total number of CA splits for this interval.
Direct access section:					
160	A0	SMF2AFIA	4	binary	Coupling facility cache partition number.
164	A4	SMF2AFIB	4	binary	Number of direct requests.
168	A8	SMF2AFIC	4	binary	Number of read requests - NRI protocol (No Read Integrity).
172	AC	SMF2AFID	4	binary	Number of read requests - Consistent read protocol.
176	B0	SMF2AFIE	4	binary	Number of Write requests.
180	B4	SMF2AFIF	4	binary	Number of direct access BMF requests.
184	B8	SMF2AFIG	4	binary	Number of direct access BMF Read requests.
188	BC	SMF2AFIH	4	binary	Number of direct access BMF Write requests.
192	C0	SMF2AFII	4	binary	Number of direct access BMF read hits.
196	C4	SMF2AFIJ	4	binary	Number of direct access BMF valid read hits.
200	C8	SMF2AFIK	4	binary	Number of BMF false invalids.
204	CC	SMF2AFIL	4	binary	Number of direct access CF Cache structure requests.
208	D0	SMF2AFIM	4	binary	Number of direct access CF cache structure Read requests.
212	D4	SMF2AFIN	4	binary	Number of direct access CF cache structure Write requests.
216	D8	SMF2AFIO	4	binary	Number of direct access CF cache structure read hits.
220	DC	SMF2AFIP	4	binary	Number of direct access CF cache structure read castins.
224	E0	SMF2AFIQ	8	binary	Number of direct access CF cache structure bytes transferred.
232	E8	SMF2AFIR	4	binary	Number of READ real I/O direct requests to DASD.
236	EC	SMF2AFIS	4	binary	Number of WRITE real I/O direct requests to DASD.
240	F0	SMF2AFIT	8	binary	Total number of bytes transferred to DASD for the read requests.
248	F8	SMF2AFIU	8	binary	Total number of bytes transferred to DASD for the write requests.
256	100	SMF2AFIV	16	EBCDIC	Reserved.
272	110	SMF2AFIW	8	binary	Total amount of time, in milli seconds, for all the direct access requests in this interval.
280	118	SMF2AFIX	4	binary	Average response time for all of the requests in this interval (total time/number of requests).
284	11C	SMF2AFIY	4	binary	Normalized response time for all of the requests in this interval (total time/number of bytes transferred/4K).
288	120	SMF2AFIZ	8	EBCDIC	Reserved.
296	128	SMF2AFI7	32	EBCDIC	Reserved.
Direct access record merge (RE-DO) summary section:					
328	148	SMF2AFJA	4	binary	Coupling facility cache partition number.
332	14C	SMF2AFJB	4	binary	Total number of direct access requests. (RE-DO)
336	150	SMF2AFJC	4	binary	Number of read requests - NRI protocol (No Read Integrity). (RE-DO)
340	154	SMF2AFJD	4	binary	Number of read requests - Consistent read protocol. (RE-DO)
344	158	SMF2AFJE	4	binary	Number of Write requests. (RE-DO)
348	15C	SMF2AFJF	4	binary	Number of direct access BMF requests. (RE-DO)
352	160	SMF2AFJG	4	binary	Number of direct access BMF Read requests. (RE-DO)
356	164	SMF2AFJH	4	binary	Number of direct access BMF Write requests. (RE-DO)

Offsets		Name	Length	Format	Description
360	168	SMF2AFJI	4	binary	Number of direct access BMF read hits. (RE-DO)
364	16C	SMF2AFJJ	4	binary	Number of direct access BMF valid read hits. (RE-DO)
368	170	SMF2AFJK	4	binary	Number of BMF false invalids. (RE-DO)
372	174	SMF2AFJL	4	binary	Number of direct access CF cache structure requests. (RE-DO)
376	178	SMF2AFJM	4	binary	Number of direct access CF cache structure Read requests. (RE-DO)
380	17C	SMF2AFJN	4	binary	Number of direct access CF cache structure Write requests. (RE-DO)
384	180	SMF2AFJO	4	binary	Number of direct access CF cache structure read hits. (RE-DO)
388	184	SMF2AFJP	4	binary	Number of direct access CF cache structure read castins. (RE-DO)
392	188	SMF2AFJQ	8	binary	Number of direct access CF cache structure bytes transferred. (RE-DO)
400	190	SMF2AFJR	4	binary	Total number of READ real I/O direct requests to DASD. (RE-DO)
404	194	SMF2AFJS	4	binary	Total number of WRITE real I/O direct requests to DASD. (RE-DO)
408	198	SMF2AFJT	8	binary	Total number of bytes transferred to DASD for the read requests.
416	1A0	SMF2AFJU	8	binary	Total number of bytes transferred to DASD for the write requests.
424	1A8	SMF2AFJV	16	EBCDIC	Reserved.
440	1B8	SMF2AFJW	8	binary	Total amount of time, in milli seconds, for all direct access. (RE-DO) requests in this interval.
448	1C0	SMF2AFJX	4	binary	Average response time for all of the direct access requests in this interval (total time/number of requests). (RE-DO)
452	1C4	SMF2AFJY	4	binary	Normalized response time for all of the requests in this interval (total time/number of bytes transferred/4K). (RE-DO)
456	1C8	SMF2AFJZ	8	EBCDIC	Reserved.
464	1D0	SMF2AFJ7	32	EBCDIC	Reserved.
Sequential access section:					
496	1F0	SMF2AFKA	4	binary	Coupling facility cache partition number.
500	1F4	SMF2AFKB	4	binary	Total number of sequential access requests.
504	1F8	SMF2AFKC	4	binary	Number of read requests - NRI protocol (No Read Integrity).
508	1FC	SMF2AFKD	4	binary	Number of read requests - Consistent read protocol.
512	200	SMF2AFKE	4	binary	Number of Write requests.
516	204	SMF2AFKF	4	binary	Number of sequential access BMF requests.
520	208	SMF2AFKG	4	binary	Number of sequential access BMF Read requests.
524	20C	SMF2AFKH	4	binary	Number of sequential access BMF Write requests.
528	210	SMF2AFKI	4	binary	Number of sequential access BMF read hits.
532	214	SMF2AFKJ	4	binary	Number of sequential access BMF valid read hits.
536	218	SMF2AFKK	4	binary	Number of sequential BMF false invalids.
540	21C	SMF2AFKL	4	binary	Number of sequential access CF cache structure requests.
544	220	SMF2AFKM	4	binary	Number of sequential access CF cache structure Read requests.
548	224	SMF2AFKN	4	binary	Number of sequential access CF cache structure Write requests.
552	228	SMF2AFKO	4	binary	Number of sequential access CF cache structure read hits.
556	22C	SMF2AFKP	4	binary	Number of sequential access CF cache structure read castins.
560	230	SMF2AFKQ	8	binary	Number of sequential access CF cache structure bytes transferred.

Offsets		Name	Length	Format	Description
568	238	SMF2AFKR	4	binary	Total number of READ real I/O sequential requests to DASD.
572	23C	SMF2AFKS	4	binary	Total number of WRITE real I/O sequential requests to DASD.
576	240	SMF2AFKT	8	binary	Total number of bytes transferred to DASD for the read requests.
584	248	SMF2AFKU	8	binary	Total number of bytes transferred to DASD for the write requests.
592	250	SMF2AFKV	16	EBCDIC	Reserved.
608	260	SMF2AFKW	8	binary	Total amount of time, in milli seconds, for all sequential access requests in this interval.
616	268	SMF2AFKX	4	binary	Average response time for all of the sequential access requests in this interval (total time/number of requests).
620	26C	SMF2AFKY	4	binary	Normalized response time for all of the requests in this interval (total time/number of bytes transferred/4K).
624	270	SMF2AFKZ	8	EBCDIC	Reserved.
632	278	SMF2AFK7	32	EBCDIC	Reserved.
Sequential access record merge (RE-DO) summary section:					
664	298	SMF2AFLA	4	binary	Coupling facility cache partition number.
668	29C	SMF2AFLB	4	binary	Total number of sequential access requests. (RE-DO)
672	2A0	SMF2AFLC	4	binary	Number of read requests - NRI protocol (No Read Integrity). (RE-DO)
676	2A4	SMF2AFLD	4	binary	Number of read requests - Consistent read protocol. (RE-DO)
680	2A8	SMF2AFLE	4	binary	Number of Write requests. (RE-DO)
684	2AC	SMF2AFLF	4	binary	Number of sequential access BMF requests. (RE-DO)
688	2B0	SMF2AFL6	4	binary	Number of sequential access BMF Read requests. (RE-DO)
692	2B4	SMF2AFLH	4	binary	Number of sequential access BMF Write requests. (RE-DO)
696	2B8	SMF2AFLI	4	binary	Number of sequential access BMF read hits. (RE-DO)
700	2BC	SMF2AFLJ	4	binary	Number of sequential access BMF valid read hits. (RE-DO)
704	2C0	SMF2AFLK	4	binary	Number of BMF false invalids. (RE-DO)
708	2C4	SMF2AFLL	4	binary	Total number of sequential access requests. (RE-DO)
712	2C8	SMF2AFLM	4	binary	Number of sequential access CF cache structure Read requests. (RE-DO)
716	2CC	SMF2AFLN	4	binary	Number of sequential access CF cache structure Write requests. (RE-DO)
720	2D0	SMF2AFLO	4	binary	Number of sequential access CF cache structure Read hits. (RE-DO)
724	2D4	SMF2AFLP	4	binary	Number of sequential access CF cache structure read castins. (RE-DO)
728	2D8	SMF2AFLQ	8	binary	Number of sequential access CF cache structure bytes transferred. (RE-DO)
736	2E0	SMF2AFLR	4	binary	Total number of READ real I/O sequential requests to DASD. (RE-DO)
740	2E4	SMF2AFLS	4	binary	Total number of WRITE real I/O sequential requests to DASD. (RE-DO)
744	2E8	SMF2AFLT	8	binary	Total number of bytes transferred to DASD for the read requests.
752	2F0	SMF2AFLU	8	binary	Total number of bytes transferred to DASD for the write requests.
760	2F8	SMF2AFLV	16	EBCDIC	Reserved.

Offsets		Name	Length	Format	Description
776	308	SMF2AFLW	8	binary	Total amount of time, in milli seconds, for all sequential access (RE-DO) requests in this interval.
784	310	SMF2AFLX	4	binary	Average response time for all of the sequential access (RE-DO) requests in this interval (total time/number of requests).
788	314	SMF2AFLY	4	binary	Normalized response time for all of the requests in this interval (total time/number of bytes transferred/4K). (RE-DO)
792	318	SMF2AFLZ	8	EBCDIC	Reserved.
800	320	SMF2AFL7	32	EBCDIC	Reserved.
Sequential access read ahead summary section:					
832	340	SMF2AFMA	4	binary	Coupling facility cache partition number.
836	344	SMF2AFMB	4	binary	Total number of sequential access requests. (read ahead)
840	348	SMF2AFMC	4	binary	Number of read requests - NRI protocol (No Read Integrity). (read ahead)
844	34C	SMF2AFMD	4	binary	Number of read requests - Consistent read protocol. (read ahead)
848	350	SMF2AFME	4	binary	Number of Write requests. (read ahead)
852	354	SMF2AFMF	4	binary	Number of sequential access BMF requests. (read ahead)
856	358	SMF2AFMG	4	binary	Number of sequential access BMF Read requests. (read ahead)
860	35C	SMF2AFMH	4	binary	Number of sequential access BMF Write requests. (read ahead)
864	360	SMF2AFMI	4	binary	Number of sequential access BMF read hits. (read ahead)
868	364	SMF2AFMJ	4	binary	Number of sequential access BMF valid read hits. (read ahead)
872	368	SMF2AFMK	4	binary	Number of BMF false invalids. (read ahead)
876	36C	SMF2AFML	4	binary	Number of sequential access CF cache structure requests. (read ahead)
880	370	SMF2AFMM	4	binary	Number of sequential access CF cache structure Read requests. (read ahead)
884	374	SMF2AFMN	4	binary	Number of sequential access CF cache structure Write requests. (read ahead)
888	378	SMF2AFMO	4	binary	Number of sequential access CF cache structure read hits. (read ahead)
892	37C	SMF2AFMP	4	binary	Number of sequential access CF cache structure read castins. (read ahead)
896	380	SMF2AFMQ	8	binary	Number of sequential access CF cache structure bytes transferred. (read ahead)
904	388	SMF2AFMR	4	binary	Total number of READ real I/O sequential requests to DASD. (read ahead)
908	38C	SMF2AFMS	4	binary	Total number of WRITE real I/O sequential requests to DASD. (read ahead)
912	390	SMF2AFMT	8	binary	Total number of bytes transferred to DASD for the read requests.
920	398	SMF2AFMU	8	binary	Total number of bytes transferred to DASD for the write requests.
928	3A0	SMF2AFMV	16	EBCDIC	Reserved.
944	3B0	SMF2AFMW	8	binary	Total amount of time, in milli seconds, for all sequential access (read ahead) requests in this interval.
952	3B8	SMF2AFMX	4	binary	Average response time for all of the sequential access (read ahead) requests in this interval (total time/number of requests).
956	3BC	SMF2AFMY	4	binary	Normalized response time for all of the requests in this interval (total time/number of bytes transferred/4K). (read ahead)
960	3C0	SMF2AFMZ	8	EBCDIC	Reserved.

Offsets		Name	Length	Format	Description
968	3C8	SMF2AFM7	32	EBCDIC	Reserved.
Sequential access pre-format summary section:					
1000	3E8	SMF2AFNA	4	binary	Coupling facility cache partition number.
1004	3EC	SMF2AFNB	4	binary	Total number of sequential access requests. (Pre-format)
1008	3F0	SMF2AFNC	4	binary	Number of read requests - NRI protocol (No Read Integrity). (Pre-format)
1012	3F4	SMF2AFND	4	binary	Number of read requests - Consistent read protocol. (Pre-format)
1016	3F8	SMF2AFNE	4	binary	Number of Write requests. (Pre-format)
1020	3FC	SMF2AFNF	4	binary	Number of sequential access BMF requests. (Pre-format)
1024	400	SMF2AFNG	4	binary	Number of sequential access BMF Read requests. (Pre-format)
1028	404	SMF2AFNH	4	binary	Number of sequential access BMF Write requests. (Pre-format)
1032	408	SMF2AFNI	4	binary	Number of sequential access BMF read hits. (Pre-format)
1036	40C	SMF2AFNJ	4	binary	Number of sequential access BMF valid read hits. (Pre-format)
1040	410	SMF2AFNK	4	binary	Number of BMF false invalids. (Pre-format)
1044	414	SMF2AFNL	4	binary	Number of sequential access CF cache structure requests. (Pre-format)
1048	418	SMF2AFNM	4	binary	Number of sequential access CF cache structure Read requests. (Pre-format)
1052	41C	SMF2AFNN	4	binary	Number of sequential access CF cache structure Write requests. (read ahead)
1056	420	SMF2AFNO	4	binary	Number of sequential access CF cache structure read hits. (read ahead)
1060	424	SMF2AFNP	4	binary	Number of sequential access CF cache structure read castins. (Pre-format)
1064	428	SMF2AFNQ	8	binary	Number of sequential access CF cache structure bytes transferred. (Pre-format)
1072	430	SMF2AFNR	4	binary	Total number of READ real I/O sequential requests to DASD. (Pre-format)
1076	434	SMF2AFNS	4	binary	Total number of WRITE real I/O sequential requests to DASD. (pre-format)
1080	438	SMF2AFNT	8	binary	Total number of bytes transferred to DASD for the read requests.
1088	440	SMF2AFNU	8	binary	Total number of bytes transferred to DASD for the write requests.
1096	448	SMF2AFNV	16	EBCDIC	Reserved.
1112	458	SMF2AFNW	8	binary	Total amount of time, in milli seconds, for all sequential access (pre-format) requests in this interval.
1120	460	SMF2AFNX	4	binary	Average response time for all of the sequential access (pre-format) requests in this interval (total time/number of requests).
1124	464	SMF2AFNY	4	binary	Normalized response time for all of the requests in this interval (total time/number of bytes transferred/4K). (pre-format)
1128	468	SMF2AFNZ	8	EBCDIC	Reserved.
1136	470	SMF2AFN7	32	EBCDIC	Reserved.
1168	490	SMF2AFRA	4	binary	Number of record lock requests (obtain/alter/promote).
1172	494	SMF2AFRB	4	binary	Number of record lock requests that cause true contention.
1176	498	SMF2AFRC	4	binary	Number of record lock requests that cause false contention.
1180	49C	SMF2AFRD	4	binary	Number of record lock release requests.

Offsets		Name	Length	Format	Description
1184	4A0	SMF2AFRE	4	binary	Number of component_1 type lock requests.
1188	4A4	SMF2AFRF	4	binary	Number of component_1 type release lock requests.
1192	4A8	SMF42FVAA	4	binary	Accumulation of waiters for record lock.
1196	4AC	SMF42FVBA	4	binary	Number of record locks hashed to the same hash table entry.
1200	4B0	SMF2AFRH	4	binary	Number of component_1 class_1 (DIWA) locks (obtain/alter/promote).
1204	4B4	SMF2AFRI	4	binary	Number of component_1 class_1 (DIWA) locks that cause true contention.
1208	4B8	SMF2AFRJ	4	binary	Number of component_1 class_1 (DIWA) locks that cause false contention.
1212	4BC	SMF2AFRK	4	binary	Number of component_1 class_1 (DIWA) release lock requests.
1216	4C0	SMF2AFRL	4	binary	Number of component_1 class_2 (UPGRADE) locks (obtain/alter/promote).
1220	4C4	SMF2AFRM	4	binary	Number of component_1 class_2 (UPGRADE) locks that cause true contention.
1224	4C8	SMF2AFRN	4	binary	Number of component_1 class_2 (UPGRADE) locks that cause false contention.
1228	4CC	SMF2AFRO	4	binary	Number of component_1 class_2 (UPGRADE) release lock requests.
1232	4D0	SMF2AFRP	4	binary	Number of component_1 class_3 (PREFORMAT) locks (obtain/alter/promote).
1236	4D4	SMF2AFRQ	4	binary	Number of component_1 class_3 (PREFORMAT) locks that cause true contention.
1240	4D8	SMF2AFRR	4	binary	Number of component_1 class_3 (PREFORMAT) locks that cause false contention.
1244	4DC	SMF2AFRS	4	binary	Number of component_1 class_3 (PREFORMAT) release lock requests.
1248	4E0	SMF2AFRT	4	binary	Number of component_2 lock requests (obtain/alter/promote).
1252	4E4	SMF2AFRU	4	binary	Number of component_2 locks that cause true contention.
1256	4E8	SMF2AFRV	4	binary	Number of component_2 locks that cause false contention.
1260	4EC	SMF2AFRW	4	binary	Number of component_2 release lock requests.
1264	4F0	SMF42FVDA	4	binary	Accumulation of waiters for DIWA lock.
1268	4F4	SMF42FVEA	4	binary	Accumulation of waiters for UPGRADE lock.
1272	4F8	SMF42FVFA	4	binary	Accumulation of waiters for COMP2 lock.
1276	4FC	SMF42FVGA	4	binary	Number of locks (DIWA, UPGRADE, and COMP2) hashed to the same hash table entry.
1280	500	SMF42FSHA	4	binary	Number of component_1 class 4 (Index Record) locks (obtain/alter/promote).
1284	504	SMF42FSIA	4	binary	Number of component_1 class 4 (Index Record) locks that cause true contention.
1288	508	SMF42FSJA	4	binary	Number of component_1 class 4 (Index Record) locks that cause false contention.
1292	50C	SMF42FSKA	4	binary	Number of component_1 class 4 (Index Record) release lock requests.
1296	510	SMF2AFQR	8	EBCDIC	Total time all thread requests.
1304	518	SMF2AFQS	4	binary	Total number of all thread requests.
1308	51C	SMF2AFQT	4	binary	Reserved.

Offsets		Name	Length	Format	Description
1312	520	SMF2AFQU	4	binary	Average response time for all of the thread requests in the interval. (Total time/number of thread requests)
1316	524	SMF2AFQV	4	binary	Normalized response time for all of the thread requests in the interval. (Total time/number of bytes transferred/4K)
1320	528	SMF2AFQW	8	EBCDIC	Reserved.
1328	530	SMF2AFBM	16	EBCDIC	Lock structure name.
1344	540	SMF2AFBN	8	EBCDIC	Lock set.

Subtype 16 — VSAM RLS Data Set Response Time Summary

The system will produce SMF TYPE 42, subtype 16 records when statistical monitoring is on. Use the following command format to specify which data sets are eligible for CF statistical monitoring.

```
VARY SMS,MONDS(dsname{dsname,...}),{ON|OFF}
```

Sysplex-wide data set summary section for below the bar

Offsets		Name	Length	Format	Description
0	0	SMF42GAA	4	binary	Interval length. This is the total time, in seconds, of the measurement period.
4	4	SMF42A00	12	EBCDIC	Reserved.
16	10	SMF42GAB	44	EBCDIC	Data set name
60	3C	SMF42A01	4	binary	Reserved.
64	40	SMF42GAC	44	EBCDIC	VSAM sphere name.
108	6C	SMF42A02	4	binary	Reserved.
112	70	SMF42GAD	2	binary	Length of the storage class name.
114	72	SMF42GAE	30	EBCDIC	Storage class name.
144	90	SMF42A03	2	binary	Length of DFSMS CacheSet name.
146	92	SMF42GAF	30	EBCDIC	DFSMS CacheSet name.
176	B0	SMF42GAG	2	EBCDIC	Reserved.
178	B2	SMF42GAH	30	EBCDIC	DFP CF cache structure name.
208	D0	SMF42GAI	4	binary	Indicator of component being processed. **Bit** **Meaning when set** **0** Data component **1** Index component **2-31** Reserved.
212	D4	SMF42GAJ	12	EBCDIC	Indicates DFSMS greater than 4K CF caching status. Value is ALL, NONE, UPDATESONLY, DIRONLY or GT4KNOTACT.
224	E0	SMF42GAK	4	binary	Reserved.
228	E4	SMF42GAL	4	binary	Reserved.
232	E8	SMF42GAM	4	binary	Reserved.
236	EC	SMF42GZ1	2	binary	SMS Direct Weight
240	EE	SMF42GZ2	2	binary	SMS Sequential Weight

Offsets		Name	Length	Format	Description
240	F0	SMF42GAN	8	EBCDIC	In DFSMS 1.4 WLM Server class name
248	F8	SMF42GAO	8	EBCDIC	In DFSMS 1.4 WLM report class name
256	100	SMF42GAP	16	EBCDIC	SMS data class name
Sysplex-wide direct access summary section:					
272	110	SMF42GCA	4	binary	Coupling facility cache partition number.
276	114	SMF42GCB	4	binary	Total number of direct access requests.
280	118	SMF42GCC	4	binary	Number of read requests - NRI protocol (No Read Integrity).
284	11C	SMF42GCD	4	binary	Number of read requests - Consistent read protocol.
288	120	SMF42GCE	4	binary	Number of Write requests.
292	124	SMF42CGF	4	binary	Number of direct access BMF requests.
296	128	SMF42GCG	4	binary	Number of direct access BMF Read requests.
300	12C	SMF42GCH	4	binary	Number of direct access BMF Write requests.
304	130	SMF42GCI	4	binary	Number of direct access BMF read hits.
308	134	SMF42GCJ	4	binary	Number of direct access BMF valid read hits.
312	138	SMF42GCK	4	binary	Number of BMF false invalids.
316	13C	SMF42GCL	4	binary	Number of direct access CF cache structure requests.
320	140	SMF42GCM	4	binary	Number of direct access CF cache structure Read requests.
324	144	SMF42GCN	4	binary	Number of direct access CF cache structure Write requests.
328	148	SMF42GCO	4	binary	Number of direct access CF cache structure read hits.
332	14C	SMF42GCP	4	binary	Number of direct access CF cache structure read castins.
336	150	SMF42GCQ	8	binary	Number of bytes transferred into the DFSMS cache structure.
344	158	SMF42GCR	4	binary	Total number READ of real I/O direct requests to DASD.
348	15C	SMF42GCS	4	binary	Total number WRITE of real I/O direct requests to DASD.
352	160	SMF42GCT	8	binary	Total number of bytes transferred to DASD for the read requests.
360	168	SMF42GCU	8	binary	Total number of bytes transferred to DASD for the write requests.
368	170	SMF42GCV	16	EBCDIC	Reserve
384	180	SMF42GCW	8	binary	Total amount of time, in milli seconds, for all the direct access requests in this interval.
392	188	SMF42GCX	4	binary	Average response time for all of the requests in this interval (total time/number of requests).
396	18C	SMF42GCY	4	binary	Normalized response time for all of the requests in this interval (total time/number of bytes transferred/4K).
400	190	SMF42GCZ	8	EBCDIC	Reserved.
408	198	SMF42GC7	32	EBCDIC	Reserved.
Sysplex-wide direct access record merge (RE-DO) summary section:					
440	1B8	SMF42GDA	4	binary	Coupling facility cache partition number.
444	1BC	SMF42GDB	4	binary	Total number of direct access requests. (RE-DO)
448	1C0	SMF42GDC	4	binary	Number of read requests - NRI protocol (No Read Integrity). (RE-DO)
452	1C4	SMF42GDD	4	binary	Number of read requests - Consistent read protocol. (RE-DO)
456	1C8	SMF42GDE	4	binary	Number of Write requests. (RE-DO)
460	1CC	SMF42GDF	4	binary	Number of direct access BMF requests. (RE-DO)

Offsets		Name	Length	Format	Description
464	1D0	SMF42GDG	4	binary	Number of direct access BMF Read requests. (RE-DO)
468	1D4	SMF42GDH	4	binary	Number of direct access BMF Write requests. (RE-DO)
472	1D8	SMF42GDI	4	binary	Number of direct access BMF read hits. (RE-DO)
476	1DC	SMF42GDJ	4	binary	Number of direct access BMF valid read hits. (RE-DO)
480	1E0	SMF42GDK	4	binary	Number of BMF false invalids. (RE-DO)
484	1E4	SMF42GDL	4	binary	Number of direct access CF cache structure requests. (RE-DO)
488	1E8	SMF42GDM	4	binary	Number of direct access CF cache structure Read requests. (RE-DO)
492	1EC	SMF42GDN	4	binary	Number of direct access CF cache structure Write requests. (RE-DO)
496	1F0	SMF42GDO	4	binary	Number of direct access CF cache structure read hits. (RE-DO)
500	1F4	SMF42GDP	4	binary	Number of direct access CF cache structure read castins. (RE-DO)
504	1F8	SMF42GDQ	8	binary	Number of direct access CF cache structure byte transferred. (RE-DO)
512	200	SMF42GDR	4	binary	Total number of READ real I/O direct requests to DASD. (RE-DO)
516	204	SMF42GDS	4	binary	Total number of WRITE real I/O direct requests to DASD. (RE-DO)
520	208	SMF42GDT	8	binary	Total number of bytes transferred to DASD for the read requests.
528	210	SMF42GDU	8	binary	Total number of bytes transferred to DASD for the write requests.
536	218	SMF42GDV	16	EBCDIC	Reserved.
552	228	SMF42GDW	8	binary	Total amount of time, in milli seconds, for all direct access (RE-DO) requests in this interval.
560	230	SMF42GDX	4	binary	Average response time for all of the direct access (RE-DO) requests in this interval (total time/number of requests).
564	234	SMF42GDY	4	binary	Normalized response time for all of the requests in this interval (total time/number of bytes transferred/4K). (RE-DO)
568	238	SMF42GDZ	8	EBCDIC	Reserved.
576	240	SMF42GD7	32	EBCDIC	Reserved.
Sysplex-wide sequential access summary section:					
608	260	SMF42GEA	4	binary	Coupling facility cache partition number.
612	264	SMF42GEB	4	binary	Total number of sequential access requests.
616	268	SMF42GDC	4	binary	Number of read requests - NRI protocol (No Read Integrity).
620	26C	SMF42GED	4	binary	Number of read requests - Consistent read protocol.
624	270	SMF42GEE	4	binary	Number of Write requests.
628	274	SMF42GEF	4	binary	Number of direct access BMF requests.
632	278	SMF42GEG	4	binary	Number of direct access BMF Read requests.
636	27C	SMF42GEH	4	binary	Number of direct access BMF Write requests.
640	280	SMF42GEI	4	binary	Number of direct access BMF read hits.
644	284	SMF42GEJ	4	binary	Number of direct access BMF valid read hits.
648	288	SMF42GEK	4	binary	Number of BMF false invalids.
652	28C	SMF42GEL	4	binary	Number of direct access CF cache structure requests.
656	290	SMF42GEM	4	binary	Number of direct access CF cache structure Read requests.
660	294	SMF42GEN	4	binary	Number of direct access CF cache structure Write requests.
664	298	SMF42GEO	4	binary	Number of direct access CF cache structure read hits.

Offsets		Name	Length	Format	Description
668	29C	SMF42GEP	4	binary	Number of direct access CF cache structure read castins.
672	2A0	SMF42GEQ	8	binary	Number of direct access CF cache structure byte transferred.
680	2A8	SMF42GER	4	binary	Total number of READ real I/O sequential requests to DASD.
684	2AC	SMF42GES	4	binary	Total number of WRITE real I/O sequential requests to DASD.
688	2B0	SMF42GET	8	binary	Total number of bytes transferred to DASD for the read requests.
696	2B8	SMF42GEU	8	binary	Total number of bytes transferred to DASD for the write requests.
704	2C0	SMF42GEV	16	EBCDIC	Reserved.
720	2D0	SMF42GEW	8	binary	Total amount of time, in milli seconds, for all sequential access requests in this interval.
728	2D8	SMF42GEX	4	binary	Average response time for all of the sequential access requests in this interval (total time/number of requests).
732	2DC	SMF42GEY	4	binary	Normalized response time for all of the requests in this interval (total time/number of bytes transferred/4K).
736	2E0	SMF42GEZ	8	EBCDIC	Reserved.
744	2E8	SMF42GE7	32	EBCDIC	Reserved.
Sysplex-wide sequential access record merge (RE-DO) summary section:					
776	308	SMF42GFA	4	binary	Coupling facility cache partition number.
780	30C	SMF42GFB	4	binary	Total number of direct access requests. (RE-DO)
784	310	SMF42GFC	4	binary	Number of read requests - NRI protocol (No Read Integrity). (RE-DO)
788	314	SMF42GFD	4	binary	Number of read requests - Consistent read protocol. (RE-DO)
792	318	SMF42GFE	4	binary	Number of Write requests.(RE-DO)
796	31C	SMF42GFF	4	binary	Number of direct access BMF requests. (RE-DO)
800	320	SMF42GFG	4	binary	Number of direct access BMF Read requests. (RE-DO)
804	324	SMF42GFH	4	binary	Number of direct access BMF Write requests. (RE-DO)
808	328	SMF42GFI	4	binary	Number of direct access BMF read hits. (RE-DO)
812	32C	SMF42GFJ	4	binary	Number of direct access BMF valid read hits. (RE-DO)
816	330	SMF42GFK	4	binary	Number of BMF false invalids. (RE-DO)
820	334	SMF42GFL	4	binary	Number of direct access CF cache structure requests. (RE-DO)
824	338	SMF42GFM	4	binary	Number of direct access CF cache structure Read requests. (RE-DO)
828	33C	SMF42GFN	4	binary	Number of direct access CF cache structure Write requests. (RE-DO)
832	340	SMF42GFO	4	binary	Number of direct access CF cache structure read hits. (RE-DO)
836	344	SMF42GFP	4	binary	Number of direct access CF cache structure read castins. (RE-DO)
840	348	SMF42GFQ	8	binary	Number of direct access CF cache structure byte transferred. (RE-DO)
848	350	SMF42GFR	4	binary	Total number of real READ I/O sequential requests to DASD. (RE-DO)
852	354	SMF42GFS	4	binary	Total number of real WRITE I/O sequential requests to DASD. (RE-DO)
856	358	SMF42GFT	8	binary	Total number of bytes transferred to DASD for the read requests.
864	360	SMF42GFU	8	binary	Total number of bytes transferred to DASD for the write requests.
872	368	SMF42GFV	16	EBCDIC	Reserved.

Offsets		Name	Length	Format	Description
888	378	SMF42GFW	8	binary	Total amount of time, in milli seconds, for all sequential access (RE-DO) requests in this interval.
896	380	SMF42GFX	4	binary	Average response time for all of the sequential access (RE-DO) requests in this interval (total time/number of requests).
900	384	SMF42GFY	4	binary	Normalized response time for all of the requests in this interval (total time/number of bytes transferred/4K). (RE-DO)
904	388	SMF42GFZ	8	EBCDIC	Reserved.
912	390	SMF42GF7	32	EBCDIC	Reserved.
Sysplex-wide sequential access read ahead summary section:					
944	3B0	SMF42GGA	4	binary	Coupling facility cache partition number.
948	3B4	SMF42GGB	4	binary	Total number of sequential access requests. (read ahead)
952	3B8	SMF42GGC	4	binary	Number of read requests - NRI protocol (No Read Integrity).(read ahead)
956	3BC	SMF42GGD	4	binary	Number of read requests - Consistent read protocol. (read ahead)
960	3C0	SMF42GGE	4	binary	Number of Write requests.(read ahead)
964	3C4	SMF42GGF	4	binary	Number of direct access BMF requests. (read ahead)
968	3C8	SMF42GGG	4	binary	Number of direct access BMF Read requests. (read ahead)
972	3CC	SMF42GGH	4	binary	Number of direct access BMF Write requests. (read ahead)
976	3D0	SMF42GGI	4	binary	Number of direct access BMF read hits. (read ahead)
980	3D4	SMF42GGJ	4	binary	Number of direct access BMF valid read hits. (read ahead)
984	3D8	SMF42GGK	4	binary	Number of BMF false invalids. (RE-DO)
988	3DC	SMF42GGL	4	binary	Number of direct access CF cache structure requests. (read ahead)
992	3E0	SMF42GGM	4	binary	Number of direct access CF cache structure Read requests. (read ahead)
996	3E4	SMF42GGN	4	binary	Number of direct access CF cache structure Write requests. (read ahead)
1000	3E8	SMF42GGO	4	binary	Number of direct access CF cache structure read hits. (read ahead)
1004	3EC	SMF42GGP	4	binary	Number of direct access CF cache structure read castins. (read ahead)
1008	3F0	SMF42GGQ	8	binary	Number of direct access CF cache structure byte transferred. (read ahead)
1016	3F8	SMF42GGR	4	binary	Total number of READ real I/O sequential requests to DASD. (read ahead)
1020	3FC	SMF42GGS	4	binary	Total number of WRITE real I/O sequential requests to DASD. (read ahead)
1024	400	SMF42GGT	8	binary	Total number of bytes transferred to DASD for the read requests.
1032	408	SMF42GGU	8	binary	Total number of bytes transferred to DASD for the write requests.
1040	410	SMF42GGV	16	EBCDIC	Reserved.
1056	420	SMF42GGW	8	binary	Total amount of time, in milli seconds, for all sequential access (read ahead) requests in this interval.
1064	428	SMF42GGX	4	binary	Average response time for all of the sequential access (read ahead) requests in this interval (total time/number of requests).
1068	42C	SMF42GGY	4	binary	Normalized response time for all of the requests in this interval (total time/number of bytes transferred/4K). (read ahead)
1072	430	SMF42GGZ	8	EBCDIC	Reserved.
1080	438	SMF42GG7	32	EBCDIC	Reserved.

Offsets		Name	Length	Format	Description
Sysplex-wide sequential access pre-format summary section:					
1112	458	SMF42GHA	4	binary	Coupling facility cache partition number.
1116	45C	SMF42GHB	4	binary	Total number of sequential access requests. (pre-format)
1120	460	SMF42GHC	4	binary	Number of read requests - NRI protocol (No Read Integrity). (pre-format)
1124	464	SMF42GHD	4	binary	Number of read requests - Consistent read protocol. (pre-format)
1128	468	SMF42GHE	4	binary	Number of Write requests. (pre-format)
1132	46C	SMF42GHF	4	binary	Number of direct access BMF requests. (pre-format)
1136	470	SMF42GHG	4	binary	Number of direct access BMF Read requests. (pre-format)
1140	474	SMF42GHH	4	binary	Number of direct access BMF Write requests. (pre-format)
1144	478	SMF42GHI	4	binary	Number of direct access BMF read hits. (pre-format)
1148	47C	SMF42GHJ	4	binary	Number of direct access BMF valid read hits. (pre-format)
1152	480	SMF42GHK	4	binary	Number of BMF false invalids. (pre-format)
1156	484	SMF42GHL	4	binary	Number of direct access CF cache structure requests. (pre-format)
1160	488	SMF42GHM	4	binary	Number of direct access CF cache structure Read requests. (pre-format)
1164	48C	SMF42GHN	4	binary	Number of direct access CF cache structure Write requests. (pre-format)
1168	490	SMF42GHO	4	binary	Number of direct access CF cache structure read hits. (pre-format)
1172	494	SMF42GHP	4	binary	Number of direct access CF cache structure read castins. (pre-format)
1176	498	SMF42GHQ	8	binary	Number of direct access CF cache structure byte transferred. (pre-format)
1184	4A0	SMF42GHR	4	binary	Total number of READ real I/O sequential requests to DASD. (pre-format)
1188	4A4	SMF42GHS	4	binary	Total number of WRITE real I/O sequential requests to DASD. (pre-format)
1192	4A8	SMF42GHT	8	binary	Total number of bytes transferred to DASD for the read requests.
1200	4B0	SMF42GHU	8	binary	Total number of bytes transferred to DASD for the write requests.
1208	4B8	SMF42GHV	16	EBCDIC	Reserved.
1224	4C8	SMF42GHW	8	binary	Total amount of time, in milli seconds, for all sequential access (pre-format) requests in this interval.
1232	4D0	SMF42GHX	4	binary	Average response time for all of the sequential access (pre-format) requests in this interval (total time/number of requests).
1236	4D4	SMF42GHY	4	binary	Normalized response time for all of the requests in this interval (total time/number of bytes transferred/4K). (pre-format)
1240	4D8	SMF42GHZ	8	EBCDIC	Reserved.
1248	4E0	SMF42GH7	32	EBCDIC	Reserved.
Sysplex-wide locking statistics summary section:					
1280	500	SMF42GPA	4	binary	Number of record lock requests (obtain/alter/promote)
1284	504	SMF42GPB	4	binary	Number of record lock requests that cause true contention.
1288	508	SMF42GPC	4	binary	Number of record lock requests that cause false contention.
1292	50C	SMF42GPD	4	binary	Number of record lock release requests.
1296	510	SMF42GPE	4	binary	Number of component_1 type lock requests.
1300	514	SMF42GPF	4	binary	Number of component_1 type release lock requests.

Offsets		Name	Length	Format	Description
1304	518	SMF42GUA	4	binary	Accumulation of waiters for record lock.
1308	51C	SMF42GUB	4	binary	Number of record locks hashed to the same hash table entry.
1312	520	SMF42GPH	4	binary	Number of component_1 class_1 (DIWA) locks (obtain/alter/promote).
1316	524	SMF42GPI	4	binary	Number of component_1 class_1 (DIWA) locks that cause true contention.
1320	528	SMF42GPJ	4	binary	Number of component_1 class_1 (DIWA) locks that cause false contention.
1324	52C	SMF42GPK	4	binary	Number of component_1 class_1 (DIWA) release lock requests.
1328	530	SMF42GPL	4	binary	Number of component_1 class_2 (UPGRADE) locks (obtain/alter/promote).
1332	534	SMF42GPM	4	binary	Number of component_1 class_2 (UPGRADE) locks that cause true contention.
1336	538	SMF42GPN	4	binary	Number of component_1 class_2 (UPGRADE) locks that cause false contention.
1340	53C	SMF42GPO	4	binary	Number of component_1 class_2 (UPGRADE) release lock requests.
1344	540	SMF42GPP	4	binary	Number of component_1 class_3 (PREFORMAT) locks (obtain/alter/promote).
1348	544	SMF42GPQ	4	binary	Number of component_1 class_3 (PREFORMAT) locks that cause true contention.
1352	548	SMF42GPR	4	binary	Number of component_1 class_3 (PREFORMAT) locks that cause false contention.
1356	54C	SMF42GPS	4	binary	Number of component_1 class_3 (PREFORMAT) release lock requests.
1360	550	SMF42GPT	4	binary	Number of component_2 lock requests (obtain/alter/promote).
1364	554	SMF42GPU	4	binary	Number of component_2 locks that cause true contention.
1368	558	SMF42GPV	4	binary	Number of component_2 locks that cause false contention.
1372	55C	SMF42GPW	4	binary	Number of component_2 release lock requests.
1376	560	SMF42GUD	4	binary	Accumulation of waiters for DIWA lock.
1380	564	SMF42GUE	4	binary	Accumulation of waiters for UPGRADE lock.
1384	568	SMF42GUF	4	binary	Accumulation of waiters for COMP2 lock.
1388	56C	SMF42GUG	4	binary	Number of locks (DIWA, UPGRADE, and COMP2) hashed to the same hash table entry.
1392	570	SMF42GSH	4	binary	Number of component_1 class 4 (Index Record) locks (obtain/alter/promote).
1396	574	SMF42GSI	4	binary	Number of component_1 class 4 (Index Record) locks that cause true contention.
1400	578	SMF42GSJ	4	binary	Number of component_1 class 4 (Index Record) locks that cause false contention.
1404	57C	SMF42GSK	4	binary	Number of component_1 class 4 (Index Record) release lock requests.
Sysplex-wide data set BMF LRU statistical section:					
1408	580	SMF42GRA	4	binary	Number of RE-DO's.
1412	584	SMF42GRB	4	binary	Number of recursive RE-DO's.
1416	588	SMF42GRC	4	binary	Number of BMF writes.
1420	58C	SMF42GRD	4	binary	Number of SCM read requests.

Offsets		Name	Length	Format	Description
1424	590	SMF42GRE	4	binary	Number of SCM read requests that encountered castout lock contention.
1428	594	SMF42GRG	4	binary	RE-DO percentage.
1432	598	SMF42GRH	4	binary	Recursive RE-DO percentage.
1436	59C	SMF42GRI	4	binary	SCM castout lock percentage.
1440	5A0	SMF42GRF	12	EBCDIC	Reserved.
1452	5AC	SMF42GRJ	4	binary	Total number of CF read requests that encountered retries for cast out locks.
1456	5B0	SMF42GSA	4	binary	Total number of CI splits for this interval (across the sysplex).
1460	5B4	SMF42GSB	4	binary	Total number of CA splits for this interval (across the sysplex).
1464	5B8	SMF42GRK	8	EBCDIC	Reserved.
1472	5C0	SMF42GAQ	16	EBCDIC	Lock structure name.

Data Set, CF, SYS summary section for below the bar

Offsets		Name	Length	Format	Description
0	0	SMF42GBA	4	binary	Interval length. This is the total length, in seconds, of the measurement period.
4	4	SMF42A05	12	EBCDIC	Reserved.
16	10	SMF42GBB	44	EBCDIC	Data set name.
60	3C	SMF42A06	4	binary	Reserved.
64	40	SMF42GBC	44	EBCDIC	VSAM sphere name.
108	6C	SMF42A07	4	binary	Reserved.
112	70	SMF42GBD	2	binary	Length of storage class name.
114	72	SMF42GBE	30	EBCDIC	Storage class name.
144	90	SMF42A08	2	binary	Length of cache set name.
146	92	SMF42GBF	30	EBCDIC	Cache set name.
176	B0	SMF42A12	2	binary	Reserved.
178	B2	SMF42GBG	30	EBCDIC	Cache structure name.
208	D0	SMF42GBH	8	EBCDIC	MVS system name.
216	D8	SMF42A11	8	EBCDIC	Reserved.
224	E0	SMF42GBI	4	binary	Indicator of component being processed **Bit** **Meaning when set** **0** Data component **1** Index component **2-31** Reserved.
228	E4	SMF42A09	12	EBCDIC	Indicates DFSMS greater than 4K CF caching status. Value is ALL, NONE, UPDATESONLY, DIRONLY or GT4KNOTACT.
240	F0	SMF42GBK	4	binary	Number of lock requests processed by this MVS system.
244	F4	SMF42GBL	4	binary	Number of true contention lock requests.
248	F8	SMF42GBM	4	binary	Number of false contention lock requests.

Offsets		Name	Length	Format	Description
252	FC	SMF42GZ8	2	binary	SMS DIRECT WEIGHT
254	FE	SMF42GZ9	2	binary	SMS SEQUENTIAL WEIGHT
256	100	SMF42GBN	8	EBCDIC	In DFSMS 1.4, WLM SERV Class Name
264	108	SMF42GBO	8	EBCDIC	In DFSMS 1.4, WLM Report Class Name
272	110	SMF42GBP	16	EBCDIC	SMS data class name.
Direct access section:					
288	120	SMF42GIA	4	binary	Coupling facility cache partition number.
292	124	SMF42GIB	4	binary	Total number of direct access requests.
296	128	SMF42GIC	4	binary	Number of read requests - NRI protocol (No Read Integrity). (pre-format)
300	12C	SMF42GID	4	binary	Number of read requests - Consistent read protocol.
304	130	SMF42GIE	4	binary	Number of Write requests.
308	134	SMF42GIF	4	binary	Number of direct access BMF requests.
312	138	SMF42GIG	4	binary	Number of direct access BMF Read requests.
316	13C	SMF42GIH	4	binary	Number of direct access BMF Write requests.
320	140	SMF42GII	4	binary	Number of direct access BMF read hits.
324	144	SMF42GIJ	4	binary	Number of direct access BMF valid read hits.
328	148	SMF42GIK	4	binary	Number of BMF false invalids.
332	14C	SMF42GIL	4	binary	Number of direct access CF cache structure requests.
336	150	SMF42GIM	4	binary	Number of direct access CF cache structure Read requests.
340	154	SMF42GIN	4	binary	Number of direct access CF cache structure Write requests.
344	158	SMF42GIO	4	binary	Number of direct access CF cache structure read hits.
348	15C	SMF42GIP	4	binary	Number of direct access CF cache structure read castins.
352	160	SMF42GIQ	8	binary	Number of direct access CF cache structure byte transferred.
360	168	SMF42GIR	4	binary	Total number of real READ I/O direct requests to DASD.
364	16C	SMF42GIS	4	binary	Total number of real WRITE I/O direct requests to DASD.
368	170	SMF42GIT	8	binary	Total number of bytes transferred to DASD for the read requests.
376	178	SMF42GIU	8	binary	Total number of bytes transferred to DASD for the write requests.
384	180	SMF42GIV	16	EBCDIC	Reserved.
400	190	SMF42GIW	8	binary	Total amount of time, in milli seconds, for all the direct access requests in this interval.
408	198	SMF42GIX	4	binary	Average response time for all of the requests in this interval (total time/number of requests).
412	19C	SMF42GIY	4	binary	Normalized response time for all of the requests in this interval (total time/number of bytes transferred/4K).
416	1A0	SMF42GIZ	8	EBCDIC	Reserved.
424	1A8	SMF42GI7	32	EBCDIC	Reserved.
Direct access record merge (RE-DO) summary section:					
456	1C8	SMF42GJA	4	binary	Coupling facility cache partition number.
460	1CC	SMF42GJB	4	binary	Total number of direct access requests. (RE-DO)
464	1D0	SMF42GJC	4	binary	Number of read requests - NRI protocol (No Read Integrity). (RE-DO)
468	1D4	SMF42GJD	4	binary	Number of read requests - Consistent read protocol. (RE-DO)

Offsets		Name	Length	Format	Description
472	1D8	SMF42GJE	4	binary	Number of Write requests. (RE-DO)
476	1DC	SMF42GJF	4	binary	Number of direct access BMF requests. (RE-DO)
480	1E0	SMF42GJG	4	binary	Number of direct access BMF Read requests. (RE-DO)
484	1E4	SMF42GJH	4	binary	Number of direct access BMF Write requests. (RE-DO)
488	1E8	SMF42GJI	4	binary	Number of direct access BMF read hits. (RE-DO)
492	1EC	SMF42GJJ	4	binary	Number of direct access BMF valid read hits. (RE-DO)
496	1F0	SMF42GJK	4	binary	Number of BMF false invalids. (RE-DO)
500	1F4	SMF42GJL	4	binary	Number of direct access CF cache structure requests. (RE-DO)
504	1F8	SMF42GJM	4	binary	Number of direct access CF cache structure Read requests. (RE-DO)
508	1FC	SMF42GJN	4	binary	Number of direct access CF cache structure Write requests. (RE-DO)
512	200	SMF42GJO	4	binary	Number of direct access CF cache structure read hits. (RE-DO)
516	204	SMF42GJP	4	binary	Number of direct access CF cache structure read castins.
520	208	SMF42GJQ	8	binary	Number of direct access CF cache structure bytes transferred.
528	210	SMF42GJR	4	binary	Total number of READ real I/O direct requests to DASD. (RE-DO)
532	214	SMF42GJS	4	binary	Total number of WRITE real I/O direct requests to DASD. (RE-DO)
536	218	SMF42GJT	8	binary	Total number of bytes transferred to DASD for the read requests.
544	220	SMF42GJU	8	binary	Total number of bytes transferred to DASD for the write requests.
552	228	SMF42GJV	16	EBCDIC	Reserved.
568	238	SMF42GJW	8	binary	Total amount of time, in milli seconds, for all direct access (RE-DO) requests in this interval.
576	240	SMF42GJX	4	binary	Average response time for all of the direct access (RE-DO) requests in this interval (total time/number of requests).
580	244	SMF42GJY	4	binary	Normalized response time for all of the requests in this interval (total time/number of bytes transferred/4K). (RE-DO)
584	248	SMF42GJZ	8	EBCDIC	Reserved.
592	250	SMF42GJ7	32	EBCDIC	Reserved.
Sequential access section:					
624	270	SMF42GKA	4	binary	Coupling facility cache partition number.
628	274	SMF42GKB	4	binary	Total number of sequential access requests.
632	278	SMF42GKC	4	binary	Number of read requests - NRI protocol (No Read Integrity).
636	27C	SMF42GKD	4	binary	Number of read requests - Consistent read protocol.
640	280	SMF42GKE	4	binary	Number of Write requests.
644	284	SMF42GKF	4	binary	Number of direct access BMF requests.
648	288	SMF42GKG	4	binary	Number of direct access BMF Read requests.
652	28C	SMF42GKH	4	binary	Number of direct access BMF Write requests.
656	290	SMF42GKI	4	binary	Number of direct access BMF read hits.
660	294	SMF42GKJ	4	binary	Number of direct access BMF valid read hits.
664	298	SMF42GKK	4	binary	Number of BMF false invalids.
668	29C	SMF42GKL	4	binary	Number of direct access CF cache structure requests.
672	2A0	SMF42GKM	4	binary	Number of direct access CF cache structure Read requests.
676	2A4	SMF42GKN	4	binary	Number of direct access CF cache structure Write requests.

Offsets		Name	Length	Format	Description
680	2A8	SMF42GKO	4	binary	Number of direct access CF cache structure read hits.
684	2AC	SMF42GKP	4	binary	Number of direct access CF cache structure read castins.
688	2B0	SMF42GKQ	8	binary	Number of direct access CF cache structure byte transferred.
696	2B8	SMF42GKR	4	binary	Total number of READ real I/O sequential requests to DASD.
700	2BC	SMF42GKS	4	binary	Total number of WRITE real I/O sequential requests to DASD.
704	2C0	SMF42GKT	8	binary	Total number of bytes transferred for all sequential access requests where the data was retrieved from DASD. (real I/O DASD)
712	2C8	SMF42GKU	8	binary	Total number of bytes transferred for all sequential access requests where the data was retrieved from DASD or a coupling facility cache structure. (real I/O DASD)
720	2D0	SMF42GKV	16	EBCDIC	Reserved.
736	2E0	SMF42GKW	8	binary	Total amount of time, in milli seconds, for all sequential access requests in this interval.
744	2E8	SMF42GKX	4	binary	Average response time for all of the sequential access requests in this interval (total time/number of requests).
748	2EC	SMF42GKY	4	binary	Normalized response time for all of the requests in this interval (total time/number of bytes transferred/4K).
752	2F0	SMF42GKZ	8	EBCDIC	Reserved.
760	2F8	SMF42GK7	32	EBCDIC	Reserved.
Sequential access record merge (RE-DO) summary section:					
792	318	SMF42GLA	4	binary	Coupling facility cache partition number.
796	31C	SMF42GLB	4	binary	Total number of sequential access requests. (RE-DO)
800	320	SMF42GLC	4	binary	Number of read requests - NRI protocol (No Read Integrity). (RE-DO)
804	324	SMF42GLD	4	binary	Number of read requests - Consistent read protocol. (RE-DO)
808	328	SMF42GLE	4	binary	Number of Write requests. (RE-DO)
812	32C	SMF42GLF	4	binary	Number of direct access BMF requests. (RE-DO)
816	330	SMF42GLG	4	binary	Number of direct access BMF Read requests.
820	334	SMF42GLH	4	binary	Number of direct access BMF Write requests.
824	338	SMF42GLI	4	binary	Number of direct access BMF read hits.
828	33C	SMF42GLJ	4	binary	Number of direct access BMF valid read hits.
832	340	SMF42GLK	4	binary	Number of BMF false invalids. (RE-DO)
836	344	SMF42GLL	4	binary	Number of direct access CF cache structure requests.
840	348	SMF42GLM	4	binary	Number of direct access CF cache structure Read requests.
844	34C	SMF42GLN	4	binary	Number of direct access CF cache structure Write requests.
848	350	SMF42GLO	4	binary	Number of direct access CF cache structure read hits. (RE-DO)
852	354	SMF42GLP	4	binary	Number of direct access CF cache structure read castins.
856	358	SMF42GLQ	8	binary	Number of direct access CF cache structure bytes transferred.
864	360	SMF42GLR	4	binary	Total number of READ real I/O sequential requests to DASD. (RE-DO)
868	364	SMF42GLS	4	binary	Total number of WRITE real I/O sequential requests to DASD. (RE-DO)
872	368	SMF42GLT	8	binary	Total number of bytes transferred to DASD for the read requests.
880	370	SMF42GLU	8	binary	Total number of bytes transferred to DASD for the write requests.

Offsets		Name	Length	Format	Description
888	378	SMF42GLV	16	EBCDIC	Reserved.
904	388	SMF42GLW	8	binary	Total amount of time, in milli seconds, for all sequential access (RE-DO) requests in this interval.
912	390	SMF42GLX	4	binary	Average response time for all of the sequential access (RE-DO) requests in this interval (total time/number of requests).
916	394	SMF42GLY	4	binary	Normalized response time for all of the requests in this interval (total time/number of bytes transferred/4K). (RE-DO)
920	398	SMF42GLZ	8	EBCDIC	Reserved.
928	3A0	SMF42GL7	32	EBCDIC	Reserved.
Sequential access read ahead summary section:					
960	3C0	SMF42GMA	4	binary	Coupling facility cache partition number.
964	3C4	SMF42GMB	4	binary	Total number of sequential access requests. (read ahead)
968	3C8	SMF42GMC	4	binary	Number of read requests - NRI protocol (No Read Integrity). (read-ahead)
972	3CC	SMF42GMD	4	binary	Number of read requests - Consistent read protocol. (read-ahead)
976	3D0	SMF42GME	4	binary	Number of Write requests. (read-ahead)
980	3D4	SMF42GMF	4	binary	Number of direct access BMF requests. (read-ahead)
984	3D8	SMF42GMG	4	binary	Number of direct access BMF Read requests.
988	3DC	SMF42GMH	4	binary	Number of direct access BMF Write requests.
992	3E0	SMF42GMI	4	binary	Number of direct access BMF read hits.
996	3E4	SMF42GMJ	4	binary	Number of direct access BMF valid read hits.
1000	3E8	SMF42GMK	4	binary	Number of BMF false invalids. (read-ahead)
1004	3EC	SMF42GML	4	binary	Number of direct access CF cache structure requests.
1008	3F0	SMF42GMM	4	binary	Number of direct access CF cache structure Read requests.
1012	3F4	SMF42GMN	4	binary	Number of direct access CF cache structure Write requests.
1016	3F8	SMF42GMO	4	binary	Number of direct access CF cache structure read hits. (read-ahead)
1020	3FC	SMF42GMP	4	binary	Number of direct access CF cache structure read castins.
1024	400	SMF42GMQ	8	binary	Number of direct access CF cache structure byte transferred.
1032	408	SMF42GMR	4	binary	Total number of real READ I/O sequential requests to DASD. (read ahead)
1036	40C	SMF42GMS	4	binary	Total number of real WRITE I/O sequential requests to DASD. (read ahead)
1040	410	SMF42GMT	8	binary	Total number of bytes transferred to DASD for the read requests.
1048	418	SMF42GMU	8	binary	Total number of bytes transferred to DASD for the write requests.
1056	420	SMF42GMV	16	EBCDIC	Reserved.
1072	430	SMF42GMW	8	binary	Total amount of time, in milli seconds, for all sequential access (read ahead) requests in this interval.
1080	438	SMF42GMX	4	binary	Average response time for all of the sequential access (read ahead) requests in this interval (total time/number of requests).
1084	43C	SMF42GMY	4	binary	Normalized response time for all of the requests in this interval (total time/number of bytes transferred/4K). (read ahead)
1088	440	SMF42GMZ	8	EBCDIC	Reserved.
1096	448	SMF42GM7	32	EBCDIC	Reserved.
Sequential access pre-format summary section:					

Offsets		Name	Length	Format	Description
1128	468	SMF42GNA	4	binary	Coupling facility cache partition number.
1132	46C	SMF42GNB	4	binary	Total number of sequential access requests. (pre-format)
1136	470	SMF42GNC	4	binary	Number of read requests - NRI protocol (No Read Integrity). (pre-format)
1140	474	SMF42GND	4	binary	Number of read requests - Consistent read protocol. (pre-format)
1144	478	SMF42GNE	4	binary	Number of Write requests. (pre-format)
1148	47C	SMF42GNF	4	binary	Number of direct access BMF requests. (pre-format)
1152	480	SMF42GNG	4	binary	Number of direct access BMF Read requests.
1156	484	SMF42GNH	4	binary	Number of direct access BMF Write requests.
1160	488	SMF42GNI	4	binary	Number of direct access BMF read hits.
1164	48C	SMF42GNJ	4	binary	Number of direct access BMF valid read hits.
1168	490	SMF42GNK	4	binary	Number of BMF false invalids. (pre-format)
1172	494	SMF42GNL	4	binary	Number of direct access CF cache structure requests.
1176	498	SMF42GNM	4	binary	Number of direct access CF cache structure Read requests.
1180	49C	SMF42GNN	4	binary	Number of direct access CF cache structure Write requests.
1184	4A0	SMF42GNO	4	binary	Number of direct access CF cache structure read hits. (pre-format)
1188	4A4	SMF42GNP	4	binary	Number of direct access CF cache structure read castins.
1192	4A8	SMF42GNQ	8	binary	Number of direct access CF cache structure byte transferred.
1200	4B0	SMF42GNR	4	binary	Total number of READ real I/O sequential requests to DASD. (pre-format)
1204	4B4	SMF42GNS	4	binary	Total number of WRITE real I/O sequential requests to DASD. (pre-format)
1208	4B8	SMF42GNT	8	binary	Total number of bytes transferred to DASD for the read requests.
1216	4C0	SMF42GNU	8	binary	Total number of bytes transferred to DASD for the write requests.
1224	4C8	SMF42GNV	16	EBCDIC	Reserved.
1240	4D8	SMF42GNW	8	binary	Total amount of time, in milli seconds, for all sequential access. (pre-format) requests in this interval.
1248	4E0	SMF42GNX	4	binary	Average response time for all of the sequential access (pre-format) requests in this interval (total time/number of requests).
1252	4E4	SMF42GNY	4	binary	Normalized response time for all of the requests in this interval (total time/number of bytes transferred/4K). (pre-format)
1256	4E8	SMF42GNZ	8	EBCDIC	Reserved.
1264	4F0	SMF42GN7	32	EBCDIC	Reserved.
1296	510	SMF42GQA	4	binary	Number of record lock requests (obtain/alter/promote)
1300	514	SMF42GQB	4	binary	Number of record lock requests that cause true contention.
1304	518	SMF42GQC	4	binary	Number of record lock requests that cause false contention.
1308	51C	SMF42GQD	4	binary	Number of record lock release requests.
1312	520	SMF42GQE	4	binary	Number of component_1 type lock requests.
1316	524	SMF42GQF	4	binary	Number of component_1 type release lock requests.
1320	528	SMF42GVA	4	binary	Accumulation of waiters for record lock.
1324	52C	SMF42GVB	4	binary	Number of record locks hashed to the same hash table entry.
1328	530	SMF42GQH	4	binary	Number of component_1 class_1 (DIWA) locks (obtain/alter/promote).

Offsets		Name	Length	Format	Description
1332	534	SMF42GQI	4	binary	Number of component_1 class_1 (DIWA) locks that cause true contention.
1336	538	SMF42GQJ	4	binary	Number of component_1 class_1 (DIWA) locks that cause false contention.
1340	53C	SMF42GQK	4	binary	Number of component_1 class_1 (DIWA) release lock requests.
1344	540	SMF42GQL	4	binary	Number of component_1 class_2 (UPGRADE) locks (obtain/alter/promote).
1348	544	SMF42GQM	4	binary	Number of component_1 class_2 (UPGRADE) locks that cause true contention.
1352	548	SMF42GQN	4	binary	Number of component_1 class_2 (UPGRADE) locks that cause false contention.
1356	54C	SMF42GQO	4	binary	Number of component_1 class_2 (UPGRADE) release lock requests.
1360	550	SMF42GQP	4	binary	Number of component_1 class_3 (PREFORMAT) locks (obtain/alter/promote).
1364	554	SMF42GQQ	4	binary	Number of component_1 class_3 (PREFORMAT) locks that cause true contention.
1368	558	SMF42GQR	4	binary	Number of component_1 class_3 (PREFORMAT) locks that cause false contention.
1372	55C	SMF42GQS	4	binary	Number of component_1 class_3 (PREFORMAT) release lock requests.
1376	560	SMF42GQT	4	binary	Number of component_2 lock requests (obtain/alter/promote).
1380	564	SMF42GQU	4	binary	Number of component_2 locks that cause true contention.
1384	568	SMF42GQV	4	binary	Number of component_2 locks that cause false contention.
1388	56C	SMF42GQW	4	binary	Number of component_2 release lock requests.
1392	570	SMF42GVD	4	binary	Accumulation of waiters for DIWA lock.
1396	574	SMF42GVE	4	binary	Accumulation of waiters for UPGRADE lock.
1400	578	SMF42GVF	4	binary	Accumulation of waiters for COMP2 lock.
1404	57C	SMF42GVG	4	binary	Number of locks (DIWA, UPGRADE, and COMP2) hashed to the same hash table entry.
1408	580	SMF42GTH	4	binary	Number of component_1 class 4 (Index Record) locks (obtain/alter/promote).
1412	584	SMF42GTI	4	binary	Number of component_1 class 4 (Index Record) locks that cause true contention.
1416	588	SMF42GTJ	4	binary	Number of component_1 class 4 (Index Record) locks that cause false contention.
1420	58C	SMF42GTK	4	binary	Number of component_1 class 4 (Index Record) release lock requests.
1424	590	SMF42GRL	4	binary	Number of RE-DO's.
1428	594	SMF42GRM	4	binary	Number of recursive RE-DO's.
1432	598	SMF42GRN	4	binary	Number of BMF writes.
1436	59C	SMF42GRO	4	binary	Number of SCM read requests.
1440	5A0	SMF42GRP	4	binary	Number of SCM read requests that encountered castout lock contention.
1444	5A4	SMF42GRR	4	binary	RE-DO percentage.
1448	5A8	SMF42GRS	4	binary	Recursive RE-DO percentage.
1452	5AC	SMF42GRT	4	binary	SCM castout lock percentage.

Offsets		Name	Length	Format	Description
1456	5B0	SMF42GRQ	12	EBCDIC	Reserved.
1468	5BC	SMF42GRU	4	binary	Total number of CF read requests that encountered retries for cast out locks.
1472	5C0	SMF42GTA	4	binary	Total number of CI splits for this interval.
1476	5C4	SMF42GTB	4	binary	Total number of CA splits for this interval.
1480	5C8	SMF42GRV	8	EBCDIC	Reserved.
1488	5D0	SMF42GBQ	16	EBCDIC	Lock structure name.

Sysplex-wide data set summary section for above the bar

Offsets		Name	Length	Format	Description
0	0	SMF2AGAA	4	binary	Interval length. This is the total time, in seconds, of the measurement period.
4	4	SMF2AA00	12	EBCDIC	Reserved.
16	10	SMF2AGAB	44	EBCDIC	Data set name
60	3C	SMF2AA01	4	binary	Reserved.
64	40	SMF2AGAC	44	EBCDIC	VSAM sphere name.
108	6C	SMF2AA02	4	binary	Reserved.
112	70	SMF2AGAD	2	binary	Length of the storage class name.
114	72	SMF2AGAE	30	EBCDIC	Storage class name.
144	90	SMF2AA03	2	binary	Length of DFSMS CacheSet name.
146	92	SMF2AGAF	30	EBCDIC	DFSMS CacheSet name.
176	B0	SMF2AGAG	2	EBCDIC	Reserved.
178	B2	SMF2AGAH	30	EBCDIC	DFP CF cache structure name.
208	D0	SMF2AGAI	4	binary	Indicator of component being processed. **Bit** **Meaning when set** **0** Data component **1** Index component **2-31** Reserved.
212	D4	SMF2AGAJ	12	EBCDIC	Indicates DFSMS greater than 4K CF caching status. Value is ALL, NONE, UPDATESONLY, DIRONLY or GT4KNOTACT.
224	E0	SMF2AGAK	4	binary	Reserved.
228	E4	SMF2AGAL	4	binary	Reserved.
232	E8	SMF2AGAM	4	binary	Reserved.
236	EC	SMF2AGZ1	2	binary	SMS Direct Weight
240	EE	SMF2AGZ2	2	binary	SMS Sequential Weight
240	F0	SMF2AGAN	8	EBCDIC	In DFSMS 1.4 WLM Server class name
248	F8	SMF2AGAO	8	EBCDIC	In DFSMS 1.4 WLM report class name
256	100	SMF2AGAP	16	EBCDIC	SMS data class name
Sysplex-wide direct access summary section:					
272	110	SMF2AGCA	4	binary	Coupling facility cache partition number.

Offsets		Name	Length	Format	Description
276	114	SMF2AGCB	4	binary	Total number of direct access requests.
280	118	SMF2AGCC	4	binary	Number of read requests - NRI protocol (No Read Integrity).
284	11C	SMF2AGCD	4	binary	Number of read requests - Consistent read protocol.
288	120	SMF2AGCE	4	binary	Number of Write requests.
292	124	SMF2ACGF	4	binary	Number of direct access BMF requests.
296	128	SMF2AGCG	4	binary	Number of direct access BMF Read requests.
300	12C	SMF2AGCH	4	binary	Number of direct access BMF Write requests.
304	130	SMF2AGCI	4	binary	Number of direct access BMF read hits.
308	134	SMF2AGCJ	4	binary	Number of direct access BMF valid read hits.
312	138	SMF2AGCK	4	binary	Number of BMF false invalids.
316	13C	SMF2AGCL	4	binary	Number of direct access CF cache structure requests.
320	140	SMF2AGCM	4	binary	Number of direct access CF cache structure Read requests.
324	144	SMF2AGCN	4	binary	Number of direct access CF cache structure Write requests.
328	148	SMF2AGCO	4	binary	Number of direct access CF cache structure read hits.
332	14C	SMF2AGCP	4	binary	Number of direct access CF cache structure read castins.
336	150	SMF2AGCQ	8	binary	Number of bytes transferred into the DFSMS cache structure.
344	158	SMF2AGCR	4	binary	Total number READ of real I/O direct requests to DASD.
348	15C	SMF2AGCS	4	binary	Total number WRITE of real I/O direct requests to DASD.
352	160	SMF2AGCT	8	binary	Total number of bytes transferred to DASD for the read requests.
360	168	SMF2AGCU	8	binary	Total number of bytes transferred to DASD for the write requests.
368	170	SMF2AGCV	16	EBCDIC	Reserve
384	180	SMF2AGCW	8	binary	Total amount of time, in milli seconds, for all the direct access requests in this interval.
392	188	SMF2AGCX	4	binary	Average response time for all of the requests in this interval (total time/number of requests).
396	18C	SMF2AGCY	4	binary	Normalized response time for all of the requests in this interval (total time/number of bytes transferred/4K).
400	190	SMF2AGCZ	8	EBCDIC	Reserved.
408	198	SMF2AGC7	32	EBCDIC	Reserved.
Sysplex-wide direct access record merge (RE-DO) summary section:					
440	1B8	SMF2AGDA	4	binary	Coupling facility cache partition number.
444	1BC	SMF2AGDB	4	binary	Total number of direct access requests. (RE-DO)
448	1C0	SMF2AGDC	4	binary	Number of read requests - NRI protocol (No Read Integrity). (RE-DO)
452	1C4	SMF2AGDD	4	binary	Number of read requests - Consistent read protocol. (RE-DO)
456	1C8	SMF2AGDE	4	binary	Number of Write requests. (RE-DO)
460	1CC	SMF2AGDF	4	binary	Number of direct access BMF requests. (RE-DO)
464	1D0	SMF2AGDG	4	binary	Number of direct access BMF Read requests. (RE-DO)
468	1D4	SMF2AGDH	4	binary	Number of direct access BMF Write requests. (RE-DO)
472	1D8	SMF2AGDI	4	binary	Number of direct access BMF read hits. (RE-DO)
476	1DC	SMF2AGDJ	4	binary	Number of direct access BMF valid read hits. (RE-DO)
480	1E0	SMF2AGDK	4	binary	Number of BMF false invalids. (RE-DO)

Offsets		Name	Length	Format	Description
484	1E4	SMF2AGDL	4	binary	Number of direct access CF cache structure requests. (RE-DO)
488	1E8	SMF2AGDM	4	binary	Number of direct access CF cache structure Read requests. (RE-DO)
492	1EC	SMF2AGDN	4	binary	Number of direct access CF cache structure Write requests. (RE-DO)
496	1F0	SMF2AGDO	4	binary	Number of direct access CF cache structure read hits. (RE-DO)
500	1F4	SMF2AGDP	4	binary	Number of direct access CF cache structure read castins. (RE-DO)
504	1F8	SMF2AGDQ	8	binary	Number of direct access CF cache structure byte transferred. (RE-DO)
512	200	SMF2AGDR	4	binary	Total number of READ real I/O direct requests to DASD. (RE-DO)
516	204	SMF2AGDS	4	binary	Total number of WRITE real I/O direct requests to DASD. (RE-DO)
520	208	SMF2AGDT	8	binary	Total number of bytes transferred to DASD for the read requests.
528	210	SMF2AGDU	8	binary	Total number of bytes transferred to DASD for the write requests.
536	218	SMF2AGDV	16	EBCDIC	Reserved.
552	228	SMF2AGDW	8	binary	Total amount of time, in milli seconds, for all direct access (RE-DO) requests in this interval.
560	230	SMF2AGDX	4	binary	Average response time for all of the direct access (RE-DO) requests in this interval (total time/number of requests).
564	234	SMF2AGDY	4	binary	Normalized response time for all of the requests in this interval (total time/number of bytes transferred/4K). (RE-DO)
568	238	SMF2AGDZ	8	EBCDIC	Reserved.
576	240	SMF2AGD7	32	EBCDIC	Reserved.
Sysplex-wide sequential access summary section:					
608	260	SMF2AGEA	4	binary	Coupling facility cache partition number.
612	264	SMF2AGEB	4	binary	Total number of sequential access requests.
616	268	SMF2AGDC	4	binary	Number of read requests - NRI protocol (No Read Integrity).
620	26C	SMF2AGED	4	binary	Number of read requests - Consistent read protocol.
624	270	SMF2AGEE	4	binary	Number of Write requests.
628	274	SMF2AGEF	4	binary	Number of direct access BMF requests.
632	278	SMF2AGEG	4	binary	Number of direct access BMF Read requests.
636	27C	SMF2AGEH	4	binary	Number of direct access BMF Write requests.
640	280	SMF2AGEI	4	binary	Number of direct access BMF read hits.
644	284	SMF2AGEJ	4	binary	Number of direct access BMF valid read hits.
648	288	SMF2AGEK	4	binary	Number of BMF false invalids.
652	28C	SMF2AGEL	4	binary	Number of direct access CF cache structure requests.
656	290	SMF2AGEM	4	binary	Number of direct access CF cache structure Read requests.
660	294	SMF2AGEN	4	binary	Number of direct access CF cache structure Write requests.
664	298	SMF2AGEO	4	binary	Number of direct access CF cache structure read hits.
668	29C	SMF2AGEP	4	binary	Number of direct access CF cache structure read castins.
672	2A0	SMF2AGEQ	8	binary	Number of direct access CF cache structure byte transferred.
680	2A8	SMF2AGER	4	binary	Total number of READ real I/O sequential requests to DASD.
684	2AC	SMF2AGES	4	binary	Total number of WRITE real I/O sequential requests to DASD.
688	2B0	SMF2AGET	8	binary	Total number of bytes transferred to DASD for the read requests.

Offsets		Name	Length	Format	Description
696	2B8	SMF2AGEU	8	binary	Total number of bytes transferred to DASD for the write requests.
704	2C0	SMF2AGEV	16	EBCDIC	Reserved.
720	2D0	SMF2AGEW	8	binary	Total amount of time, in milli seconds, for all sequential access requests in this interval.
728	2D8	SMF2AGEX	4	binary	Average response time for all of the sequential access requests in this interval (total time/number of requests).
732	2DC	SMF2AGEY	4	binary	Normalized response time for all of the requests in this interval (total time/number of bytes transferred/4K).
736	2E0	SMF2AGEZ	8	EBCDIC	Reserved.
744	2E8	SMF2AGE7	32	EBCDIC	Reserved.
Sysplex-wide sequential access record merge (RE-DO) summary section:					
776	308	SMF2AGFA	4	binary	Coupling facility cache partition number.
780	30C	SMF2AGFB	4	binary	Total number of direct access requests. (RE-DO)
784	310	SMF2AGFC	4	binary	Number of read requests - NRI protocol (No Read Integrity). (RE-DO)
788	314	SMF2AGFD	4	binary	Number of read requests - Consistent read protocol. (RE-DO)
792	318	SMF2AGFE	4	binary	Number of Write requests.(RE-DO)
796	31C	SMF2AGFF	4	binary	Number of direct access BMF requests. (RE-DO)
800	320	SMF2AGFG	4	binary	Number of direct access BMF Read requests. (RE-DO)
804	324	SMF2AGFH	4	binary	Number of direct access BMF Write requests. (RE-DO)
808	328	SMF2AGFI	4	binary	Number of direct access BMF read hits. (RE-DO)
812	32C	SMF2AGFJ	4	binary	Number of direct access BMF valid read hits. (RE-DO)
816	330	SMF2AGFK	4	binary	Number of BMF false invalids. (RE-DO)
820	334	SMF2AGFL	4	binary	Number of direct access CF cache structure requests. (RE-DO)
824	338	SMF2AGFM	4	binary	Number of direct access CF cache structure Read requests. (RE-DO)
828	33C	SMF2AGFN	4	binary	Number of direct access CF cache structure Write requests. (RE-DO)
832	340	SMF2AGFO	4	binary	Number of direct access CF cache structure read hits. (RE-DO)
836	344	SMF2AGFP	4	binary	Number of direct access CF cache structure read castins. (RE-DO)
840	348	SMF2AGFQ	8	binary	Number of direct access CF cache structure byte transferred. (RE-DO)
848	350	SMF2AGFR	4	binary	Total number of real READ I/O sequential requests to DASD. (RE-DO)
852	354	SMF2AGFS	4	binary	Total number of real WRITE I/O sequential requests to DASD. (RE-DO)
856	358	SMF2AGFT	8	binary	Total number of bytes transferred to DASD for the read requests.
864	360	SMF2AGFU	8	binary	Total number of bytes transferred to DASD for the write requests.
872	368	SMF2AGFV	16	EBCDIC	Reserved.
888	378	SMF2AGFW	8	binary	Total amount of time, in milli seconds, for all sequential access (RE-DO) requests in this interval.
896	380	SMF2AGFX	4	binary	Average response time for all of the sequential access (RE-DO) requests in this interval (total time/number of requests).
900	384	SMF2AGFY	4	binary	Normalized response time for all of the requests in this interval (total time/number of bytes transferred/4K). (RE-DO)

Offsets		Name	Length	Format	Description
904	388	SMF2AGFZ	8	EBCDIC	Reserved.
912	390	SMF2AGF7	32	EBCDIC	Reserved.
Sysplex-wide sequential access read ahead summary section:					
944	3B0	SMF2AGGA	4	binary	Coupling facility cache partition number.
948	3B4	SMF2AGGB	4	binary	Total number of sequential access requests. (read ahead)
952	3B8	SMF2AGGC	4	binary	Number of read requests - NRI protocol (No Read Integrity).(read ahead)
956	3BC	SMF2AGGD	4	binary	Number of read requests - Consistent read protocol. (read ahead)
960	3C0	SMF2AGGE	4	binary	Number of Write requests.(read ahead)
964	3C4	SMF2AGGF	4	binary	Number of direct access BMF requests. (read ahead)
968	3C8	SMF2AGGG	4	binary	Number of direct access BMF Read requests. (read ahead)
972	3CC	SMF2AGGH	4	binary	Number of direct access BMF Write requests. (read ahead)
976	3D0	SMF2AGGI	4	binary	Number of direct access BMF read hits. (read ahead)
980	3D4	SMF2AGGJ	4	binary	Number of direct access BMF valid read hits. (read ahead)
984	3D8	SMF2AGGK	4	binary	Number of BMF false invalids. (RE-DO)
988	3DC	SMF2AGGL	4	binary	Number of direct access CF cache structure requests. (read ahead)
992	3E0	SMF2AGGM	4	binary	Number of direct access CF cache structure Read requests. (read ahead)
996	3E4	SMF2AGGN	4	binary	Number of direct access CF cache structure Write requests. (read ahead)
1000	3E8	SMF2AGGO	4	binary	Number of direct access CF cache structure read hits. (read ahead)
1004	3EC	SMF2AGGP	4	binary	Number of direct access CF cache structure read castins. (read ahead)
1008	3F0	SMF2AGGQ	8	binary	Number of direct access CF cache structure byte transferred. (read ahead)
1016	3F8	SMF2AGGR	4	binary	Total number of READ real I/O sequential requests to DASD. (read ahead)
1020	3FC	SMF2AGGS	4	binary	Total number of WRITE real I/O sequential requests to DASD. (read ahead)
1024	400	SMF2AGGT	8	binary	Total number of bytes transferred to DASD for the read requests.
1032	408	SMF2AGGU	8	binary	Total number of bytes transferred to DASD for the write requests.
1040	410	SMF2AGGV	16	EBCDIC	Reserved.
1056	420	SMF2AGGW	8	binary	Total amount of time, in milli seconds, for all sequential access (read ahead) requests in this interval.
1064	428	SMF2AGGX	4	binary	Average response time for all of the sequential access (read ahead) requests in this interval (total time/number of requests).
1068	42C	SMF2AGGY	4	binary	Normalized response time for all of the requests in this interval (total time/number of bytes transferred/4K). (read ahead)
1072	430	SMF2AGGZ	8	EBCDIC	Reserved.
1080	438	SMF2AGG7	32	EBCDIC	Reserved.
Sysplex-wide sequential access pre-format summary section:					
1112	458	SMF2AGHA	4	binary	Coupling facility cache partition number.
1116	45C	SMF2AGHB	4	binary	Total number of sequential access requests. (pre-format)
1120	460	SMF2AGHC	4	binary	Number of read requests - NRI protocol (No Read Integrity). (pre-format)

Offsets		Name	Length	Format	Description
1124	464	SMF2AGHD	4	binary	Number of read requests - Consistent read protocol. (pre-format)
1128	468	SMF2AGHE	4	binary	Number of Write requests. (pre-format)
1132	46C	SMF2AGHF	4	binary	Number of direct access BMF requests. (pre-format)
1136	470	SMF2AGHG	4	binary	Number of direct access BMF Read requests. (pre-format)
1140	474	SMF2AGHH	4	binary	Number of direct access BMF Write requests. (pre-format)
1144	478	SMF2AGHI	4	binary	Number of direct access BMF read hits. (pre-format)
1148	47C	SMF2AGHJ	4	binary	Number of direct access BMF valid read hits. (pre-format)
1152	480	SMF2AGHK	4	binary	Number of BMF false invalids. (pre-format)
1156	484	SMF2AGHL	4	binary	Number of direct access CF cache structure requests. (pre-format)
1160	488	SMF2AGHM	4	binary	Number of direct access CF cache structure Read requests. (pre-format)
1164	48C	SMF2AGHN	4	binary	Number of direct access CF cache structure Write requests. (pre-format)
1168	490	SMF2AGHO	4	binary	Number of direct access CF cache structure read hits. (pre-format)
1172	494	SMF2AGHP	4	binary	Number of direct access CF cache structure read castins. (pre-format)
1176	498	SMF2AGHQ	8	binary	Number of direct access CF cache structure byte transferred. (pre-format)
1184	4A0	SMF2AGHR	4	binary	Total number of READ real I/O sequential requests to DASD. (pre-format)
1188	4A4	SMF2AGHS	4	binary	Total number of WRITE real I/O sequential requests to DASD. (pre-format)
1192	4A8	SMF2AGHT	8	binary	Total number of bytes transferred to DASD for the read requests.
1200	4B0	SMF2AGHU	8	binary	Total number of bytes transferred to DASD for the write requests.
1208	4B8	SMF2AGHV	16	EBCDIC	Reserved.
1224	4C8	SMF2AGHW	8	binary	Total amount of time, in milli seconds, for all sequential access (pre-format) requests in this interval.
1232	4D0	SMF2AGHX	4	binary	Average response time for all of the sequential access (pre-format) requests in this interval (total time/number of requests).
1236	4D4	SMF2AGHY	4	binary	Normalized response time for all of the requests in this interval (total time/number of bytes transferred/4K). (pre-format)
1240	4D8	SMF2AGHZ	8	EBCDIC	Reserved.
1248	4E0	SMF2AGH7	32	EBCDIC	Reserved.
Sysplex-wide locking statistics summary section:					
1280	500	SMF2AGPA	4	binary	Number of record lock requests (obtain/alter/promote)
1284	504	SMF2AGPB	4	binary	Number of record lock requests that cause true contention.
1288	508	SMF2AGPC	4	binary	Number of record lock requests that cause false contention.
1292	50C	SMF2AGPD	4	binary	Number of record lock release requests.
1296	510	SMF2AGPE	4	binary	Number of component_1 type lock requests.
1300	514	SMF2AGPF	4	binary	Number of component_1 type release lock requests.
1304	518	SMF42GUAA	4	binary	Accumulation of waiters for record lock.
1308	51C	SMF42GUBA	4	binary	Number of record locks hashed to the same hash table entry.
1312	520	SMF2AGPH	4	binary	Number of component_1 class_1 (DIWA) locks (obtain/alter/promote).

Offsets		Name	Length	Format	Description
1316	524	SMF2AGPI	4	binary	Number of component_1 class_1 (DIWA) locks that cause true contention.
1320	528	SMF2AGPJ	4	binary	Number of component_1 class_1 (DIWA) locks that cause false contention.
1324	52C	SMF2AGPK	4	binary	Number of component_1 class_1 (DIWA) release lock requests.
1328	530	SMF2AGPL	4	binary	Number of component_1 class_2 (UPGRADE) locks (obtain/alter/promote).
1332	534	SMF2AGPM	4	binary	Number of component_1 class_2 (UPGRADE) locks that cause true contention.
1336	538	SMF2AGPN	4	binary	Number of component_1 class_2 (UPGRADE) locks that cause false contention.
1340	53C	SMF2AGPO	4	binary	Number of component_1 class_2 (UPGRADE) release lock requests.
1344	540	SMF2AGPP	4	binary	Number of component_1 class_3 (PREFORMAT) locks (obtain/alter/promote).
1348	544	SMF2AGPQ	4	binary	Number of component_1 class_3 (PREFORMAT) locks that cause true contention.
1352	548	SMF2AGPR	4	binary	Number of component_1 class_3 (PREFORMAT) locks that cause false contention.
1356	54C	SMF2AGPS	4	binary	Number of component_1 class_3 (PREFORMAT) release lock requests.
1360	550	SMF2AGPT	4	binary	Number of component_2 lock requests (obtain/alter/promote).
1364	554	SMF2AGPU	4	binary	Number of component_2 locks that cause true contention.
1368	558	SMF2AGPV	4	binary	Number of component_2 locks that cause false contention.
1372	55C	SMF2AGPW	4	binary	Number of component_2 release lock requests.
1376	560	SMF42GUDA	4	binary	Accumulation of waiters for DIWA lock.
1380	564	SMF42GUEA	4	binary	Accumulation of waiters for UPGRADE lock.
1384	568	SMF42GUFA	4	binary	Accumulation of waiters for COMP2 lock.
1388	56C	SMF42GUGA	4	binary	Number of locks (DIWA, UPGRADE, and COMP2) hashed to the same hash table entry.
1392	570	SMF42GSHA	4	binary	Number of component_1 class 4 (Index Record) locks (obtain/alter/promote).
1396	574	SMF42GSIA	4	binary	Number of component_1 class 4 (Index Record) locks that cause true contention.
1400	578	SMF42GSJA	4	binary	Number of component_1 class 4 (Index Record) locks that cause false contention.
1404	57C	SMF42GSKA	4	binary	Number of component class 4 (Index Record) release lock requests.
Sysplex-wide data set BMF LRU statistical section:					
1408	580	SMF2AGRA	4	binary	Number of RE-DO's.
1412	584	SMF2AGRB	4	binary	Number of recursive RE-DO's.
1416	588	SMF2AGRC	4	binary	Number of BMF writes.
1420	58C	SMF2AGRD	4	binary	Number of SCM read requests.
1424	590	SMF2AGRE	4	binary	Number of SCM read requests that encountered castout lock contention.
1428	594	SMF2AGRG	4	binary	RE-DO percentage.
1432	598	SMF2AGRH	4	binary	Recursive RE-DO percentage.

Offsets		Name	Length	Format	Description
1436	59C	SMF2AGRI	4	binary	SCM castout lock percentage.
1440	5A0	SMF2AGRF	12	EBCDIC	Reserved.
1452	5AC	SMF2AGRJ	4	binary	Total number of CF read requests that encountered retries for cast out locks.
1456	5B0	SMF42GSAA	4	binary	Total number of CI splits for this interval (across the sysplex).
1460	5B4	SMF42GSBA	4	binary	Total number of CA splits for this interval (across the sysplex).
1464	5B8	SMF2AGRK	8	EBCDIC	Reserved.
1472	5C0	SMF2AGAQ	16	EBCDIC	Lock structure name.

Data Set, CF, SYS summary section for above the bar

Offsets		Name	Length	Format	Description
0	0	SMF2AGBA	4	binary	Interval length. This is the total length, in seconds, of the measurement period.
4	4	SMF2AA05	12	EBCDIC	Reserved.
16	10	SMF2AGBB	44	EBCDIC	Data set name.
60	3C	SMF2AA06	4	binary	Reserved.
64	40	SMF2AGBC	44	EBCDIC	VSAM sphere name.
108	6C	SMF2AA07	4	binary	Reserved.
112	70	SMF2AGBD	2	binary	Length of storage class name.
114	72	SMF2AGBE	30	EBCDIC	Storage class name.
144	90	SMF2AA08	2	binary	Length of cache set name.
146	92	SMF2AGBF	30	EBCDIC	Cache set name.
176	B0	SMF2AA12	2	binary	Reserved.
178	B2	SMF2AGBG	30	EBCDIC	Cache structure name.
208	D0	SMF2AGBH	8	EBCDIC	MVS system name.
216	D8	SMF2AA11	8	EBCDIC	Reserved.
224	E0	SMF2AGBI	4	binary	Indicator of component being processed **Bit** **Meaning when set** **0** Data component **1** Index component **2-31** Reserved.
228	E4	SMF2AA09	12	EBCDIC	Indicates DFSMS greater than 4K CF caching status. Value is ALL, NONE, UPDATESONLY, DIRONLY or GT4KNOTACT.
240	F0	SMF2AGBK	4	binary	Number of lock requests processed by this MVS system.
244	F4	SMF2AGBL	4	binary	Number of true contention lock requests.
248	F8	SMF2AGBM	4	binary	Number of false contention lock requests.
252	FC	SMF2AGZ8	2	binary	SMS DIRECT WEIGHT
254	FE	SMF2AGZ9	2	binary	SMS SEQUENTIAL WEIGHT
256	100	SMF2AGBN	8	EBCDIC	In DFSMS 1.4, WLM SERV Class Name
264	108	SMF2AGBO	8	EBCDIC	In DFSMS 1.4, WLM Report Class Name

Offsets		Name	Length	Format	Description
272	110	SMF2AGBP	16	EBCDIC	SMS data class name.
Direct access section:					
288	120	SMF2AGIA	4	binary	Coupling facility cache partition number.
292	124	SMF2AGIB	4	binary	Total number of direct access requests.
296	128	SMF2AGIC	4	binary	Number of read requests - NRI protocol (No Read Integrity). (pre-format)
300	12C	SMF2AGID	4	binary	Number of read requests - Consistent read protocol.
304	130	SMF2AGIE	4	binary	Number of Write requests.
308	134	SMF2AGIF	4	binary	Number of direct access BMF requests.
312	138	SMF2AGIG	4	binary	Number of direct access BMF Read requests.
316	13C	SMF2AGIH	4	binary	Number of direct access BMF Write requests.
320	140	SMF2AGII	4	binary	Number of direct access BMF read hits.
324	144	SMF2AGIJ	4	binary	Number of direct access BMF valid read hits.
328	148	SMF2AGIK	4	binary	Number of BMF false invalids.
332	14C	SMF2AGIL	4	binary	Number of direct access CF cache structure requests.
336	150	SMF2AGIM	4	binary	Number of direct access CF cache structure Read requests.
340	154	SMF2AGIN	4	binary	Number of direct access CF cache structure Write requests.
344	158	SMF2AGIO	4	binary	Number of direct access CF cache structure read hits.
348	15C	SMF2AGIP	4	binary	Number of direct access CF cache structure read castins.
352	160	SMF2AGIQ	8	binary	Number of direct access CF cache structure byte transferred.
360	168	SMF2AGIR	4	binary	Total number of real READ I/O direct requests to DASD.
364	16C	SMF2AGIS	4	binary	Total number of real WRITE I/O direct requests to DASD.
368	170	SMF2AGIT	8	binary	Total number of bytes transferred to DASD for the read requests.
376	178	SMF2AGIU	8	binary	Total number of bytes transferred to DASD for the write requests.
384	180	SMF2AGIV	16	EBCDIC	Reserved.
400	190	SMF2AGIW	8	binary	Total amount of time, in milli seconds, for all the direct access requests in this interval.
408	198	SMF2AGIX	4	binary	Average response time for all of the requests in this interval (total time/number of requests).
412	19C	SMF2AGIY	4	binary	Normalized response time for all of the requests in this interval (total time/number of bytes transferred/4K).
416	1A0	SMF2AGIZ	8	EBCDIC	Reserved.
424	1A8	SMF2AGI7	32	EBCDIC	Reserved.
Direct access record merge (RE-DO) summary section:					
456	1C8	SMF2AGJA	4	binary	Coupling facility cache partition number.
460	1CC	SMF2AGJB	4	binary	Total number of direct access requests. (RE-DO)
464	1D0	SMF2AGJC	4	binary	Number of read requests - NRI protocol (No Read Integrity). (RE-DO)
468	1D4	SMF2AGJD	4	binary	Number of read requests - Consistent read protocol. (RE-DO)
472	1D8	SMF2AGJE	4	binary	Number of Write requests. (RE-DO)
476	1DC	SMF2AGJF	4	binary	Number of direct access BMF requests. (RE-DO)
480	1E0	SMF2AGJG	4	binary	Number of direct access BMF Read requests. (RE-DO)
484	1E4	SMF2AGJH	4	binary	Number of direct access BMF Write requests. (RE-DO)

Offsets		Name	Length	Format	Description
488	1E8	SMF2AGJI	4	binary	Number of direct access BMF read hits. (RE-DO)
492	1EC	SMF2AGJJ	4	binary	Number of direct access BMF valid read hits. (RE-DO)
496	1F0	SMF2AGJK	4	binary	Number of BMF false invalids. (RE-DO)
500	1F4	SMF2AGJL	4	binary	Number of direct access CF cache structure requests. (RE-DO)
504	1F8	SMF2AGJM	4	binary	Number of direct access CF cache structure Read requests. (RE-DO)
508	1FC	SMF2AGJN	4	binary	Number of direct access CF cache structure Write requests. (RE-DO)
512	200	SMF2AGJO	4	binary	Number of direct access CF cache structure read hits. (RE-DO)
516	204	SMF2AGJP	4	binary	Number of direct access CF cache structure read castins.
520	208	SMF2AGJQ	8	binary	Number of direct access CF cache structure bytes transferred.
528	210	SMF2AGJR	4	binary	Total number of READ real I/O direct requests to DASD. (RE-DO)
532	214	SMF2AGJS	4	binary	Total number of WRITE real I/O direct requests to DASD. (RE-DO)
536	218	SMF2AGJT	8	binary	Total number of bytes transferred to DASD for the read requests.
544	220	SMF2AGJU	8	binary	Total number of bytes transferred to DASD for the write requests.
552	228	SMF2AGJV	16	EBCDIC	Reserved.
568	238	SMF2AGJW	8	binary	Total amount of time, in milli seconds, for all direct access (RE-DO) requests in this interval.
576	240	SMF2AGJX	4	binary	Average response time for all of the direct access (RE-DO) requests in this interval (total time/number of requests).
580	244	SMF2AGJY	4	binary	Normalized response time for all of the requests in this interval (total time/number of bytes transferred/4K). (RE-DO)
584	248	SMF2AGJZ	8	EBCDIC	Reserved.
592	250	SMF2AGJ7	32	EBCDIC	Reserved.
Sequential access section:					
624	270	SMF2AGKA	4	binary	Coupling facility cache partition number.
628	274	SMF2AGKB	4	binary	Total number of sequential access requests.
632	278	SMF2AGKC	4	binary	Number of read requests - NRI protocol (No Read Integrity).
636	27C	SMF2AGKD	4	binary	Number of read requests - Consistent read protocol.
640	280	SMF2AGKE	4	binary	Number of Write requests.
644	284	SMF2AGKF	4	binary	Number of direct access BMF requests.
648	288	SMF2AGKG	4	binary	Number of direct access BMF Read requests.
652	28C	SMF2AGKH	4	binary	Number of direct access BMF Write requests.
656	290	SMF2AGKI	4	binary	Number of direct access BMF read hits.
660	294	SMF2AGKJ	4	binary	Number of direct access BMF valid read hits.
664	298	SMF2AGKK	4	binary	Number of BMF false invalids.
668	29C	SMF2AGKL	4	binary	Number of direct access CF cache structure requests.
672	2A0	SMF2AGKM	4	binary	Number of direct access CF cache structure Read requests.
676	2A4	SMF2AGKN	4	binary	Number of direct access CF cache structure Write requests.
680	2A8	SMF2AGKO	4	binary	Number of direct access CF cache structure read hits.
684	2AC	SMF2AGKP	4	binary	Number of direct access CF cache structure read castins.
688	2B0	SMF2AGKQ	8	binary	Number of direct access CF cache structure byte transferred.
696	2B8	SMF2AGKR	4	binary	Total number of READ real I/O sequential requests to DASD.

Offsets		Name	Length	Format	Description
700	2BC	SMF2AGKS	4	binary	Total number of WRITE real I/O sequential requests to DASD.
704	2C0	SMF2AGKT	8	binary	Total number of bytes transferred for all sequential access requests where the data was retrieved from DASD. (real I/O DASD)
712	2C8	SMF2AGKU	8	binary	Total number of bytes transferred for all sequential access requests where the data was retrieved from DASD or a coupling facility cache structure. (real I/O DASD)
720	2D0	SMF2AGKV	16	EBCDIC	Reserved.
736	2E0	SMF2AGKW	8	binary	Total amount of time, in milli seconds, for all sequential access requests in this interval.
744	2E8	SMF2AGKX	4	binary	Average response time for all of the sequential access requests in this interval (total time/number of requests).
748	2EC	SMF2AGKY	4	binary	Normalized response time for all of the requests in this interval (total time/number of bytes transferred/4K).
752	2F0	SMF2AGKZ	8	EBCDIC	Reserved.
760	2F8	SMF2AGK7	32	EBCDIC	Reserved.
Sequential access record merge (RE-DO) summary section:					
792	318	SMF2AGLA	4	binary	Coupling facility cache partition number.
796	31C	SMF2AGLB	4	binary	Total number of sequential access requests. (RE-DO)
800	320	SMF2AGLC	4	binary	Number of read requests - NRI protocol (No Read Integrity). (RE-DO)
804	324	SMF2AGLD	4	binary	Number of read requests - Consistent read protocol. (RE-DO)
808	328	SMF2AGLE	4	binary	Number of Write requests. (RE-DO)
812	32C	SMF2AGLF	4	binary	Number of direct access BMF requests. (RE-DO)
816	330	SMF2AGLG	4	binary	Number of direct access BMF Read requests.
820	334	SMF2AGLH	4	binary	Number of direct access BMF Write requests.
824	338	SMF2AGLI	4	binary	Number of direct access BMF read hits.
828	33C	SMF2AGLJ	4	binary	Number of direct access BMF valid read hits.
832	340	SMF2AGLK	4	binary	Number of BMF false invalids. (RE-DO)
836	344	SMF2AGLL	4	binary	Number of direct access CF cache structure requests.
840	348	SMF2AGLM	4	binary	Number of direct access CF cache structure Read requests.
844	34C	SMF2AGLN	4	binary	Number of direct access CF cache structure Write requests.
848	350	SMF2AGLO	4	binary	Number of direct access CF cache structure read hits. (RE-DO)
852	354	SMF2AGLP	4	binary	Number of direct access CF cache structure read castins.
856	358	SMF2AGLQ	8	binary	Number of direct access CF cache structure bytes transferred.
864	360	SMF2AGLR	4	binary	Total number of READ real I/O sequential requests to DASD. (RE-DO)
868	364	SMF2AGLS	4	binary	Total number of WRITE real I/O sequential requests to DASD. (RE-DO)
872	368	SMF2AGLT	8	binary	Total number of bytes transferred to DASD for the read requests.
880	370	SMF2AGLU	8	binary	Total number of bytes transferred to DASD for the write requests.
888	378	SMF2AGLV	16	EBCDIC	Reserved.
904	388	SMF2AGLW	8	binary	Total amount of time, in milli seconds, for all sequential access (RE-DO) requests in this interval.
912	390	SMF2AGLX	4	binary	Average response time for all of the sequential access (RE-DO) requests in this interval (total time/number of requests).

Offsets		Name	Length	Format	Description
916	394	SMF2AGLY	4	binary	Normalized response time for all of the requests in this interval (total time/number of bytes transferred/4K). (RE-DO)
920	398	SMF2AGLZ	8	EBCDIC	Reserved.
928	3A0	SMF2AGL7	32	EBCDIC	Reserved.
Sequential access read ahead summary section:					
960	3C0	SMF2AGMA	4	binary	Coupling facility cache partition number.
964	3C4	SMF2AGMB	4	binary	Total number of sequential access requests. (read ahead)
968	3C8	SMF2AGMC	4	binary	Number of read requests - NRI protocol (No Read Integrity). (read-ahead)
972	3CC	SMF2AGMD	4	binary	Number of read requests - Consistent read protocol. (read-ahead)
976	3D0	SMF2AGME	4	binary	Number of Write requests. (read-ahead)
980	3D4	SMF2AGMF	4	binary	Number of direct access BMF requests. (read-ahead)
984	3D8	SMF2AGMG	4	binary	Number of direct access BMF Read requests.
988	3DC	SMF2AGMH	4	binary	Number of direct access BMF Write requests.
992	3E0	SMF2AGMI	4	binary	Number of direct access BMF read hits.
996	3E4	SMF2AGMJ	4	binary	Number of direct access BMF valid read hits.
1000	3E8	SMF2AGMK	4	binary	Number of BMF false invalids. (read-ahead)
1004	3EC	SMF2AGML	4	binary	Number of direct access CF cache structure requests.
1008	3F0	SMF2AGMM	4	binary	Number of direct access CF cache structure Read requests.
1012	3F4	SMF2AGMN	4	binary	Number of direct access CF cache structure Write requests.
1016	3F8	SMF2AGMO	4	binary	Number of direct access CF cache structure read hits. (read-ahead)
1020	3FC	SMF2AGMP	4	binary	Number of direct access CF cache structure read castins.
1024	400	SMF2AGMQ	8	binary	Number of direct access CF cache structure byte transferred.
1032	408	SMF2AGMR	4	binary	Total number of real READ I/O sequential requests to DASD. (read ahead)
1036	40C	SMF2AGMS	4	binary	Total number of real WRITE I/O sequential requests to DASD. (read ahead)
1040	410	SMF2AGMT	8	binary	Total number of bytes transferred to DASD for the read requests.
1048	418	SMF2AGMU	8	binary	Total number of bytes transferred to DASD for the write requests.
1056	420	SMF2AGMV	16	EBCDIC	Reserved.
1072	430	SMF2AGMW	8	binary	Total amount of time, in milli seconds, for all sequential access (read ahead) requests in this interval.
1080	438	SMF2AGMX	4	binary	Average response time for all of the sequential access (read ahead) requests in this interval (total time/number of requests).
1084	43C	SMF2AGMY	4	binary	Normalized response time for all of the requests in this interval (total time/number of bytes transferred/4K). (read ahead)
1088	440	SMF2AGMZ	8	EBCDIC	Reserved.
1096	448	SMF2AGM7	32	EBCDIC	Reserved.
Sequential access pre-format summary section:					
1128	468	SMF2AGNA	4	binary	Coupling facility cache partition number.
1132	46C	SMF2AGNB	4	binary	Total number of sequential access requests. (pre-format)
1136	470	SMF2AGNC	4	binary	Number of read requests - NRI protocol (No Read Integrity). (pre-format)
1140	474	SMF2AGND	4	binary	Number of read requests - Consistent read protocol. (pre-format)

Offsets		Name	Length	Format	Description
1144	478	SMF2AGNE	4	binary	Number of Write requests. (pre-format)
1148	47C	SMF2AGNF	4	binary	Number of direct access BMF requests. (pre-format)
1152	480	SMF2AGNG	4	binary	Number of direct access BMF Read requests.
1156	484	SMF2AGNH	4	binary	Number of direct access BMF Write requests.
1160	488	SMF2AGNI	4	binary	Number of direct access BMF read hits.
1164	48C	SMF2AGNJ	4	binary	Number of direct access BMF valid read hits.
1168	490	SMF2AGNK	4	binary	Number of BMF false invalids. (pre-format)
1172	494	SMF2AGNL	4	binary	Number of direct access CF cache structure requests.
1176	498	SMF2AGNM	4	binary	Number of direct access CF cache structure Read requests.
1180	49C	SMF2AGNN	4	binary	Number of direct access CF cache structure Write requests.
1184	4A0	SMF2AGNO	4	binary	Number of direct access CF cache structure read hits. (pre-format)
1188	4A4	SMF2AGNP	4	binary	Number of direct access CF cache structure read castins.
1192	4A8	SMF2AGNQ	8	binary	Number of direct access CF cache structure byte transferred.
1200	4B0	SMF2AGNR	4	binary	Total number of READ real I/O sequential requests to DASD. (pre-format)
1204	4B4	SMF2AGNS	4	binary	Total number of WRITE real I/O sequential requests to DASD. (pre-format)
1208	4B8	SMF2AGNT	8	binary	Total number of bytes transferred to DASD for the read requests.
1216	4C0	SMF2AGNU	8	binary	Total number of bytes transferred to DASD for the write requests.
1224	4C8	SMF2AGNV	16	EBCDIC	Reserved.
1240	4D8	SMF2AGNW	8	binary	Total amount of time, in milli seconds, for all sequential access. (pre-format) requests in this interval.
1248	4E0	SMF2AGNX	4	binary	Average response time for all of the sequential access (pre-format) requests in this interval (total time/number of requests).
1252	4E4	SMF2AGNY	4	binary	Normalized response time for all of the requests in this interval (total time/number of bytes transferred/4K). (pre-format)
1256	4E8	SMF2AGNZ	8	EBCDIC	Reserved.
1264	4F0	SMF2AGN7	32	EBCDIC	Reserved.
1296	510	SMF2AGQA	4	binary	Number of record lock requests (obtain/alter/promote)
1300	514	SMF2AGQB	4	binary	Number of record lock requests that cause true contention.
1304	518	SMF2AGQC	4	binary	Number of record lock requests that cause false contention.
1308	51C	SMF2AGQD	4	binary	Number of record lock release requests.
1312	520	SMF2AGQE	4	binary	Number of component_1 type lock requests.
1316	524	SMF2AGQF	4	binary	Number of component_1 type release lock requests.
1320	528	SMF42GVAA	4	binary	Accumulation of waiters for record lock.
1324	52C	SMF42GVBA	4	binary	Number of record locks hashed to the same hash table entry.
1328	530	SMF2AGQH	4	binary	Number of component_1 class_1 (DIWA) locks (obtain/alter/promote).
1332	534	SMF2AGQI	4	binary	Number of component_1 class_1 (DIWA) locks that cause true contention.
1336	538	SMF2AGQJ	4	binary	Number of component_1 class_1 (DIWA) locks that cause false contention.
1340	53C	SMF2AGQK	4	binary	Number of component_1 class_1 (DIWA) release lock requests.

Offsets		Name	Length	Format	Description
1344	540	SMF2AGQL	4	binary	Number of component_1 class_2 (UPGRADE) locks (obtain/alter/promote).
1348	544	SMF2AGQM	4	binary	Number of component_1 class_2 (UPGRADE) locks that cause true contention.
1352	548	SMF2AGQN	4	binary	Number of component_1 class_2 (UPGRADE) locks that cause false contention.
1356	54C	SMF2AGQO	4	binary	Number of component_1 class_2 (UPGRADE) release lock requests.
1360	550	SMF2AGQP	4	binary	Number of component_1 class_3 (PREFORMAT) locks (obtain/alter/promote).
1364	554	SMF2AGQQ	4	binary	Number of component_1 class_3 (PREFORMAT) locks that cause true contention.
1368	558	SMF2AGQR	4	binary	Number of component_1 class_3 (PREFORMAT) locks that cause false contention.
1372	55C	SMF2AGQS	4	binary	Number of component_1 class_3 (PREFORMAT) release lock requests.
1376	560	SMF2AGQT	4	binary	Number of component_2 lock requests (obtain/alter/promote).
1380	564	SMF2AGQU	4	binary	Number of component_2 locks that cause true contention.
1384	568	SMF2AGQV	4	binary	Number of component_2 locks that cause false contention.
1388	56C	SMF2AGQW	4	binary	Number of component_2 release lock requests.
1392	570	SMF42GVDA	4	binary	Accumulation of waiters for DIWA lock.
1396	574	SMF42GVEA	4	binary	Accumulation of waiters for UPGRADE lock.
1400	578	SMF42GVFA	4	binary	Accumulation of waiters for COMP2 lock.
1404	57C	SMF42GVGA	4	binary	Number of locks (DIWA, UPGRADE, and COMP2) hashed to the same hash table entry.
1408	580	SMF42GTHA	4	binary	Number of component_1 class 4 (Index Record) locks (obtain/alter/promote).
1412	584	SMF42GTIA	4	binary	Number of component_1 class 4 (Index Record) locks that cause true contention.
1416	588	SMF42GTJA	4	binary	Number of component_1 class 4 (Index Record) locks that cause false contention.
1420	58C	SMF42GTKA	4	binary	Number of component_1 class 4 (Index Record) release lock requests.
1424	590	SMF2AGRL	4	binary	Number of RE-DO's.
1428	594	SMF2AGRM	4	binary	Number of recursive RE-DO's.
1432	598	SMF2AGRN	4	binary	Number of BMF writes.
1436	59C	SMF2AGRO	4	binary	Number of SCM read requests.
1440	5A0	SMF2AGRP	4	binary	Number of SCM read requests that encountered castout lock contention.
1444	5A4	SMF2AGRR	4	binary	RE-DO percentage.
1448	5A8	SMF2AGRS	4	binary	Recursive RE-DO percentage.
1452	5AC	SMF2AGRT	4	binary	SCM castout lock percentage.
1456	5B0	SMF2AGRQ	12	EBCDIC	Reserved.
1468	5BC	SMF2AGRU	4	binary	Total number of CF read requests that encountered retries for cast out locks.
1472	5C0	SMF42GTAA	4	binary	Total number of CI splits for this interval.
1476	5C4	SMF42GTBA	4	binary	Total number of CA splits for this interval.

Offsets		Name	Length	Format	Description
1480	5C8	SMF2AGRV	8	EBCDIC	Reserved.
1488	5D0	SMF2AGBQ	16	EBCDIC	Lock structure name.

Subtype 17 — VSAM RLS Coupling Facility Lock Structure Usage

MVS system CF lock structure activity totals section

Offsets		Name	Length	Format	Description
0	0	SMF42HAA	4	binary	Interval length. This is the total length, in seconds, of the measurement period.
4	4	SMF42H00	12	EBCDIC	Reserved.
16	10	SMF42HAB	16	EBCDIC	DFSMS lock table name.
32	20	SMF42H01	16	EBCDIC	Reserved.
48	30	SMF42HAC	4	binary	Reserved.
52	34	SMF42HAD	4	binary	Reserved.
56	38	SMF42HAE	4	binary	Reserved.
60	3C	SMF42HAF	4	binary	Reserved.
64	40	SMF42HAG	32	EBCDIC	Reserved.
96	60	SMF42HAH	4	binary	Reserved.
100	64	SMF42HAI	4	binary	Reserved.
104	68	SMF42HAJ	4	binary	Reserved.
108	6C	SMF42HAK	4	binary	Reserved.
112	70	SMF42HAL	8	EBCDIC	Reserved.
120	78	SMF42HUA	4	binary	Accumulation of waiters for record lock.
124	7C	SMF42HUB	4	binary	Number of record locks hashed to the same hash table entry.
128	80	SMF42HUD	4	binary	Accumulation of waiters for DIWA lock.
132	84	SMF42HUE	4	binary	Accumulation of waiters for UPGRADE lock.
136	88	SMF42HUF	4	binary	Accumulation of waiters for COMP2 lock.
140	8C	SMF42HUG	4	binary	Number of locks (DIWA, UPGRADE, and COMP2) hashed to the same hash table entry.
144	90	SMF42HCA	4	binary	Number of record lock requests (obtain/alter/promote).
148	94	SMF42HCB	4	binary	Number of record lock requests that cause true contention.
152	98	SMF42HCC	4	binary	Number of record lock requests that cause false contention.
156	9C	SMF42HCD	4	binary	Number of record lock release requests.
160	A0	SMF42HCE	4	binary	Number of component_1 type lock requests.
164	A4	SMF42HCF	4	binary	Number of component_1 type release lock requests.
168	A8	SMF42HCG	8	EBCDIC	Reserved.
176	B0	SMF42HCH	4	binary	Number of component_1 class_1 (DIWA) locks (obtain/alter/promote).
180	B4	SMF42HCI	4	binary	Number of component_1 class_1 (DIWA) locks that cause true contention.
184	B8	SMF42HCJ	4	binary	Number of component_1 class_1 (DIWA) locks that cause false contention.
188	BC	SMF42HCK	4	binary	Number of component_1 class_1 (DIWA) release lock requests.

Offsets		Name	Length	Format	Description
192	C0	SMF42HCL	4	binary	Number of component_1 class_2 (UPGRADE) locks (obtain/alter/promote).
196	C4	SMF42HCM	4	binary	Number of component_1 class_2 (UPGRADE) locks that cause true contention.
200	C8	SMF42HCN	4	binary	Number of component_1 class_2 (UPGRADE) locks that cause false contention.
204	CC	SMF42HCO	4	binary	Number of component_1 class_2 (UPGRADE) release lock requests.
208	D0	SMF42HCP	4	binary	Number of component_1 class_3 (PREFORMAT) locks (obtain/alter/promote).
212	D4	SMF42HCQ	4	binary	Number of component_1 class_3 (PREFORMAT) locks that cause true contention.
216	D8	SMF42HCR	4	binary	Number of component_1 class_3 (PREFORMAT) locks that cause false contention.
220	DC	SMF42HCS	4	binary	Number of component_1 class_3 (PREFORMAT) release lock requests.
224	E0	SMF42HCT	4	binary	Number of component_2 lock requests (obtain/alter/promote).
228	E4	SMF42HCU	4	binary	Number of component_2 locks that cause true contention.
232	E8	SMF42HCV	4	binary	Number of component_2 locks that cause false contention.
236	EC	SMF42HCW	4	binary	Number of component_2 release lock requests.
240	F0	SMF42HCX	4	binary	Number of special lock requests.
244	F4	SMF42HCY	12	EBCDIC	Reserved.
256	100	SMF42HCZ	16	EBCDIC	Reserved.
272	110	SMF42HEH	4	binary	Number of component_1 class 4 (Index Record) locks (obtain/alter/promote).
276	114	SMF42HEI	4	binary	Number of component_1 class 4 (Index Record) locks that cause true contention.
280	118	SMF42HEJ	4	binary	Number of component_1 class 4 (Index Record) locks that cause false contention.
284	11C	SMF42HEK	4	binary	Number of component_1 class 4 (Index Record) release lock requests.

Lock structure summary section

Offsets		Name	Length	Format	Description
0	0	SMF42HBA	4	binary	Interval length. This is the total length, in seconds, of the measurement period.
4	4	SMF42H02	12	EBCDIC	Reserved.
16	10	SMF42HBB	16	EBCDIC	DFSMS lock table name.
32	20	SMF42HBC	8	EBCDIC	MVS system name.
40	28	SMF42H03	8	EBCDIC	Reserved.
48	30	SMF42HBD	4	binary	Reserved.
52	34	SMF42HBE	4	binary	Reserved.
56	38	SMF42HBF	4	binary	Reserved.
60	3C	SMF42HBG	4	binary	Reserved.
64	40	SMF42HBH	32	EBCDIC	Reserved.
96	60	SMF42HBI	4	binary	Reserved.

Offsets		Name	Length	Format	Description
100	64	SMF42HBJ	4	binary	Reserved.
104	68	SMF42HBK	4	binary	Reserved.
108	6C	SMF42HBL	4	binary	Reserved.
112	70	SMF42HBM	8	EBCDIC	Reserved.
120	78	SMF42HVA	4	binary	Accumulation of waiters for record lock.
124	7C	SMF42HVB	4	binary	Number of record locks hashed to the same hash table entry.
128	80	SMF42HVC	4	binary	Accumulation of waiters for DIWA lock.
132	84	SMF42HVD	4	binary	Accumulation of waiters for UPGRADE lock.
136	88	SMF42HVF	4	binary	Accumulation of waiters for COMP2 lock.
140	8C	SMF42HVG	4	binary	Number of locks (DIWA, UPGRADE, and COMP2) hashed to the same hash table entry.
144	90	SMF42HDA	4	binary	Number of record lock requests (obtain/alter/promote)
148	94	SMF42HDB	4	binary	Number of record lock requests that cause true contention.
152	98	SMF42HDC	4	binary	Number of record lock requests that cause false contention.
156	9C	SMF42HDD	4	binary	Number of record lock release requests.
160	A0	SMF42HDE	4	binary	Number of component_1 type lock requests.
164	A4	SMF42HDF	4	binary	Number of component_1 type release lock requests.
168	A8	SMF42HDG	8	EBCDIC	Reserved.
176	B0	SMF42HDH	4	binary	Number of component_1 class_1 (DIWA) locks (obtain/alter/promote).
180	B4	SMF42HDI	4	binary	Number of component_1 class_1 (DIWA) locks that cause true contention.
184	B8	SMF42HDJ	4	binary	Number of component_1 class_1 (DIWA) locks that cause false contention.
188	BC	SMF42HDK	4	binary	Number of component_1 class_1 (DIWA) release lock requests.
192	C0	SMF42HDL	4	binary	Number of component_1 class_2 (UPGRADE) locks (obtain/alter/promote).
196	C4	SMF42HDM	4	binary	Number of component_1 class_2 (UPGRADE) locks that cause true contention.
200	C8	SMF42HDN	4	binary	Number of component_1 class_2 (UPGRADE) locks that cause false contention.
204	CC	SMF42HDO	4	binary	Number of component_1 class_2 (UPGRADE) release lock requests.
208	D0	SMF42HDP	4	binary	Number of component_1 class_3 (PREFORMAT) locks (obtain/alter/promote).
212	D4	SMF42HDQ	4	binary	Number of component_1 class_3 (PREFORMAT) locks that cause true contention.
216	D8	SMF42HDR	4	binary	Number of component_1 class_3 (PREFORMAT) locks that cause false contention.
220	DC	SMF42HDS	4	binary	Number of component_1 class_3 (PREFORMAT) release lock requests.
224	E0	SMF42HDT	4	binary	Number of component_2 lock requests (obtain/alter/promote).
228	E4	SMF42HDU	4	binary	Number of component_2 locks that cause true contention.
232	E8	SMF42HDV	4	binary	Number of component_2 locks that cause false contention.
236	EC	SMF42HDW	4	binary	Number of component_2 release lock requests.

Offsets		Name	Length	Format	Description
240	F0	SMF42HDX	4	binary	Number of special lock requests.
244	F4	SMF42HDY	12	EBCDIC	Reserved.
256	100	SMF42HDZ	32	EBCDIC	Reserved.
272	110	SMF42HFH	4	Binary	Number of component_1 class 4 (Index Record) locks (obtain/ alter/promote)
276	114	SMF42HFI	4	Binary	Number of component_1 class 4 (Index Record) locks that cause true contention
280	118	SMF42HFJ	4	Binary	Number of component_1 class 4 (Index Record) locks that cause false contention
284	11C	SMF42HFK	4	Binary	Number of component_1 class 4 (Index Record) release lock requests

Subtype 18 — VSAM RLS CF cache partition usage

For additional information about the fields in this subtype, see the "IXLCACHE Storage Class Statistics Description" in *z/OS MVS Programming: Sysplex Services Guide*.

CF cache partition activity totals section

Offsets		Name	Length	Format	Description
0	0	SMF42IAA	4	binary	Interval length. This is the total length, in seconds, of the measurement period.
4	4	SMF42I00	12	EBCDIC	Reserved.
16	10	SMF42IAB	32	EBCDIC	Reserved.
48	30	SMF42IBG	16	EBCDIC	Partition type (sequential, direct, or combined).
64	40	SMF42IBH	4	binary	DFSMS specified cache weight.
68	44	SMF42I01	12	EBCDIC	Partition name.
80	50	SMF42IAD	4	binary	Coupling facility cache partition number.
84	54	SMF42IAE	4	binary	Status conditions.
88	58	SMF42IAF	4	binary	Read-hit counter.
92	5C	SMF42IAG	4	binary	Read-miss directory-hit counter.
96	60	SMF42IAH	4	binary	Read-miss assignment-suppressed counter.
100	64	SMF42IAI	4	binary	Read-miss name-assigned counter.
104	68	SMF42IAJ	4	binary	Read-miss target storage class full counter.
108	6C	SMF42IAK	4	binary	Write-hit change bit 0 counter.
112	70	SMF42IAL	4	binary	Write-hit change bit 1 counter.
116	74	SMF42IAM	4	binary	Write-miss not-registered counter.
120	78	SMF42IAN	4	binary	Write-miss invalid state counter.
124	7C	SMF42IAO	4	binary	Write-miss target storage class full counter.
128	80	SMF42IAP	4	binary	Directory entry reclaim counter.
132	84	SMF42IAQ	4	binary	Data table entry reclaim counter.
136	88	SMF42IAR	4	binary	Cross invalidate (XI) for directory reclaim counter.
140	8C	SMF42IAS	4	binary	XI for write counter.
144	90	SMF42IAT	4	binary	XI for name invalidation counter.
148	94	SMF42IAU	4	binary	XI for complement invalidation counter.

Offsets		Name	Length	Format	Description
152	98	SMF42IAV	4	binary	Cast-out counter.
156	9C	SMF42IAW	4	binary	Reference signal miss counter.
160	A0	SMF42IAX	4	binary	Target storage class full counter.
164	A4	SMF42IAY	4	binary	Directory entry counter.
168	A8	SMF42IAZ	4	binary	Data area element counter.
172	AC	SMF42IBA	4	binary	Total changed counter.
176	B0	SMF42IBB	4	binary	Data area counter.
180	B4	SMF42IBC	4	binary	Completed reference lists counter.
184	B8	SMF42IBD	4	binary	Partially completed reference lists counter.
188	BC	SMF42IBE	4	binary	XI for local cache vector entry replacement counter.
192	C0	SMF42IBF	4	binary	Write unchanged with XI counter.

CF cache partition summary section

Offsets		Name	Length	Format	Description
0	0	SMF42ICA	4	binary	Interval length. This is the total length, in seconds, of the measurement period.
4	4	SMF42I02	12	EBCDIC	Reserved.
16	10	SMF42I04	2	binary	Reserved.
18	12	SMF42ICB	30	EBCDIC	DFSMS cache structure name.
48	30	SMF42IDG	16	EBCDIC	Partition type (sequential, direct, or combined).
64	40	SMF42IDH	4	binary	DFSMS specified cache weight.
68	44	SMF42I03	12	EBCDIC	Reserved.
80	50	SMF42ICD	4	binary	Coupling facility cache partition number.
84	54	SMF42ICE	4	binary	Status conditions.
88	58	SMF42ICF	4	binary	Read-hit counter.
92	5C	SMF42ICG	4	binary	Read-miss directory-hit counter.
96	60	SMF42ICH	4	binary	Read-miss assignment suppressed counter.
100	64	SMF42ICI	4	binary	Read-miss name assigned counter.
104	68	SMF42ICJ	4	binary	Read-miss target storage class full counter.
108	6C	SMF42ICK	4	binary	Write-hit change bit 0 counter.
112	70	SMF42ICL	4	binary	Write-hit change bit 1 counter.
116	74	SMF42ICM	4	binary	Write-miss not-registered counter.
120	78	SMF42ICN	4	binary	Write-miss invalid state counter.
124	7C	SMF42ICO	4	binary	Write-miss target storage class full counter.
128	80	SMF42ICP	4	binary	Directory entry reclaim counter.
132	84	SMF42ICQ	4	binary	Data table entry reclaim counter.
136	88	SMF42ICR	4	binary	XI for directory reclaim counter.
140	8C	SMF42ICS	4	binary	XI for write counter.
144	90	SMF42ICT	4	binary	XI for name invalidation counter.
148	94	SMF42ICU	4	binary	XI for complement invalidation counter.
152	98	SMF42ICV	4	binary	Cast-out counter.

Offsets		Name	Length	Format	Description
156	9C	SMF42ICW	4	binary	Reference signal miss counter.
160	A0	SMF42ICX	4	binary	Target storage class full counter.
164	A4	SMF42ICY	4	binary	Directory entry counter.
168	A8	SMF42ICZ	4	binary	Data area element counter.
172	AC	SMF42IDA	4	binary	Total changed counter.
176	B0	SMF42IDB	4	binary	Data area counter.
180	B4	SMF42IDC	4	binary	Completed reference lists counter.
184	B8	SMF42IDD	4	binary	Partially completed reference lists counter.
188	BC	SMF42IDE	4	binary	XI for local cache vector entry replacement counter.
192	C0	SMF42IDF	4	binary	Write unchanged with XI counter.

CF Cache partition summary section, directory/element ratio data

Offsets		Name	Length	Format	Description
0	0	SMF42IEA	4	binary	Interval length. This is the total length, in seconds, of the measurement period.
4	4	SMF42I06	12	EBCDIC	Reserved.
16	10	SMF42I07	2	EBCDIC	Reserved.
18	12	SMF42IEB	30	EBCDIC	DFSMS cache structure name.
48	30	SMF42IEC	4	binary	Number of changes to directory portion of directory/element ratio.
52	34	SMF42IED	4	binary	Number of changes to element portion of directory/element ratio.
56	38	SMF42IEE	4	binary	Low ratio value for directory portion of directory/element ratio.
60	3C	SMF42IEF	4	binary	Low ratio value for element portion of directory/element ratio.
64	40	SMF42IEG	4	binary	High ratio value for directory portion of directory/element ratio.
68	44	SMF42IEH	4	binary	High ratio value for element portion of directory/element ratio.
72	48	SMF42IEI	4	binary	Current ratio value for directory portion of directory/element ratio.
76	4C	SMF42IEJ	4	binary	Current ratio value for element portion of directory/element ratio.

Subtype 19 — VSAM RLS local buffer manager LRU statistics summary

Sysplex totals local buffer manager LRU statistics summary for below the bar

Offsets		Name	Length	Format	Description
0	0	SMF42JNA	4	binary	Interval length. This is the total length, in seconds, of the measurement period.
4	4	SMF42J00	12	EBCDIC	Reserved.
16	10	SMF42JNB	16	EBCDIC	Reserved.
32	20	SMF42JND	8	EBCDIC	Reserved.
40	28	SMF42JNE	8	EBCDIC	Average CPU time for all systems in sysplex (in milli-seconds).
48	30	SMF42JNF	8	EBCDIC	Total CPU time for this record (in milli-seconds).
56	38	SMF42JN0	4	EBCDIC	Reserved.
60	3C	SMF42JN7	4	binary	Total number of write requests (sysplex totals).
64	40	SMF42JNG	4	binary	Average number of Buffer Manager LRU intervals processed (sysplex totals).

Offsets		Name	Length	Format	Description
68	44	SMF42JNH	4	binary	Total number of Buffer Manager LRU intervals processed (across sysplex).
72	48	SMF42JNI	4	binary	Average number of Buffer Manager LRU intervals where BMF was over the goal, and normal algorithms were bypassed to reclaim buffers.
76	4C	SMF42JNJ	4	binary	Total number of Buffer Manager LRU intervals where BMF was over the goal, and normal algorithms were bypassed to reclaim buffers (across sysplex).
80	50	SMF42JNK	4	binary	Average number of times that BMF was called in this interval.
84	54	SMF42JNL	4	binary	Total number of times that BMF was called in this interval (across sysplex).
88	58	SMF42JNM	4	binary	Average number of Buffer Manager 'hits' during this interval.
92	5C	SMF42JNN	4	binary	Total number of Buffer Manager 'hits' during this interval.
96	60	SMF42JNO	4	binary	Buffer Manager 'hits' current percentage during this interval.
100	64	SMF42JNP	4	binary	Buffer Manager 'hits' low percentage during this interval.
104	68	SMF42JNQ	4	binary	Buffer Manager 'hits' high percentage during this interval.
108	6C	SMF42JNR	4	binary	Buffer Manager average 'hits' during this interval.
112	70	SMF42JNS	4	binary	Average Sysplex Cache manager number of 'hits' during this interval.
116	74	SMF42JNT	4	binary	Total Sysplex Cache manager number of 'hits' during this interval.
120	78	SMF42JNU	4	binary	Sysplex Cache manager number of 'hits' current percentage during this interval.
124	7C	SMF42JNV	4	binary	Sysplex Cache manager number of 'hits' low percentage during this interval.
128	80	SMF42JNW	4	binary	Sysplex Cache manager number of 'hits' high percentage during this interval.
132	84	SMF42JNX	4	binary	Sysplex Cache manager number of 'hits' average percentage during this interval.
136	88	SMF42JNY	4	binary	Average DASD number of 'hits' during this interval.
140	8C	SMF42JNZ	4	binary	Total DASD number of 'hits' during this interval.
144	90	SMF42JOA	4	binary	DASD 'hits' current percentage during this interval.
148	94	SMF42JOB	4	binary	DASD 'hits' low percentage during this interval.
152	98	SMF42JOC	4	binary	DASD 'hits' high percentage during this interval.
156	9C	SMF42JOD	4	binary	DASD average 'hits' during this interval.
160	A0	SMF42JOE	512	EBCDIC	Sysplex Average Buffer Pool Count array. This is a 16 bit entry array with each entry 32 bytes long. The first entry is the 2K storage pool, the second entry is for the 4K storage pool... See "Sysplex average buffer pool count array for below the bar" on page 464.
672	2A0	SMF42JRI	512	EBCDIC	Sysplex Wide Totals Buffer Pool Count array. This is a 16 bit entry array with each entry 32 bytes long. The first entry is the 2K storage pool, the second entry is for the 4K storage pool... See "Sysplex wide totals buffer pool count array for below the bar" on page 465.
1184	4A0	SMF42JON	4	binary	Average buffer size goal (in megabytes) - low value.
1188	4A4	SMF42JOO	4	binary	Total Buffer size goal (in megabytes) - Low value.
1192	4A8	SMF42JOP	4	binary	Average Buffer size goal (in megabytes) - high value.

Offsets		Name	Length	Format	Description
1196	4AC	SMF42JOQ	4	binary	Total Buffer size goal (in megabytes) - high value.
1200	4B0	SMF42JOR	4	binary	Average Buffer size goal (in megabytes) - current value.
1204	4B4	SMF42JOS	4	binary	Total Buffer size goal (in megabytes) - current value.
1208	4B8	SMF42JOT	4	binary	Total Buffer size goal (in megabytes) - average value.
1212	4BC	SMF42JOU	4	binary	Reserved.
1216	4C0	SMF42JOV	4	binary	Average Buffer size Calculated (in megabytes) - low value.
1220	4C4	SMF42JOW	4	binary	Total Buffer size Calculated (in megabytes) - low value.
1224	4C8	SMF42JOX	4	binary	Average Buffer size Calculated (in megabytes) - high value.
1228	4CC	SMF42JOY	4	binary	Total Buffer size Calculated (in megabytes) - high value.
1232	4D0	SMF42JOZ	4	binary	Average Buffer size Calculated (in megabytes) - current value.
1236	4D4	SMF42JRA	4	binary	Total Buffer size Calculated (in megabytes) - current value.
1240	4D8	SMF42JRB	4	binary	Total Buffer size Calculated (in megabytes) - Average value.
1244	4DC	SMF42JRC	4	binary	Total number of CF read requests that encountered retries for cast out locks for this interval (across the sysplex).
1248	4E0	SMF42JRD	8	EBCDIC	Reserved.
1252	4E4	SMF42JRE	64	EBCDIC	Average calculated megabytes distribution array. This is a 16 entry array which contains the number of times the calculated value occurred within a 100MB span. Entry 1 = 0-99m, entry 2 = 100-199m,... entry 16 > 150m. See “Average buffer manager calculated distribution array for below the bar” on page 465.
1316	524	SMF42JRG	64	EBCDIC	Total calculated megabytes distribution array. This is a 16 entry array which contains the number of times the calculated value occurred within a 100MB span. Entry 1 = 0-99m, entry 2 = 100-199m,... entry 16 > 150m. See “Total buffer manager calculated distribution array for below the bar” on page 465.
1380	564	SMF42JTA	4	binary	Average number of SCM read requests which encountered castout lock contention during this interval (across the sysplex).
1384	568	SMF42JTB	4	binary	Total number of SCM read requests which encountered castout lock contention during this interval (across the sysplex).
1388	56C	SMF42JTC	4	binary	Average number of SCM read requests during this interval (across the sysplex).
1392	570	SMF42JTD	4	binary	Total number of SCM read requests during this interval (across the sysplex).
1396	574	SMF42JTE	4	binary	Current percentage of SCM read requests which encountered castout lock contention during this interval (across the sysplex).
1400	578	SMF42JTF	4	binary	Low percentage of SCM read requests which encountered castout lock contention during this interval (across the sysplex).
1404	57C	SMF42JTG	4	binary	High percentage of SCM read requests which encountered castout lock contention during this interval (across the sysplex).

Offsets		Name	Length	Format	Description
1408	580	SMF42JTH	4	binary	Average percentage of SCM read requests which encountered castout lock contention during this interval (across the sysplex).
1412	584	SMF42JTI	4	binary	Average number of RE-DO's during this interval (across the sysplex).
1416	588	SMF42JTJ	4	binary	Total number of RE-DO's during this interval (across the sysplex).
1420	58C	SMF42JTK	4	binary	Average number of recursive RE-DO's during this interval (across the sysplex).
1424	590	SMF42JTL	4	binary	Total number of recursive redo during this interval (across the sysplex).
1428	594	SMF42JTM	4	binary	Current percentage of RE-DO's during this interval (across the sysplex).
1432	598	SMF42JTN	4	binary	Low percentage of RE-DO's during this interval (across the sysplex).
1436	59C	SMF42JTO	4	binary	High percentage of RE-DO's during this interval (across the sysplex).
1440	5A0	SMF42JTP	4	binary	Average percentage of RE-DO's during this interval (across the sysplex).
1444	5A4	SMF42JTQ	4	binary	Current percentage of Recursive RE-DO's during this interval (across the sysplex).
1448	5A8	SMF42JTR	4	binary	Low percentage of Recursive RE-DO's during this interval (across the sysplex).
1452	5AC	SMF42JTS	4	binary	High percentage of Recursive RE-DO's during this interval (across the sysplex).
1456	5B0	SMF42JTT	4	binary	Average percentage of Recursive RE-DO's during this interval (across the sysplex).
1460	5B4	SMF42JUA	4	binary	Average number of buffer manager LRU intervals processed, where BMF was over the goal accelerated the aging, but did not go into panic mode (across the sysplex).
1464	5B8	SMF42JUB	4	binary	Total number of buffer manager LRU intervals processed, where BMF was over the goal accelerated the aging, but did not go into panic mode (across the sysplex).

Sysplex average buffer pool count array for below the bar

Offsets		Name	Length	Format	Description
0	0	SMF42JOF	4	binary	Average low value of the number of BMF buffers for this pool during this interval.
4	4	SMF42JOG	4	binary	Average high value of the number of BMF buffers for this pool during this interval.
8	8	SMF42JOH	4	binary	Average current value of the number of BMF buffers for this pool during this interval.
12	C	SMF42JOI	4	binary	Reserved.
16	10	SMF42JOJ	4	binary	Average low value of the number of extents for this pool during this interval.
20	14	SMF42JOK	4	binary	Average high value of the number of extents for this pool during this interval.
24	18	SMF42JOL	4	binary	Average current value of the number of extents for this pool during this interval.
28	1C	SMF42JOM	4	binary	Reserved.

Sysplex wide totals buffer pool count array for below the bar

Offsets		Name	Length	Format	Description
0	0	SMF42JRJ	4	binary	Low value of the number of BMF buffers for this pool during this interval.
4	4	SMF42JRK	4	binary	High value of the number of BMF buffers for this pool during this interval.
8	8	SMF42JRL	4	binary	Value of the number of BMF buffers for this pool during this interval.
12	C	SMF42JRM	4	binary	Reserved.
16	10	SMF42JRN	4	binary	Low value of the number of extents for this pool during this interval.
20	14	SMF42JRO	4	binary	High value of the number of extents for this pool during this interval.
24	18	SMF42JRP	4	binary	Current value of the number of extents for this pool during this interval.
28	1C	SMF42JRQ	4	binary	Reserved.

Average buffer manager calculated distribution array for below the bar

Offsets		Name	Length	Format	Description
0	0	SMF42JRF	4	binary	Average number of times calculated value was within this range (across the sysplex).

Total buffer manager calculated distribution array for below the bar

Offsets		Name	Length	Format	Description
0	0	SMF42JRH	4	binary	Total number of times calculated value was within this range (across the sysplex).

System local buffer manager LRU statistics summary for below the bar

Offsets		Name	Length	Format	Description
0	0	SMF42JPA	4	binary	Interval length. This is the total length, in seconds, of the measurement period.
4	4	SMF42J01	12	EBCDIC	Reserved.
16	10	SMF42JPB	8	EBCDIC	MVS system name.
24	18	SMF42JPC	8	EBCDIC	Reserved.
32	20	SMF42JPD	8	EBCDIC	Reserved.
40	28	SMF42JPE	8	EBCDIC	Average CPU time for all systems in sysplex (in milliseconds).
48	30	SMF42JPF	8	EBCDIC	Total CPU time for this record (in milliseconds).
56	38	SMF42JP1	12	EBCDIC	Reserved.
68	44	SMF42JP6	4	binary	Total number of write requests.
72	48	SMF42JPG	4	binary	Number of Buffer Manager LRU intervals processed.
76	4C	SMF42JPH	4	binary	Number of Buffer Manager LRU intervals where BMF was over the goal, and normal algorithms were bypassed to reclaim buffers
80	50	SMF42JPI	4	binary	Total number of times that BMF was called in this interval.
84	54	SMF42JP2	4	binary	Number of buffer manager LRU intervals processed, where BMF was over the goal, accelerated the aging, but did not go into panic mode.

Offsets		Name	Length	Format	Description
88	58	SMF42JPJ	4	binary	Buffer Manager number of hits during this interval.
92	5C	SMF42JPK	4	binary	Buffer Manager number of hits current percentage during this interval.
96	60	SMF42JPL	4	binary	Buffer Manager number of hits low percentage during this interval.
100	64	SMF42JPM	4	binary	Buffer Manager number of hits high percentage during this interval.
104	68	SMF42JPN	4	binary	Buffer Manager average hits during this interval.
108	6C	SMF42JP3	12	EBCDIC	Reserved.
120	78	SMF42JPO	4	binary	Sysplex Cache manager number of hits during this interval.
124	7C	SMF42JPP	4	binary	Sysplex Cache manager number of hits current percentage during this interval.
128	80	SMF42JPQ	4	binary	Sysplex Cache manager number of hits low percentage during this interval.
132	84	SMF42JPR	4	binary	Sysplex Cache manager number of hits high percentage during this interval.
136	88	SMF42JPS	4	binary	Sysplex Cache manager number of hits average percentage during this interval.
140	8C	SMF42JP4	12	EBCDIC	Reserved.
152	98	SMF42JPT	4	binary	DASD number of hits during this interval.
156	9C	SMF42JPU	4	binary	DASD hits current percentage during this interval.
160	A0	SMF42JPV	4	binary	DASD hits low percentage during this interval.
164	A4	SMF42JPW	4	binary	DASD hits high percentage during this interval.
168	A8	SMF42JPX	4	binary	DASD average hits during this interval.
172	AC	SMF42JP5	12	EBCDIC	Reserved.
184	B8	SMF42JPY	512	EBCDIC	Sysplex Average Buffer Pool Count array. This is a 16-bit entry array with each entry 32 bytes long. The first entry is the 2 K storage pool. The second entry is for the 4 K storage pool... See “Sysplex average buffer pool count array for below the bar” on page 467.
696	2B8	SMF42JQG	4	binary	Buffer size goal (in megabytes) - low value.
700	2BC	SMF42JQH	4	binary	Buffer size goal (in megabytes) - high value.
704	2C0	SMF42JQI	4	binary	Buffer size goal (in megabytes) - current value.
708	2C4	SMF42JQJ	4	binary	Buffer size goal (in megabytes) - average value.
712	2C8	SMF42JQK	4	binary	Buffer size Calculated (in megabytes) - low value.
716	2CC	SMF42JQL	4	binary	Buffer size Calculated (in megabytes) - high value.
720	2D0	SMF42JQM	4	binary	Buffer size Calculated (in megabytes) - current value.
724	2D4	SMF42JQN	4	binary	Buffer size Calculated (in megabytes) - Average value.
728	2D8	SMF42JQ2	4	binary	Total number of CF read requests that encountered retries for cast out locks for this interval.
728	2D8	SMF42JQ3	4	EBCDIC	Reserved.
736	2E0	SMF42JQO	64	EBCDIC	Calculated megabytes distribution array. This is a 16 entry array, which contains the number of times the calculated value occurred within a 100 MB span. Entry 1 = 0-99m, entry 2 = 100-199m,... entry 16 > 150 m. See “Calculated megabytes distribution array for below the bar” on page 468
800	320	SMF42JSA	4	binary	Number of SCM read requests, which encountered castout contention during this interval.
804	324	SMF42JSB	4	binary	Number of SCM read requests during this interval.

Offsets		Name	Length	Format	Description
808	328	SMF42JSC	4	binary	Current percentage of SCM read requests, which encountered cast contention during this interval. (Value is for the last LRU cycle before the SMF record was processed.)
812	32C	SMF42JSD	4	binary	Low percentage during this interval for SMF42JSC.
816	330	SMF42JSE	4	binary	High percentage during this interval for SMF42JSC.
820	334	SMF42JSF	4	binary	Average percentage during this interval for SMF42JSC.
824	338	SMF42JSG	4	binary	Number of RE-DO's during this interval.
828	33C	SMF42JSH	4	binary	Current percentage of RE-DO's during this interval. (Value is for the last LRU cycle before the SMF record was processed.)
832	340	SMF42JSI	4	binary	Low percentage during this interval for SMF42JSH.
836	344	SMF42JSJ	4	binary	High percentage during this interval for SMF42JSH.
840	348	SMF42JSK	4	binary	Average percentage during this interval for SMF42JSH.
844	34C	SMF42JSL	4	binary	Number of recursive RE-DO's during this interval.
848	350	SMF42JSM	4	binary	Current percentage of recursive RE-DO's during this interval. (Value is for the last LRU cycle before the SMF record was processed.)
852	354	SMF42JSN	4	binary	Low percentage during this interval for SMF42JSM.
856	358	SMF42JSO	4	binary	High percentage during this interval for SMF42JSM.
860	35C	SMF42JSP	4	binary	Average percentage during this interval for SMF42JSM.
864	360	SMF42JUC	4	binary	Low number of fixed 4 K pages in use (above and below the bar).
868	364	SMF42JUD	4	binary	High number of fixed 4 K pages in use (above and below the bar).
872	368	SMF42JUE	4	binary	Average number of fixed 4 K pages in use (above and below the bar).
876	36C	SMF42JUF	4	binary	Maximum amount of fixed storage (in megabytes). Set by RLSFIXEDPOOLSIZE.
880	370	SMF42JUG	4	binary	Percentage of available real storage that can be used by fixed pages.

Sysplex average buffer pool count array for below the bar

Offsets		Name	Length	Format	Description
0	0	SMF42JPZ	4	binary	Low value of the number of BMF buffers for this pool during this interval.
4	4	SMF42JQA	4	binary	High value of the number of BMF buffers for this pool during this interval.
8	8	SMF42JQB	4	binary	Current value of the number of BMF buffers for this pool during this interval.
12	C	SMF42JQ6	4	binary	Reserved.
16	10	SMF42JQC	4	binary	Low value of the number of extents for this pool during this interval.
20	14	SMF42JQD	4	binary	High value of the number of extents for this pool during this interval.
24	18	SMF42JQF	4	binary	Current value of the number of extents for this pool during this interval.
28	1C	SMF42JQ7	4	binary	Reserved.

Calculated megabytes distribution array for below the bar

Offsets		Name	Length	Format	Description
0	0	SMF42JQP	4	binary	For a single system, number of times calculated value was within this range.

Sysplex totals local buffer manager LRU statistics summary for above the bar

Offsets		Name	Length	Format	Description
0	0	SMF2AJNA	4	binary	Interval length. This is the total length, in seconds, of the measurement period.
4	4	SMF2AJ00	12	EBCDIC	Reserved.
16	10	SMF2AJNB	16	EBCDIC	Reserved.
32	20	SMF2AJND	8	EBCDIC	Reserved.
40	28	SMF2AJNE	8	EBCDIC	Average CPU time for all systems in sysplex (in milli-seconds).
48	30	SMF2AJNF	8	EBCDIC	Total CPU time for this record (in milli-seconds).
56	38	SMF2AJN0	4	EBCDIC	Reserved.
60	3C	SMF2AJN7	4	binary	Total number of write requests (sysplex totals).
64	40	SMF2AJNG	4	binary	Average number of Buffer Manager LRU intervals processed (sysplex totals).
68	44	SMF2AJNH	4	binary	Total number of Buffer Manager LRU intervals processed (across sysplex).
72	48	SMF2AJNI	4	binary	Average number of Buffer Manager LRU intervals where BMF was over the goal, and normal algorithms were bypassed to reclaim buffers.
76	4C	SMF2AJNJ	4	binary	Total number of Buffer Manager LRU intervals where BMF was over the goal, and normal algorithms were bypassed to reclaim buffers (across sysplex).
80	50	SMF2AJNK	4	binary	Average number of times that BMF was called in this interval.
84	54	SMF2AJNL	4	binary	Total number of times that BMF was called in this interval (across sysplex).
88	58	SMF2AJNM	4	binary	Average number of Buffer Manager ‘hits’ during this interval.
92	5C	SMF2AJNN	4	binary	Total number of Buffer Manager ‘hits’ during this interval.
96	60	SMF2AJNO	4	binary	Buffer Manager ‘hits’ current percentage during this interval.
100	64	SMF2AJNP	4	binary	Buffer Manager ‘hits’ low percentage during this interval.
104	68	SMF2AJNQ	4	binary	Buffer Manager ‘hits’ high percentage during this interval.
108	6C	SMF2AJNR	4	binary	Buffer Manager average ‘hits’ during this interval.
112	70	SMF2AJNS	4	binary	Average Sysplex Cache manager number of ‘hits’ during this interval.
116	74	SMF2AJNT	4	binary	Total Sysplex Cache manager number of ‘hits’ during this interval.
120	78	SMF2AJNU	4	binary	Sysplex Cache manager number of ‘hits’ current percentage during this interval.
124	7C	SMF2AJNV	4	binary	Sysplex Cache manager number of ‘hits’ low percentage during this interval.
128	80	SMF2AJNW	4	binary	Sysplex Cache manager number of ‘hits’ high percentage during this interval.
132	84	SMF2AJNX	4	binary	Sysplex Cache manager number of ‘hits’ average percentage during this interval.
136	88	SMF2AJNY	4	binary	Average DASD number of ‘hits’ during this interval.

Offsets		Name	Length	Format	Description
140	8C	SMF2AJNZ	4	binary	Total DASD number of ‘hits’ during this interval.
144	90	SMF2AJOA	4	binary	DASD ‘hits’ current percentage during this interval.
148	94	SMF2AJOB	4	binary	DASD ‘hits’ low percentage during this interval.
152	98	SMF2AJOC	4	binary	DASD ‘hits’ high percentage during this interval.
156	9C	SMF2AJOD	4	binary	DASD average ‘hits’ during this interval.
160	A0	SMF2AJOE	512	EBCDIC	Sysplex Average Buffer Pool Count array. This is a 16 bit entry array with each entry 32 bytes long. The first entry is the 2K storage pool, the second entry is for the 4K storage pool... See “Sysplex average buffer pool count array for below the bar” on page 464.
672	2A0	SMF2AJRI	512	EBCDIC	Sysplex Wide Totals Buffer Pool Count array. This is a 16 bit entry array with each entry 32 bytes long. The first entry is the 2K storage pool, the second entry is for the 4K storage pool... See “Sysplex wide totals buffer pool count array for below the bar” on page 465.
1184	4A0	SMF2AJON	4	binary	Average buffer size goal (in megabytes) - low value.
1188	4A4	SMF2AJOO	4	binary	Total Buffer size goal (in megabytes) - Low value.
1192	4A8	SMF2AJOP	4	binary	Average Buffer size goal (in megabytes) - high value.
1196	4AC	SMF2AJOQ	4	binary	Total Buffer size goal (in megabytes) - high value.
1200	4B0	SMF2AJOR	4	binary	Average Buffer size goal (in megabytes) - current value.
1204	4B4	SMF2AJOS	4	binary	Total Buffer size goal (in megabytes) - current value.
1208	4B8	SMF2AJOT	4	binary	Total Buffer size goal (in megabytes) - average value.
1212	4BC	SMF2AJOU	4	binary	Reserved.
1216	4C0	SMF2AJOV	4	binary	Average Buffer size Calculated (in megabytes) - low value.
1220	4C4	SMF2AJOW	4	binary	Total Buffer size Calculated (in megabytes) - low value.
1224	4C8	SMF2AJOX	4	binary	Average Buffer size Calculated (in megabytes) - high value.
1228	4CC	SMF2AJOY	4	binary	Total Buffer size Calculated (in megabytes) - high value.
1232	4D0	SMF2AJOZ	4	binary	Average Buffer size Calculated (in megabytes) - current value.
1236	4D4	SMF2AJRA	4	binary	Total Buffer size Calculated (in megabytes) - current value.
1240	4D8	SMF2AJRB	4	binary	Total Buffer size Calculated (in megabytes) - Average value.
1244	4DC	SMF2AJRC	4	binary	Total number of CF read requests that encountered retries for cast out locks for this interval (across the sysplex).
1248	4E0	SMF2AJRD	8	EBCDIC	Reserved.
1252	4E4	SMF2AJRE	64	EBCDIC	Average calculated megabytes distribution array. This is a 16 entry array which contains the number of times the calculated value occurred within a 100MB span. Entry 1 = 0-99m, entry 2 = 100-199m,... entry 16 > 150m. See “Average buffer manager calculated distribution array for below the bar” on page 465.
1316	524	SMF2AJRG	64	EBCDIC	Total calculated megabytes distribution array. This is a 16 entry array which contains the number of times the calculated value occurred within a 100MB span. Entry 1 = 0-99m, entry 2 = 100-199m,... entry 16 > 150m. See “Total buffer manager calculated distribution array for below the bar” on page 465.
1380	564	SMF2AJTA	4	binary	Average number of SCM read requests which encountered castout lock contention during this interval (across the sysplex).
1384	568	SMF2AJTB	4	binary	Total number of SCM read requests which encountered castout lock contention during this interval (across the sysplex).
1388	56C	SMF2AJTC	4	binary	Average number of SCM read requests during this interval (across the sysplex).

Offsets		Name	Length	Format	Description
1392	570	SMF2AJTD	4	binary	Total number of SCM read requests during this interval (across the sysplex).
1396	574	SMF2AJTE	4	binary	Current percentage of SCM read requests which encountered castout lock contention during this interval (across the sysplex).
1400	578	SMF2AJTF	4	binary	Low percentage of SCM read requests which encountered castout lock contention during this interval (across the sysplex).
1404	57C	SMF2AJTG	4	binary	High percentage of SCM read requests which encountered castout lock contention during this interval (across the sysplex).
1408	580	SMF2AJTH	4	binary	Average percentage of SCM read requests which encountered castout lock contention during this interval (across the sysplex).
1412	584	SMF2AJTI	4	binary	Average number of RE-DO's during this interval (across the sysplex).
1416	588	SMF2AJTJ	4	binary	Total number of RE-DO's during this interval (across the sysplex).
1420	58C	SMF2AJTK	4	binary	Average number of recursive RE-DO's during this interval (across the sysplex).
1424	590	SMF2AJTL	4	binary	Total number of recursive redo during this interval (across the sysplex).
1428	594	SMF2AJTM	4	binary	Current percentage of RE-DO's during this interval (across the sysplex).
1432	598	SMF2AJTN	4	binary	Low percentage of RE-DO's during this interval (across the sysplex).
1436	59C	SMF2AJTO	4	binary	High percentage of RE-DO's during this interval (across the sysplex).
1440	5A0	SMF2AJTP	4	binary	Average percentage of RE-DO's during this interval (across the sysplex).
1444	5A4	SMF2AJTQ	4	binary	Current percentage of Recursive RE-DO's during this interval (across the sysplex).
1448	5A8	SMF2AJTR	4	binary	Low percentage of Recursive RE-DO's during this interval (across the sysplex).
1452	5AC	SMF2AJTS	4	binary	High percentage of Recursive RE-DO's during this interval (across the sysplex).
1456	5B0	SMF2AJTT	4	binary	Average percentage of Recursive RE-DO's during this interval (across the sysplex).
1460	5B4	SMF2AJUA	4	binary	Average number of buffer manager LRU intervals processed, where BMF was over the goal accelerated the aging, but did not go into panic mode (across the sysplex).
1464	5B8	SMF2AJUB	4	binary	Total number of buffer manager LRU intervals processed, where BMF was over the goal accelerated the aging, but did not go into panic mode (across the sysplex).

Sysplex average buffer pool count array for above the bar

Offsets		Name	Length	Format	Description
0	0	SMF2AJOF	4	binary	Average low value of the number of BMF buffers for this pool during this interval.
4	4	SMF2AJOG	4	binary	Average high value of the number of BMF buffers for this pool during this interval.
8	8	SMF2AJOH	4	binary	Average current value of the number of BMF buffers for this pool during this interval.
12	C	SMF2AJOI	4	binary	Reserved.

Offsets		Name	Length	Format	Description
16	10	SMF2AJOJ	4	binary	Average low value of the number of extents for this pool during this interval.
20	14	SMF2AJOK	4	binary	Average high value of the number of extents for this pool during this interval.
24	18	SMF2AJOL	4	binary	Average current value of the number of extents for this pool during this interval.
28	1C	SMF2AJOM	4	binary	Reserved.

Sysplex wide totals buffer pool count array for above the bar

Offsets		Name	Length	Format	Description
0	0	SMF2AJRJ	4	binary	Low value of the number of BMF buffers for this pool during this interval.
4	4	SMF2AJRK	4	binary	High value of the number of BMF buffers for this pool during this interval.
8	8	SMF2AJRL	4	binary	Value of the number of BMF buffers for this pool during this interval.
12	C	SMF2AJRM	4	binary	Reserved.
16	10	SMF2AJRN	4	binary	Low value of the number of extents for this pool during this interval.
20	14	SMF2AJRO	4	binary	High value of the number of extents for this pool during this interval.
24	18	SMF2AJRP	4	binary	Current value of the number of extents for this pool during this interval.
28	1C	SMF2AJRQ	4	binary	Reserved.

Average buffer manager calculated distribution array for above the bar

Offsets		Name	Length	Format	Description
0	0	SMF2AJRF	4	binary	Average number of times calculated value was within this range (across the sysplex).

Total buffer manager calculated distribution array for above the bar

Offsets		Name	Length	Format	Description
0	0	SMF2AJRH	4	binary	Total number of times calculated value was within this range (across the sysplex).

System local buffer manager LRU statistics summary for above the bar

Offsets		Name	Length	Format	Description
0	0	SMF2AJPA	4	binary	Interval length. This is the total length, in seconds, of the measurement period.
4	4	SMF2AJ01	12	EBCDIC	Reserved.
16	10	SMF2AJPB	8	EBCDIC	MVS system name.
24	18	SMF2AJPC	8	EBCDIC	Reserved.
32	20	SMF2AJPD	8	EBCDIC	Reserved.
40	28	SMF2AJPE	8	EBCDIC	Average CPU time for all systems in sysplex (in milliseconds).
48	30	SMF2AJPF	8	EBCDIC	Total CPU time for this record (in milliseconds).
56	38	SMF2AJP1	12	EBCDIC	Reserved.

Offsets		Name	Length	Format	Description
68	44	SMF2AJP6	4	binary	Total number of write requests.
72	48	SMF2AJPG	4	binary	Number of Buffer Manager LRU intervals processed.
76	4C	SMF2AJPH	4	binary	Number of Buffer Manager LRU intervals where BMF was over the goal, and normal algorithms were bypassed to reclaim buffers
80	50	SMF2AJPI	4	binary	Total number of times that BMF was called in this interval.
84	54	SMF2AJP2	4	binary	Number of buffer manager LRU intervals processed, where BMF was over the goal, accelerated the aging, but did not go into panic mode.
88	58	SMF2AJPJ	4	binary	Buffer Manager number of hits during this interval.
92	5C	SMF2AJPK	4	binary	Buffer Manager number of hits current percentage during this interval.
96	60	SMF2AJPL	4	binary	Buffer Manager number of hits low percentage during this interval.
100	64	SMF2AJPM	4	binary	Buffer Manager number of hits high percentage during this interval.
104	68	SMF2AJPN	4	binary	Buffer Manager average hits during this interval.
108	6C	SMF2AJP3	12	EBCDIC	Reserved.
120	78	SMF2AJPO	4	binary	Sysplex Cache manager number of hits during this interval.
124	7C	SMF2AJPP	4	binary	Sysplex Cache manager number of hits current percentage during this interval.
128	80	SMF2AJPQ	4	binary	Sysplex Cache manager number of hits low percentage during this interval.
132	84	SMF2AJPR	4	binary	Sysplex Cache manager number of hits high percentage during this interval.
136	88	SMF2AJPS	4	binary	Sysplex Cache manager number of hits average percentage during this interval.
140	8C	SMF2AJP4	12	EBCDIC	Reserved.
152	98	SMF2AJPT	4	binary	DASD number of hits during this interval.
156	9C	SMF2AJPU	4	binary	DASD hits current percentage during this interval.
160	A0	SMF2AJPV	4	binary	DASD hits low percentage during this interval.
164	A4	SMF2AJPW	4	binary	DASD hits high percentage during this interval.
168	A8	SMF2AJPX	4	binary	DASD average hits during this interval.
172	AC	SMF2AJP5	12	EBCDIC	Reserved.
184	B8	SMF2AJPY	512	EBCDIC	Sysplex Average Buffer Pool Count array. This is a 16-bit entry array with each entry 32 bytes long. The first entry is the 2 K storage pool. The second entry is for the 4 K storage pool... See “Sysplex average buffer pool count array for below the bar” on page 467.
696	2B8	SMF2AJQG	8	binary	Buffer size goal (in megabytes) - low value.
704	2C0	SMF2AJQH	8	binary	Buffer size goal (in megabytes) - high value.
712	2C8	SMF2AJQI	8	binary	Buffer size goal (in megabytes) - current value.
720	2D0	SMF2AJQJ	8	binary	Buffer size goal (in megabytes) - average value.
728	2D8	SMF2AJQK	8	binary	Buffer size Calculated (in megabytes) - low value.
736	2E0	SMF2AJQL	8	binary	Buffer size Calculated (in megabytes) - high value.
744	2E8	SMF2AJQM	8	binary	Buffer size Calculated (in megabytes) - current value.
752	2F0	SMF2AJQN	8	binary	Buffer size Calculated (in megabytes) - Average value.
760	2F8	SMF2AJQ2	4	binary	Total number of CF read requests that encountered retries for cast-out locks for this interval.

Offsets		Name	Length	Format	Description
764	2FC	SMF2AJQ3	4	EBCDIC	Reserved.
768	300	SMF2AJQO	64	EBCDIC	Calculated megabytes distribution array. This is a 16 entry array which contains the number of times the calculated value occurred within a 100 MB span. Entry 1 = 0-99m, entry 2 = 100-199m,... entry 16 > 150 m. See "Calculated megabytes distribution array for below the bar" on page 468
832	340	SMF2AJSA	4	binary	Number of SCM read requests, which encountered castout contention during this interval.
836	344	SMF2AJSB	4	binary	Number of SCM read requests during this interval.
840	348	SMF2AJSC	4	binary	Current percentage of SCM read requests, which encountered cast contention during this interval. (Value is for the last LRU cycle before the SMF record was processed.)
844	34C	SMF2AJSD	4	binary	Low percentage during this interval for SMF2AJSC.
848	350	SMF2AJSE	4	binary	High percentage during this interval for SMF2AJSC.
852	354	SMF2AJSF	4	binary	Average percentage during this interval for SMF2AJSC.
856	358	SMF2AJSG	4	binary	Number of RE-DO's during this interval.
860	35C	SMF2AJSH	4	binary	Current percentage of RE-DO's during this interval. (Value is for the last LRU cycle before the SMF record was processed.)
864	360	SMF2AJSI	4	binary	Low percentage during this interval for SMF2AJSH.
868	364	SMF2AJSJ	4	binary	High percentage during this interval for SMF2AJSH.
872	368	SMF2AJSK	4	binary	Average percentage during this interval for SMF2AJSH.
876	36C	SMF2AJSL	4	binary	Number of recursive RE-DO's during this interval.
880	370	SMF2AJSM	4	binary	Current percentage of recursive RE-DO's during this interval. (Value is for the last LRU cycle before the SMF record was processed.)
884	374	SMF2AJSN	4	binary	Low percentage during this interval for SMF2AJSM.
888	378	SMF2AJSO	4	binary	High percentage during this interval for SMF2AJSM.
892	37C	SMF2AJSP	4	binary	Average percentage during this interval for SMF2AJSM.
896	380	SMF2AJUC	4	binary	Low number of fixed 4 K pages in use (above and below the bar).
900	384	SMF2AJUD	4	binary	High number of fixed 4 K pages in use (above and below the bar).
904	388	SMF2AJUE	4	binary	Average number of fixed 4 K pages in use (above and below the bar).
908	38C	SMF2AJUF	4	binary	Maximum amount of fixed storage (in megabytes). Set by RLSFIXEDPOOLSIZE.
912	390	SMF2AJUG	4	binary	Percentage of available real storage that can be used by fixed pages.

Sysplex average buffer pool count array for above the bar

Offsets		Name	Length	Format	Description
0	0	SMF2AJPZ	4	binary	Low value of the number of BMF buffers for this pool during this interval.
4	4	SMF2AJQA	4	binary	High value of the number of BMF buffers for this pool during this interval.
8	8	SMF2AJQB	4	binary	Current value of the number of BMF buffers for this pool during this interval.
12	C	SMF2AJQ6	4	binary	Reserved.
16	10	SMF2AJQC	4	binary	Low value of the number of extents for this pool during this interval.

Offsets		Name	Length	Format	Description
20	14	SMF2AJQD	4	binary	High value of the number of extents for this pool during this interval.
24	18	SMF2AJQF	4	binary	Current value of the number of extents for this pool during this interval.
28	1C	SMF2AJQ7	4	binary	Reserved.

Calculated megabytes distribution array for above the bar

Offsets		Name	Length	Format	Description
0	0	SMF2AJQP	4	binary	For a single system, number of times calculated value was within this range.

Subtype 20 — STOW initialize

Job and data set information

Offsets		Name	Length	Format	Description
0	0	SMF42KJB	8	EBCDIC	Job name, started task control, or time sharing user who issued the STOW Initialize.
8	8	SMF42KST	8	EBCDIC	Step name.
16	10	SMF42KPR	8	EBCDIC	Proc name (or blanks).
24	18	SMF42KDS	44	EBCDIC	Data set name.
68	44	SMF42KVS	6	EBCDIC	VOLSER.

User information

Offsets		Name	Length	Format	Description
0	0	SMF42KUI	80	EBCDIC	User information of the caller of STOW macro that is mapped by ICHRUTKN.

Subtype 21 — Member delete

Job and data set information

Offsets		Name	Length	Format	Description
0	0	SMF42LJB	8	EBCDIC	Job name, started task control, or time sharing user who issued the STOW or DESERV delete.
8	8	SMF42LST	8	EBCDIC	Step name.
16	10	SMF42LPR	8	EBCDIC	Proc name (or blanks).
24	18	SMF42LDS	44	EBCDIC	Data set name.
68	44	SMF42LVS	6	EBCDIC	VOLSER.
74	4A	SMF42LNL	2	binary	Length of the member name that was deleted (SMF42LMN).
76	4C	SMF42LFL	4	binary	Flags **Bit** **Meaning when set** **0** Some aliases were excluded from the record because the record length would have exceeded the maximum **1-31** Reserved.

Offsets		Name	Length	Format	Description
80	50	SMF42LMN	VAR	EBCDIC	Member name that was deleted. Actual length used is determined by SMF42LNL. (Maximum length is 63.)

Alias names deleted in sympathy

Offsets		Name	Length	Format	Description
0	0	SMF42LNA	2	binary	Number of alias names that were also deleted because SMF42LMN is a PDSE primary member name.
2	2	SMF42LAA	VAR	EBCDIC	Alias name list array, contains SMF42LNA number of entries. See "Alias name list array" on page 475.

Alias name list array

Offsets		Name	Length	Format	Description
0	0	SMF42LAL	2	binary	Length of the alias name that was deleted in sympathy.
2	2	SMF42LAN	VAR	EBCDIC	Alias name deleted in sympathy. (Length is SMF42LAL.)

User Information

Offsets		Name	Length	Format	Description
0	0	SMF42LUI	80	EBCDIC	User information of the caller of STOW macro that is mapped by ICHRUTKN.

Subtype 22 — DFSMSrmm audit records

DFSMSrmm audit records section

Offsets		Name	Length	Format	Description
0	0	SMF420MA	76	Structure	
0	0	SMF42MJBN	8	EBCDIC	Job name.
8	8	SMF42MRST	4	binary	Reader start time in hundredths of a second.
12	C	SMF42MRSD	4	packed	Reader start date in the form *0cyydddF*.
16	10	SMF42MUID	8	EBCDIC	RACF user ID.
24	18	SMF42MACT	1	EBCDIC	Activity type: A - Record added; C - Record changed; D - Record deleted.
25	19	SMF42MFG1	1	binary	Flag 1. **Bit** **Meaning when set** **0 SMF42MLIS** Last in set. **1 SMF42MJRN** Journal record available. **2-7 *** Reserved.
26	1A	SMF42MCVTSFLG	8	binary	Virtual tape server flag.
27	1B	SMF42MCENABLE	8	binary	Control record enable flag.
28	1C	SMF42MLDTO	8	EBCDIC	Local time/date offset.

Offsets		Name	Length	Format	Description
36	24	SMF42MCJNRECN	4	Signed	Journal record number.
40	28	SMF42MJNRECN	4	Signed	Number of next jn rec.
44	2C	SMF42MCUPDVSI	4	Signed	VSI when MCUPDACT set on.
48	30	SMF42MCVSICNT	4	Signed	VSI control count.
52	34	SMF42MCVRLCTK	8	EBCDIC	VRSEL last change token.
60	3C	SMF42MCVRSCNT	4	Signed	Current VRS change counter.
64	40	SMF42MCVRSRUN	4	Signed	Last HSKP VRS change counter.
68	44	SMF42MCSYNCTS	8	EBCDIC	Catsynch time stamp.
68	44	SMF42MCSYNCDT	4	EBCDIC	Catsynch date.
72	48	SMF42MCSYNCTM	4	EBCDIC	Catsynch time.
76	4C	SMF42MEND	0	EBCDIC	1st data section end.

Subtype 23 — DFSMSrmm security records

DFSMSrmm security records section

Offsets		Name	Length	Format	Description
0	0	SMF420NA	120	Structure	
0	0	SMF42NJBN	8	EBCDIC	Job name.
8	8	SMF42NRST	4	binary	Reader start time in hundredths of a second.
12	C	SMF42NRSD	4	packed	Reader start date in the form *0cyydddF*.
16	10	SMF42NUIF	8	EBCDIC	User identification.
24	18	SMF42NUID	8	EBCDIC	RACF user ID.
32	20	SMF42NCGP	8	EBCDIC	RACF connect group.
40	28	SMF42NVER	1	EBCDIC	Record version identifier (2).
41	29	SMF42NACT	1	EBCDIC	Activity type: C - Data set create E - Data set extend U - Data set update R - Data set read access D - Data set delete
42	2A	SMF42NSTP	1	binary	Security type.
43	2B	*	1	EBCDIC	Reserved.
44	2C	SMF42NDSN	44	EBCDIC	Data set name.
88	58	SMF42NVOL	6	EBCDIC	Volume serial number.
94	5E	SMF42NUNT	8	EBCDIC	Device type.
102	66	SMF42NDSQ	2	Unsigned	Data set sequence number.
104	68	SMF42NVSQ	2	Unsigned	Volume sequence number.
112	70	SMF42NLDTO	8	EBCDIC	Local time/date offset.
120	78	SMF42NEND	0	EBCDIC	1st data section end.

Subtype 24 — Member Add/Replace

Job and data set information

Offsets		Name	Length	Format	Description
0	0	SMF42PJB	8	EBCDIC	Job name, started task control, or time sharing user who issued the STOW (add/replace) or DESERV PUT.
8	8	SMF42PST	8	EBCDIC	Step name.
16	10	SMF42PPR	8	EBCDIC	Proc name (or blanks).
24	18	SMF42PDS	44	EBCDIC	Data set name.
68	44	SMF42PVS	6	EBCDIC	Volume serial number (VOLSER).
74	4A	SMF42PML	2	binary	Length of the member name that was added or replaced.
76	4C	SMF42PF1	1	binary	Flags **Bit** **Meaning when set** **0** Some aliases were excluded from the record because the record length would have exceeded the maximum. **1** When this bit is on, a new member was added. **2–7** Reserved.
77	4D		3	binary	Reserved.
80	50	SMF42PMN	VAR	EBCDIC	Member name that was added or replaced.

Alias names deleted in sympathy

Offsets		Name	Length	Format	Description
0	0	SMF42P#A	2	binary	Number of alias names that were deleted because SMF42PMN is a PDSE primary member name.
2	2	SMF42PAA	VAR	EBCDIC	Alias name list array, contains SMF42P#A number of entries. See “Alias name list array” on page 477.

Alias name list array

Offsets		Name	Length	Format	Description
0	0	SMF42PAL	2	binary	Length of the alias name that was deleted in sympathy.
2	2	SMF42PAN	VAR	EBCDIC	Alias name that was deleted in sympathy.

User information

Offsets		Name	Length	Format	Description
0	0	SMF42PUI	80	EBCDIC	User information of the caller of STOW or DESERV macro that is mapped by ICHRUTKN.

Subtype 25 — Member rename

Job and data set information

Offsets		Name	Length	Format	Description
0	0	SMF42QJB	8	EBCDIC	Job name, started task control, or time sharing user who issued the STOW (rename) or DESERV RENAME.

Offsets		Name	Length	Format	Description
8	8	SMF42QST	8	EBCDIC	Step name.
16	10	SMF42QPR	8	EBCDIC	Proc name (or blanks).
24	18	SMF42QDS	44	EBCDIC	Data set name.
68	44	SMF42QVS	6	EBCDIC	Volume serial number (VOLSER).
74	4A	SMF42QML	2	binary	Length of the member name after the rename.
76	4C	SMF42QMN	VAR	EBCDIC	Member name after the rename (new name).

Original member name

Offsets		Name	Length	Format	Description
0	0	SMF42QOL	2	binary	Length of the member name before the rename.
2	2	SMF42QON	VAR	EBCDIC	Member name before the rename (old name).

User information

Offsets		Name	Length	Format	Description
0	0	SMF42QUI	80	EBCDIC	User information of the caller of STOW or DESERV macro that is mapped by ICHRUTKN.

Subtype 27 — VTOC audit log

The SMF type 42 subtype 27 record contains the data set control blocks (DSCBs) that are being written to the VTOC, along with data (such as the job name) to identify the VTOC writer.

DADSM/CVAF writes this SMF record for the following activity types: DCRE, DCVF, DDEL, DEXT, DPAR and DREN. For these records, the SMF42PSV (version number) field will contain a value of 2. When the version number is 2, all DSCBs affected by the activity will be recorded. There is a DSCB change section for the OLD and the NEW DSCBs.

VTOC update header section

Offsets		Name	Length	Format	Description
0	0	SMF42RJOB	8	EBCDIC	Job name
8	8	SMF42RJNO	8	EBCDIC	Job number
16	10	SMF42RSTN	8	EBCDIC	Step name
24	18	SMF42RPRN	8	EBCDIC	Proc name or blanks
32	20	SMF42RVOL	6	EBCDIC	Volume serial number
38	26	SMF42RDEV	2	binary	Device number (UCBCHAN)

Offsets		Name	Length	Format	Description

40	28	SMF42RACT	4	EBCDIC	Activity type:
					Value
					    Meaning
					AZAP
					    AMASPZAP
					DCLI
					    Close for input (non-VSAM)
					DCLO
					    Close for output non-VSAM data set
					DCLV
					    VSAM close
					DCLX
					    CLOSE executor non-VSAM extended format data set
					DCON
					    DSS consolidate
					DCPY
					    DSS copy
					DCRE
					    DADSM create data set
					DCVF
					    CVAFDIR
					    Note: CVCLID not specified
					DDEL
					    DADSM scratch data set.
					    Note: This entry reflects the DSCB just prior to the erase of the DSCB.
					DDMP
					    DSS dump
					DERR
					    VTOC protect
					DEVI
					    End-of-volume for input
					DEVO
					    End-of-volume for output
					DEXT
					    DADSM extend data set
					DFRG
					    DSS defrag
					DMMS
					    Called by Media Manager
					DOPI
					    Open for input
					DOPO
					    Open for output
					DOPV
					    VSAM open
					DPAR
					    DADSM partial release data set
					DREN
					    DADSM rename data set
					DRST
					    DSS restore
					DSSM
					    SSAM non-VSAM extended format data set
					DUPT
					    Update DSCB fields
					IOBE
					    IOBE not provided
					IOBU
					    IOBEUSER not specified

Offsets		Name	Length	Format	Description
44	2C	SMF42RIND	1	binary	Record indicators: **Value (Name)** **Meaning** **X'80' (SMF42RRSV)** Device is reserved.
45	2D	SMF42RDS1	1	binary	Data set indicators: **Value** **Meaning** **X'80' (SMF42REOS)** Data set is erase on scratch; only indicated when DDEL or DPAR is the value in SMF42RACT. **X'40' (SMF42RZRTY)** zHPF channel program failed; retry successful with FICON channel program. SMF42RCMDS indicates the FICON channel program operation codes.
46	2E	*	2	CHAR	Reserved
48	30	SMF42RSEEK	4	binary	VTOC track ID (CCCCHHHH)
52	34	SMF42RSRCH	5	binary	VTOC record ID (CCCCHHHHR) (optional)
57	39	SMF42RCMDS	15	binary	For zHPF, the 15-byte field consists of the following data: Offset 0, length 1, Transport command area header (TCAH) format (X'7F') Offset 1, length 1, TCA length Offset 2, length 8, First device command word (DCW) Offset 10, length 1, Number of DSCBs written Offset 11, length 1, Locate record operation Offset 12, length 1, Locate record auxiliary byte Offset 13, length 1, Locate record imbedded operation code Offset 14, length 1, Locate record count For FICON, CCW command codes scanned (X'7F' is not a valid command code.)
72	48	SMF42RUPSW	4	binary	EXCP caller address following SVC 0. For version 2 (SMF42PSV=2) the value in this field depends on the activity type, as follows: • For DDEL (scratch), DPAR (partial release), and DEXT (extend), the address of the caller of the DADSM function. • For DREN (rename), and DCRE (create), zeros. • For DCVF the address of the caller of CVAF.
76	4C	SMF42RUTOK	80	binary	User security token (mapped by ICHRUTKN)

DSCB change section

Offsets		Name	Length	Format	Description
0	0	SMF42RDSCB	140	binary	complete DSCB.
0	0	SMF42RKEY	44	binary	DSCB key field.
44	2C	SMF42RDSC	96	binary	DSCB data field.

Record type 43 (X'2B') — JES2 Start

Record type 43 is written when the operator issues an S JES2 command (to start JES2) or a $E SYS command (to reclaim the job processing that was being done on the named system in a multi-access spool configuration). This record contains a warm start indicator, JES2 start options, and the identification of the system whose job processing is to be reclaimed.

Record mapping

Header/Self-defining Section

This section contains the common SMF record headers fields and the triplet fields (offset/length/number), if applicable, that locate the other sections on the record.

Offsets		Name	Length	Format	Description
0	0	SMF43LEN	2	binary	Record length. This field and the next field (total of four bytes) form the RDW (record descriptor word). See “Standard and Extended SMF record headers” on page 162 for a detailed description.
2	2	SMF43SEG	2	binary	Segment descriptor (see record length field).
4	4	SMF43FLG	1	binary	System indicator: **Bit** **Meaning when set** **0-2** Reserved **3-6** Version indicators* **7** Reserved. *See “Standard and Extended SMF record headers” on page 162 for a detailed description.
5	5	SMF43RTY	1	binary	Record type 43 (X'2B').
6	6	SMF43TME	4	binary	Time since midnight, in hundredths of second, when the record was moved into the SMF buffer.
10	10	SMF43DTE	4	packed	Date record was moved into SMF buffer, in the form 0*cyydddF*. See “Standard and Extended SMF record headers” on page 162 for a detailed description.
14	E	SMF43SID	4	EBCDIC	System identification (from the SID parameter).
18	12	SMF43SBS	2	binary	Subsystem identification — X'0002' signifies JES2.
20	14	SMF43RSV	2		Reserved.
22	16	SMF43LRR	2	binary	Length of rest of record, excluding this field.
24	18	SMF43RV1	2		Reserved.
26	1A	SMF43RST	1	binary	Warm start indicator **Bit** **Meaning when set** **0** If 0, record written for $S JES2 command If 1, record written for $E SYS command **1-7** Reserved.

Offsets		Name	Length	Format	Description
27	1B	SMF43OPT	1	binary	JES2 start options. (This field is zero for $E SYS command.) See *z/OS JES2 Initialization and Tuning Guide* for more detailed information. **Bit** **Meaning when set** **0** Format the spool **1** Cold start **2** REQ option was specified **3** LIST option was specified **4** LOG option was specified **5** RECONFIG option was specified **6** CONSOLE option was specified **7** JES2 determined that it could perform a quick start.
28	1C	SMF43EID	4	EBCDIC	If $E SYS command, identification of system whose job processing is to be reclaimed. If S JES2 command, zero.

Record type 43 (X'2B') — JES3 Start

Record type 43 is written during JES3 and the converter/interpreter functional subsystem (C/I FSS) initialization. This record contains an indicator for the type of JES3 start, JES3 initialization deck origin type and contents, and JES3 procedure name.

Record environment

The following conditions exist for the generation of this record:

Macro
SMFEWTM, BRANCH=NO (record exit: IEFU83)

Storage Residency
24-bit

Record mapping

Header/Self-defining Section

This section contains the common SMF record headers fields and the triplet fields (offset/length/number), if applicable, that locate the other sections on the record.

Offsets		Name	Length	Format	Description
0	0	SMF43LEN	2	binary	Record length. This field and the next field (total of four bytes) form the RDW (record descriptor word). See “Standard and Extended SMF record headers” on page 162 for a detailed description.
2	2	SMF43SEG	2	binary	Segment descriptor (see record length field).

Offsets		Name	Length	Format	Description
4	4	SMF43FLG	1	binary	System indicator: **Bit** **Meaning when set** **0-2** Reserved **3-6** Version indicators* **7** Reserved. *See “Standard and Extended SMF record headers” on page 162 for a detailed description.
5	5	SMF43RTY	1	binary	Record type 43 (X'2B').
6	6	SMF43TME	4	binary	Time since midnight, in hundredths of second, that the record moved into the SMF buffer.
10	A	SMF43DTE	4	packed	Date when record was moved into SMF buffer, in the form 0*cyydddF*. See “Standard and Extended SMF record headers” on page 162 for a detailed description.
14	E	SMF43SID	4	EBCDIC	System identification (from the SID parameter).
18	12	SMF43SBS	2	binary	Subsystem identification — X'0005' signifies JES3.
20	14	SMF43RSV	2		Reserved.
22	16	SMF43LRR	2	binary	Length of rest of record, excluding this field.
24	18	SMF43RV1	2		Reserved.
26	1A	SMF43RST	1	binary	JES3 start record indicator (taken from operator's response to WTOR macro) **Bit** **Meaning when set** **0** Cold start **1** Warm start **2** Hot start **3** Start is with JES3 queue analysis **4** JES3 global processor. This bit is always set if start is a cold start or warm start. **5** JES3 local processor. This bit is always set if start is a hot start. **6** Reserved **7** Dynamic system interchange (DSI) was invoked by operator to convert a local processor to the global processor. Bits 2 and 4 will also be set.
27	18	SMF43RV2	1		Reserved.
28	1C	SMF43US1	1	binary	User flags.
29	1D	SMF43NMU	1	EBCDIC	JES3 initialization deck origin type (taken from operator's response to WTOR macro).

Offsets		Name	Length	Format	Description

30	1E	SMF43ORG	8	EBCDIC	JES3 initialization deck origin location (taken from operator's response to WTOR macro)
					`Type  Contents      Location`
					`N     Member name   JCL in JES3 procedure`
					`M     Member name   Dataset in JES3 procedure`
					`U     Unit address  3- or 4-digit unit at specified address (stored in 4-digit format).`

38	26	SMF43PJ3	4	EBCDIC	JES3 procedure name.
42	2A	SMF43RVJ	8		Reserved for JES3.
50	32	SMF43RVU	4		Reserved for user.

Record type 45 (X'2D') — JES2 Withdrawal

Record type 45 is written when a $P JES2 command (to withdraw JES2 from the system) is issued. It is written at the abnormal termination of JES2 if JES2 retains control long enough to write the record. This record contains a termination indicator and the JES2 completion code.

Record mapping

Header/Self-defining Section

This section contains the common SMF record headers fields and the triplet fields (offset/length/number), if applicable, that locate the other sections on the record.

Offsets		Name	Length	Format	Description
0	0	SMF45LEN	2	binary	Record length. This field and the next field (total of four bytes) form the RDW (record descriptor word). See "Standard and Extended SMF record headers" on page 162 for a detailed description.
2	2	SMF45SEG	2	binary	Segment descriptor (see record length field).
4	4	SMF45FLG	1	binary	System indicator: **Bit** **Meaning when set** **0-2** Reserved **3-6** Version indicators* **7** Reserved. *See "Standard and Extended SMF record headers" on page 162 for a detailed description.
5	5	SMF45RTY	1	binary	Record type 45 (X'2B').
6	6	SMF45TME	4	binary	Time since midnight, in hundredths of a second, that the record was moved into the SMF buffer.
10	A	SMF45DTE	4	packed	Date when the record was moved into the SMF buffer, in the form 0*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for a detailed description.
14	E	SMF45SID	4	EBCDIC	System identification (from the SID parameter).
18	12	SMF45SBS	2	binary	Subsystem identification — X'0002' signifies JES2.
20	14	SMF45RSV	2		Reserved.
22	16	SMF45LRR	2	binary	Length of rest of record, excluding this field.

Offsets		Name	Length	Format	Description
24	18	SMF45IND	2	binary	Termination indicator **Bit** **Meaning when set** **0** If 0, record written for $P JES2 command (JES2 withdrawal) If 1, record written for abnormal JES2 termination **1-15** Reserved.
26	1A	SMF45JCC	2	binary	JES2 completion code.

Record type 45 (X'2D') — JES3 Stop

Record type 45 is written during JES3 and the converter/interpreter functional subsystem (C/I FSS) termination. This record contains an indicator for the type of JES3 stop, and JES3 completion code.

Record environment

The following conditions exist for the generation of this record:

Macro
SMFEWTM, BRANCH=NO (record exit: IEFU83)

Storage Residency
24-bit

Record mapping

Header/Self-defining Section

This section contains the common SMF record headers fields and the triplet fields (offset/length/number), if applicable, that locate the other sections on the record.

Offsets		Name	Length	Format	Description
0	0	SMF45LEN	2	binary	Record length. This field and the next field (total of four bytes) form the RDW (record descriptor word). See “Standard and Extended SMF record headers” on page 162 for a detailed description.
2	2	SMF45SEG	2	binary	Segment descriptor (see record length field).
4	4	SMF45FLG	1	binary	System indicator: **Bit** **Meaning when set** **0-2** Reserved **3-6** Version indicators* **7** Reserved. *See “Standard and Extended SMF record headers” on page 162 for a detailed description.
5	5	SMF45RTY	1	binary	Record type 45 (X'2D').
6	6	SMF45TME	4	binary	Time since midnight, in hundredths of a second, that the record was moved into the SMF buffer.
10	A	SMF45DTE	4	packed	Date when the record was moved into the SMF buffer, in the form 0*cyydddF*. See “Standard and Extended SMF record headers” on page 162 for a detailed description.

Offsets		Name	Length	Format	Description
14	E	SMF45SID	4	EBCDIC	System identification (from the SID parameter).
18	12	SMF45SBS	2	binary	Subsystem identification — X'0005' signifies JES3.
20	14	SMF45RSV	2		Reserved.
22	16	SMF45LRR	2	binary	Length of rest of record, excluding this field.
24	18	SMF45FG1	1	binary	JES3 stop record indicator **Bit** **Meaning when set** **0** JES3 or the C/I FSS abnormally terminated (taken from completion code in ECB) **1** Dynamic system interchange was invoked by operator to convert a local processor to the global processor **2-7** Reserved.
25	19	SMF45J3C	3	binary	JES3 completion code (taken from completion code in ECB) where bits 0-11 represent a system code and bits 12-23 represent a user code. Note that the JES3 completion code, as recorded on the operator's console, is always S 2FB.
28	1C	SMF45RV1	1		Reserved.
29	1D	SMF45US1	1	binary	User flags.
30	1E	SMF45RVJ	8		Reserved for JES3.
38	26	SMF45RVU	4		Reserved for user.

Record type 47 (X'2F') — JES2 SIGNON/Start Line (BSC only)

Record type 47 is written when:

- A $S LINE(*n*) command (to start a line) is issued,
- A $E LINE(*n*) command (to restart a line) is issued, or
- When a remote user signs on.

This record contains a record indicator, remote name, line name, password, and message text.

Record mapping

Header/Self-defining Section

This section contains the common SMF record headers fields and the triplet fields (offset/length/number), if applicable, that locate the other sections on the record.

Offsets		Name	Length	Format	Description
0	0	SMF47LEN	2	binary	Record length. This field and the next field (total of four bytes) form the RDW (record descriptor word). See "Standard and Extended SMF record headers" on page 162 for a detailed description.
2	2	SMF47SEG	2	binary	Segment descriptor (see record length field).

Offsets		Name	Length	Format	Description
4	4	SMF47FLG	1	binary	System indicator: **Bit** **Meaning when set** **0-2** Reserved **3-6** Version indicators* **7** Reserved. *See “Standard and Extended SMF record headers” on page 162 for a detailed description.
5	5	SMF47RTY	1	binary	Record type 47 (X'2F').
6	6	SMF47TME	4	binary	Time since midnight, in hundredths of a second, that the record was moved into the SMF buffer.
10	A	SMF47DTE	4	packed	Date when the record was moved into the SMF buffer, in the form 0*cyydddF*. See “Standard and Extended SMF record headers” on page 162 for a detailed description.
14	E	SMF47SID	4	EBCDIC	System identification (from the SID parameter).
18	12	SMF47SBS	2	binary	Subsystem identification — X'0002' signifies JES2.
20	14	SMF47RSV	2		Reserved.
22	16	SMF47LRR	2	binary	Length of rest of record, excluding this field.
24	18	SMF47EVT	2	binary	Record indicator **Bit** **Meaning when set** **0-13** Reserved **14** Record written for $S LNE*n* command **15** Record written for SIGNON.

General Section

Offsets		Name	Length	Format	Description
26	1A	SMF47LN1	2	binary	Length of general section, including this field.
28	1C	SMF47RMT	8	EBCDIC	Remote name as defined in JESPARMS. (This field is filled in only if a remote terminal is connected to this line.)
36	24	SMF47LIN	8	EBCDIC	Line name as defined in JESPARMS.
44	2C	SMF47PSW	8	EBCDIC	Password as defined in JESPARMS.

Message Section

The following fields apply when a remote user signs on:

Offsets		Name	Length	Format	Description
52	34	SMF47LN2	2	binary	Length of rest of record, including this field.
54	36	SMF47MSG	36	EBCDIC	Message text. This field includes columns 45-70 of the SIGNON card image.

Record type 47 (X'2F') — JES3 SIGNON/Start Line/LOGON

Record type 47 is written when a system network architecture (SNA) remote user logs on or when a binary synchronous communication (BSC) remote line is started or a BSC remote user signs on.

For SNA, the record contains a record indicator, a work station name, a logical unit (LU) name, and a password. The record length for an SNA LOGON is 52 bytes. For BSC, the record contains a record indicator, a remote name, a line name, a password, and, for a remote SIGNON, a message text. The record length is 52 bytes for a started line or 102 bytes for a SIGNON.

Record environment

The following conditions exist for the generation of this record:

Macro
SMFEWTM, BRANCH=NO (record exit: IEFU83)

Storage Residency
31-bit

Record mapping

Header/Self-defining Section

This section contains the common SMF record headers fields and the triplet fields (offset/length/number), if applicable, that locate the other sections on the record.

Offsets		Name	Length	Format	Description
0	0	SMF47LEN	2	binary	Record length. This field and the next field (total of four bytes) form the RDW (record descriptor word). See "Standard and Extended SMF record headers" on page 162 for a detailed description.
2	2	SMF47SEG	2	binary	Segment descriptor (see record length field).
4	4	SMF47FLG	1	binary	System indicator: **Bit** **Meaning when set** **0-2** Reserved **3-6** Version indicators* **7** Reserved. *See "Standard and Extended SMF record headers" on page 162 for a detailed description.
5	5	SMF47RTY	1	binary	Record type 47 (X'2F').
6	6	SMF47TME	4	binary	Time since midnight, in hundredths of a second, that the record was moved into the SMF buffer.
10	A	SMF47DTE	4	packed	Date when the record was moved into the SMF buffer, in the form 0*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for a detailed description.
14	E	SMF47SID	4	EBCDIC	System identification (from the SID parameter).
18	12	SMF47SBS	2	binary	Subsystem identification — X'0005' signifies JES3.
20	14	SMF47RSV	2		Reserved.
22	16	SMF47LRR	2	binary	Length of rest of record, excluding this field.

Offsets		Name	Length	Format	Description
24	18	SMF47EVT	2	binary	Record indicator **Bit** **Meaning when set** **0-12** Reserved **13** Record written for SNA LOGON **14** Record written for BSC started line **15** Record written for BSC SIGNON.

General Section

Offsets		Name	Length	Format	Description
26	1A	SMF47LN1	2	binary	Length of general section, including this field.
28	1C	SMF47RMT	8	EBCDIC	Remote name as defined in JESPARMS. (This field is filled in only if a remote terminal is connected to this line.)
36	24	SMF47LIN	8	EBCDIC	Line name as defined in JESPARMS.
44	2C	SMF47PSW	8	EBCDIC	Password as defined in JESPARMS.

Message Section

This section contains the fields that apply when a BSC remote user signs on.

Offsets		Name	Length	Format	Description
52	34	SMF47LN2	2	binary	Length of rest of message section, including this field.
54	36	SMF47MSG	36	EBCDIC	Message text. This field includes columns 35-70 of the SIGNON card image.
90	5A	SMF47RVJ	8		Reserved for JES3.
98	62	SMF47RVU	4		Reserved for user.

Record type 48 (X'30') — JES2 SIGNOFF/Stop Line (BSC only)

Record type 48 is written when:

- A $P LNE*n* command (to stop a line) is issued
- A $E LNE*n* command (to restart a line) is issued, and
- When a remote user signs off.

This record contains:

- A record indicator
- A remote name
- A line name
- A password
- A line adapter address
- The number of execute channel programs (EXCP)
- Negative acknowledgements to write text
- Data checks to read text
- Time outs to read text.

The field names beginning with MDCTS are for SIGNOFF and contain session totals; the other fields are for $P LNE*n* commands and contain connection totals.

Record mapping

Header/Self-defining Section

This section contains the common SMF record headers fields and the triplet fields (offset/length/number), if applicable, that locate the other sections on the record.

Offsets		Name	Length	Format	Description
0	0	SMF48LEN	2	binary	Record length. This field and the next field (total of four bytes) form the RDW (record descriptor word). See "Standard and Extended SMF record headers" on page 162 for a detailed description.
2	2	SMF48SEG	2	binary	Segment descriptor (see record length field).
4	4	SMF48FLG	1	binary	System indicator: **Bit** **Meaning when set** **0-2** Reserved **3-6** Version indicators* **7** Reserved. *See "Standard and Extended SMF record headers" on page 162 for a detailed description.
5	5	SMF48RTY	1	binary	Record type 48 (X'30').
6	6	SMF48TME	4	binary	Time since midnight, in hundredths of a second, that the record was moved into the SMF buffer.
10	A	SMF48DTE	4	packed	Date when the record was moved into SMF buffer, in the form 0*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for a detailed description.
14	E	SMF48SID	4	EBCDIC	System identification (from the MEMBER statement).
18	12	SMF48SBS	2	binary	Subsystem identification — X'0002' signifies JES2.
20	14	SMF48RSV	2		Reserved.
22	16	SMF48LRR	2	binary	Length of rest of record, excluding this field.
24	18	SMF48EVT	2	binary	Record indicator **Bit** **Meaning when set** **0-13** Reserved **14** Record written for $P LNE*n* command. **15** Record written for SIGNOFF.
26	1A	SMF48RV1	2		Reserved.
28	1C	SMF48RMT	8	EBCDIC	Remote name as defined in JESPARMS. (This field is filled in only if a remote terminal is connected to this line.)
36	24	SMF48LIN	8	EBCDIC	Line name as defined in JESPARMS.
44	2C	SMF48PSW	8	EBCDIC	Password as defined in JESPARMS.

Offsets		Name	Length	Format	Description
52	34	SMF48IO	4	binary	Number of EXCPs for this line.
56	36	SMF48NAK	4	binary	Number of negative acknowledgements to write text.
60	3C	SMF48DCK	4	binary	Number of data checks to read text.
64	40	SMF48OUT	4	binary	Number of time outs to read text.
68	44	SMF48ERR	4	binary	Sum of all other line errors.
72	48	SMF48LAA	3	EBCDIC	3-digit hexadecimal device number.
75	4B	SMF48LA4	4	EBCDIC	4-digit hexadecimal device number.

Record type 48 (X'30') — JES3 SIGNOFF/Stop Line/LOGOFF

Record type 48 is written when a system network architecture (SNA) remote user logs off or if a binary synchronous communication (BSC) remote line is stopped. This record is also written when a BSC remote user signs off.

For SNA, the record contains a record indicator, a work station name, a logical unit (LU) name, a password, and a line I/O count. For BSC, the record contains a record indicator, a remote name, a line name, a password, a line adapter address, and line I/O counts.

Note: For BSC, the statistics in this record are accumulated for the line from SIGNON/LOGON to SIGNOFF/LOGOFF.

Record environment

The following conditions exist for the generation of this record:

Macro
SMFEWTM, BRANCH=NO (record exit: IEFU83)

Storage Residency
31-bit

Record mapping

Header/Self-defining Section

This section contains the common SMF record headers fields and the triplet fields (offset/length/number), if applicable, that locate the other sections on the record.

Offsets		Name	Length	Format	Description
0	0	SMF48LEN	2	binary	Record length. This field and the next field (total of four bytes) form the RDW (record descriptor word). See "Standard and Extended SMF record headers" on page 162 for a detailed description.
2	2	SMF48SEG	2	binary	Segment descriptor (see record length field).
4	4	SMF48FLG	1	binary	System indicator: **Bit** **Meaning when set** **0-2** Reserved **3-6** Version indicators* **7** Reserved. *See "Standard and Extended SMF record headers" on page 162 for a detailed description.

Offsets		Name	Length	Format	Description
5	5	SMF48RTY	1	binary	Record type 48 (X'30').
6	6	SMF48TME	4	binary	Time since midnight, in hundredths of a second, that the record was moved into the SMF buffer.
10	A	SMF48DTE	4	packed	Date when the record was moved into the SMF buffer, in the form 0*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for a detailed description.
14	E	SMF48SID	4	EBCDIC	System identification (from the SID parameter).
18	12	SMF48SBS	2	binary	Subsystem identification — X'0005' signifies JES3.
20	14	SMF48RSV	2		Reserved.
22	16	SMF48LRR	2	binary	Length of rest of record, excluding this field.
24	18	SMF48EVT	2	binary	Record indicator **Bit** **Meaning when set** **0-12** Reserved **13** Record written for SNA LOGOFF **14** Record written for BSC stopped line **15** Record written for BSC SIGNOFF.
26	1A	SMF48RV1	2		Reserved.
28	1C	SMF48RMT	8	EBCDIC	Remote name as defined in JESPARMS. (This field is filled in only if a remote terminal is connected to this line.) Work station name.
36	24	SMF48LIN	8	EBCDIC	Line name as defined in JESPARMS.
44	26	SMF48PSW	8	EBCDIC	Password as defined in JESPARMS.
52	34	SMF48TRN	4	binary	Number of transmissions.
56	38	SMF48ERS	4	binary	Number of line errors.
60	3C	SMF48TOT	2	binary	Number of time outs to read text.
62	3E	SMF48NKS	2	binary	Number of negative acknowledgements to write text.
64	40	SMF48SO	1	binary	Number of command rejects.
65	41	SMF48S1	1	binary	Number of interventions required.
66	42	SMF48S2	1	binary	Number of bus-out checks.
67	43	SMF38S3	1	binary	Number of equipment checks.
The following fields apply only to BSC:					
68	44	SMF48S4	1	binary	Number of data checks.
69	45	SMF48S5	1	binary	Number of data overruns.
70	46	SMF48S6	1	binary	Number of lost data(s).
71	47	SMF48USR	9		Reserved.
80	50	SMF48ADP	3	EBCDIC	3-digit line adapter number.
83	53	SMF48RVJ	8		Reserved for JES3.
91	5B	SMF48RVU	4		Reserved for user.
95	5F	SMF48AD4	4	EBCDIC	4-digit line adapter number.

For SNA, adjust offsets to account for the increased length.

66	42	SMF48S1
67	43	SMF48S2
69	45	SMF48S3

Record type 49 (X'31') — JES2 Integrity (BSC only)

Record type 49 is written when a remote user attempts to sign on with an incorrect password. This record is the same as record type 47 except the password is incorrect. It contains a record indicator, remote name, line name, incorrect password, and message text.

Record mapping

Header/Self-defining Section

This section contains the common SMF record headers fields and the triplet fields (offset/length/number), if applicable, that locate the other sections on the record.

Offsets		Name	Length	Format	Description
0	0	SMF49LEN	2	binary	Record length. This field and the next field (total of four bytes) form the RDW (record descriptor word). See “Standard and Extended SMF record headers” on page 162 for a detailed description.
2	2	SMF49SEG	2	binary	Segment descriptor (see record length field).
4	4	SMF49FLG	1	binary	System indicator: **Bit** **Meaning when set** **0-2** Reserved **3-6** Version indicators* **7** Reserved. *See “Standard and Extended SMF record headers” on page 162 for a detailed description.
5	5	SMF49RTY	1	binary	Record type 49 (X'31').
6	6	SMF49TME	4	binary	Time since midnight, in hundredths of a second, that the record was moved into the SMF buffer.
10	A	SMF49DTE	4	packed	Date when the record was moved into the SMF buffer, in the form 0*cyydddF*. See “Standard and Extended SMF record headers” on page 162 for a detailed description.
14	E	SMF49SID	4	EBCDIC	System identification (from the SID parameter).
18	12	SMF49SBS	2	binary	Subsystem identification — X'0002' signifies JES2.
20	14	SMF49RSV	2		Reserved.
22	16	SMF49LRR	2	binary	Length of rest of record, excluding this field.
24	18	SMF49EVT	2	binary	Record indicator **Bit** **Meaning when set** **0-13** Reserved **14** Started line **15** Record written for SIGNON.

Offsets		Name	Length	Format	Description
Identification Section:					
26	1A	SMF49LN1	2	binary	Length of identification section, including this field.
28	1C	SMF49RMT	8	EBCDIC	Remote name as defined in JESPARMS. (This field is filled in only if a remote terminal is connected to this line.)
36	24	SMF49LIN	8	EBCDIC	Line name as defined in JESPARMS.
44	2C	SMF49PSW	8	EBCDIC	Incorrect password.
Message Section:					
52	34	SMF49LN2	2	binary	Length of rest of record, including this field.
54	36	SMF49MSG	36	EBCDIC	Message text. This field includes columns 35-70 of the SIGNON card image.

Record type 49 (X'31') — JES3 Integrity

Record type 49 is written when a system network architecture (SNA) remote user attempts to log on with an incorrect password or a binary synchronous communication (BSC) remote line user attempts to sign on with an incorrect password.

For SNA, the record contains a record indicator, a work station name, a logical unit (LU) name, and an incorrect password. For BSC, the record contains a record indicator, a remote name, a line name, an incorrect password, and, for a remote sign on, a message text.

Record environment

The following conditions exist for the generation of this record:

Macro
SMFEWTM, BRANCH=NO (record exit: IEFU83)

Storage Residency
31-bit

Record mapping

Header/Self-defining Section

This section contains the common SMF record headers fields and the triplet fields (offset/length/number), if applicable, that locate the other sections on the record.

Offsets		Name	Length	Format	Description
0	0	SMF49LEN	2	binary	Record length. This field and the next field (total of four bytes) form the RDW (record descriptor word). See “Standard and Extended SMF record headers” on page 162 for a detailed description.
2	2	SMF49SEG	2	binary	Segment descriptor (see record length field).
4	4	SMF49FLG	1	binary	System indicator: **Bit** **Meaning when set** **0-2** Reserved **3-6** Version indicators* **7** Reserved. *See “Standard and Extended SMF record headers” on page 162 for a detailed description.

Offsets		Name	Length	Format	Description
5	5	SMF49RTY	1	binary	Record type 49 (X'31').
6	6	SMF49TME	4	binary	Time since midnight, in hundredths of a second, that the record was moved into the SMF buffer.
10	A	SMF49DTE	4	packed	Date when the record was moved into the SMF buffer, in the form 0*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for a detailed description.
14	E	SMF49SID	4	EBCDIC	System identification (from the SID parameter).
18	12	SMF49SBS	2	binary	Subsystem identification — X'0005' signifies JES3.
20	14	SMF49RSV	2		Reserved.
22	16	SMF49LRR	2	binary	Length of rest of record, excluding this field.
24	18	SMF49EVT	2	binary	Record indicator **Value** **Meaning** **1** Terminal not defined (BSC) **2** Security failure (BSC) **4** Line already signed on (BSC) **8** Terminal already signed on (BSC) **5** Session limit exceeded (SNA) **6** Work station undefined (SNA) **7** Security failure (SNA) **8** Bind failure (SNA).
Identification Section:					
26	1A	SMF49LN1	2	binary	Length of identification section, including this field.
28	1C	SMF49RMT	8	EBCDIC	Remote name as defined in JESPARMS. (This field is filled in only if a remote terminal is connected to this line.)
36	24	SMF49LIN	8	EBCDIC	Line name as defined in JESPARMS.
44	2C	SMF49PSW	8	EBCDIC	Incorrect password.
Message Section: The following fields apply only to BSC.					
52	34	SMF49LN2	2	binary	Length of message section, including this field.
54	36	SMF49MSG	36	EBCDIC	Message text. This field includes columns 35-70 of the SIGNON card image.

Record type 50 (X'32') — VTAM Tuning Statistics

VTAM writes type 50 records to collect statistics about tuning when a user-specified time interval expires. For more information about tuning statistics, see *z/OS Communications Server: SNA Network Implementation Guide*.

Record type 52 (X'34') — JES2 LOGON/Start Line (SNA only)

Record type 52 is written when:

- A $S LNE*n* command (to start a line) is issued

- A $E LNE*n* command (to restart a line) is issued, and
- When a remote user signs on.

This record contains a record indicator, remote name, line name, password, and message text.

Record mapping

Header/Self-defining Section

This section contains the common SMF record headers fields and the triplet fields (offset/length/number), if applicable, that locate the other sections on the record.

Offsets		Name	Length	Format	Description
0	0	SMF52LEN	2	binary	Record length. This field and the next field (total of four bytes) form the RDW (record descriptor word). See "Standard and Extended SMF record headers" on page 162 for a detailed description.
2	2	SMF52SEG	2	binary	Segment descriptor (see record length field).
4	4	SMF52FLG	1	binary	System indicator: **Bit** **Meaning when set** **0-2** Reserved **3-6** Version indicators* **7** Reserved. *See "Standard and Extended SMF record headers" on page 162 for a detailed description.
5	5	SMF52RTY	1	binary	Record type 52 (X'34').
6	6	SMF52TME	4	binary	Time since midnight, in hundredths of a second, that the record was moved into the SMF buffer.
10	A	SMF52DTE	4	packed	Date when the record was moved into the SMF buffer, in the form 0*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for a detailed description.
14	E	SMF52SID	4	EBCDIC	System identification (from the SID parameter).
18	12	SMF52POF	2	binary	Offset to product section from start of record, including record descriptor word (RDW).
20	14	SMF52PRL	2	binary	Length of product section.
22	16	SMF52PRN	2	binary	Number of product section.
24	18	SMF52IDO	2	binary	Offset to identification section from start of record, including record descriptor word (RDW).
26	1A	SMF52IDL	2	binary	Length of identification section.
28	1C	SMF52IDN	2	binary	Number of identification section.
Product Section:					
30	1E	SMF52SUB	2	binary	Subtype ID 1 = Record written for LOGON 2 = Record written for $S LNE*n*.
32	20	SMF52VER	2	EBCDIC	Record version number.
34	22	SMF52SYS	4	EBCDIC	Subsystem name, 'JES2' when JES2 creates the record, 'PPCC' when PSF creates the record.
Identification Section:					

Offsets		Name	Length	Format	Description
38	26	SMF52RMT	8	EBCDIC	Remote name as defined in JESPARMS (only for Subtype ID = 1).
46	2E	SMF52LIN	8	EBCDIC	Line name as defined in JESPARMS.
54	36	SMF52PSW	8	EBCDIC	Line password as defined in JESPARMS.

Record type 53 (X'35') — JES2 LOGOFF/Stop Line (SNA only)

Record type 53 is written when:

- A $P LNE*n* command (to stop a line) is issued
- A $E LNE*n* command (to restart a line) is issued
- When a remote user signs off.

This record contains:

- A record indicator
- A remote name
- A line name
- A password
- A line adapter address
- The number of execute channel programs (EXCP)
- Negative acknowledgements to write text
- Data checks to read text
- Time outs to read text.

Record mapping

Header/Self-defining Section

This section contains the common SMF record headers fields and the triplet fields (offset/length/number), if applicable, that locate the other sections on the record.

Offsets		Name	Length	Format	Description
0	0	SMF53LEN	2	binary	Record length. This field and the next field (total of four bytes) form the RDW (record descriptor word). See "Standard and Extended SMF record headers" on page 162 for a detailed description.
2	2	SMF53SEG	2	binary	Segment descriptor (see record length field).
4	4	SMF53FLG	1	binary	System indicator: **Bit** **Meaning when set** **0-2** Reserved **3-6** Version indicators* **7** Reserved. *See "Standard and Extended SMF record headers" on page 162 for a detailed description.
5	5	SMF53RTY	1	binary	Record type 53 (X'35').

Offsets		Name	Length	Format	Description
6	6	SMF53TME	4	binary	Time since midnight, in hundredths of a second, that the record was moved into the SMF buffer.
10	A	SMF53DTE	4	packed	Date when the record was moved into the SMF buffer, in the form 0*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for a detailed description.
14	E	SMF53SID	4	EBCDIC	System identification (from the SID parameter).
18	12	SMF53PRD	2	binary	Offset to product section from start of record, including record descriptor word (RDW).
20	14	SMF53PRL	2	binary	Length of product section.
22	16	SMF53PRN	2	binary	Number of product section.
24	18	SMF53IDO	2	binary	Offset to identification section from start of record, including record descriptor word (RDW).
26	1A	SMF53IDL	2	binary	Length of identification section.
28	1C	SMF53IDN	2	binary	Number of identification section.
Product Section:					
30	1E	SMF53SUB	2	binary	Subtype ID 1 = Record written for LOGOFF 2 = Record written for $P LNE*n*.
32	20	SMF53VER	2	EBCDIC	Record version number.
34	22	SMF53SYS	4	EBCDIC	Subsystem name, 'JES2'.
Identification Section:					
38	26	SMF53RMT	8	EBCDIC	Remote name as defined in JESPARMS.
46	2E	SMF53LIN	8	EBCDIC	Line name as defined in JESPARMS.
54	36	SMF53PSW	8	EBCDIC	Line password as defined in JESPARMS.
62	3E	SMF53CTR	4	binary	Number of VTAM requests processed.
66	42	SMF53CTR +4	4	binary	Number of exception responses.
70	46	SMF53CTR +8	4	binary	Number of LUSTATs received.
74	4A	SMF53CTR +12	4	binary	Number of bid rejects.
78	4E	SMF53CTR +16	4	binary	Number of temporary errors.
82	52	SMF53ADP	3	EBCDIC	Line identifier, 'SNA'.

Record type 54 (X'36') — JES2 Integrity (SNA only)

Record type 54 is written when a SNA remote user attempts to sign on with an incorrect password. It contains a record indicator, remote name, line name, invalid password, and message text.

Record mapping

Header/Self-defining Section

This section contains the common SMF record headers fields and the triplet fields (offset/length/number), if applicable, that locate the other sections on the record.

Offsets		Name	Length	Format	Description
0	0	SMF54LEN	2	binary	Record length. This field and the next field (total of four bytes) form the RDW (record descriptor word). See "Standard and Extended SMF record headers" on page 162 for a detailed description.

Offsets		Name	Length	Format	Description
2	2	SMF54SEG	2	binary	Segment descriptor (see record length field).
4	4	SMF54FLG	1	binary	System indicator: **Bit** **Meaning when set** **0-2** Reserved **3-6** Version indicators* **7** Reserved. *See "Standard and Extended SMF record headers" on page 162 for a detailed description.
5	5	SMF54RTY	1	binary	Record type 54 (X'36').
6	6	SMF54TME	4	binary	Time since midnight, in hundredths of a second, that the record was moved into the SMF buffer.
10	A	SMF54DTE	4	packed	Date when the record was moved into the SMF buffer, in the form 0*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for a detailed description.
14	E	SMF54SID	4	EBCDIC	System identification (from the SID parameter).
18	12	SMF54POF	2	binary	Offset to product section from start of record, including record descriptor word (RDW).
20	14	SMF54PRL	2	binary	Length of product section.
22	16	SMF54PRN	2	binary	Number of product section.
24	18	SMF54IDO	2	binary	Offset to identification section from start of record, including record descriptor word (RDW).
26	1A	SMF54IDL	2	binary	Length of identification section.
28	1C	SMF54IDN	2	binary	Number of identification section.
Product Section:					
30	1E	SMF54SUB	2	binary	Subtype ID 1 = Record written for LOGON.
32	20	SMF54VER	2	EBCDIC	Record version number.
34	22	SMF54SYS	4	EBCDIC	Subsystem name, 'JES2'.
Identification Section:					
38	26	SMF54RMT	8	EBCDIC	Remote name as defined in JESPARMS.
46	2E	SMF54RPW	8	EBCDIC	Remote password as defined in JESPARMS.
54	36	SMF54PSW	8	EBCDIC	Line password as defined in JESPARMS.

Record type 55 (X'37') — JES2 Network SIGNON

Record type 55 is written at each node when a start networking command is processed. The initial SIGNON is recorded at the node to which the SIGNON was sent; the response SIGNON is recorded at the node that originated the initial SIGNON.

Record mapping

Header/self-defining section

This section contains the common SMF record headers fields and the triplet fields (offset/length/number), if applicable, that locate the other sections on the record.

Offsets		Name	Length	Format	Description
0	0	SMF55LEN	2	binary	Record length. This field and the next field (total of four bytes) form the RDW (record descriptor word). See "Standard and Extended SMF record headers" on page 162 for a detailed description.
2	2	SMF55SEG	2	binary	Segment descriptor (see record length field).
4	4	SMF55FLG	1	binary	System indicator: **Bit** **Meaning when set** **0-2** Reserved **3-6** Version indicators* **7** Reserved. *See "Standard and Extended SMF record headers" on page 162 for a detailed description.
5	5	SMF55RTY	1	binary	Record type 55 (X'37').
6	6	SMF55TME	4	binary	Time since midnight, in hundredths of a second, that the record was moved into the SMF buffer.
10	A	SMF55DTE	4	packed	Date when the record was moved into the SMF buffer, in the form 0*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for a detailed description.
14	E	SMF55SID	4	EBCDIC	System identification (from the SID parameter).
18	12	SMF55SBS	2	binary	Subsystem identification — X'0002' signifies JES2.
20	14	SMF55SUB	2	binary	Record subtype.
22	16	SMF55LRR	2	binary	Length of rest of record, not including this field.
24	18	SMF55NNM	8	EBCDIC	Node name.
32	20	SMF55MEM	1	binary	Member number.
33	21	SMF55FG1	1	binary	Sign-on status flags. **Bit** **Meaning when set** **0** Response sign-on (off = initial sign-on) **1** Reset/concur sign-on **2** Secure sign-on protocol (Line password and node password are not set with this protocol.) **3-7** Reserved.
34	22	SMF55LPW	8	EBCDIC	Line password as defined in JESPARMS.
42	2A	SMF55NPW	8	EBCDIC	Node password as defined in JESPARMS.
50	32	SMF55LNM	8	EBCDIC	Line name as defined in JESPARMS.

Record type 56 (X'38') — JES2 Network Integrity

Record type 56 is written whenever an attempt to SIGNON contains an incorrect line or node password.

Record mapping

Header/self-defining section

This section contains the common SMF record headers fields and the triplet fields (offset/length/number), if applicable, that locate the other sections on the record.

Offsets		Name	Length	Format	Description
0	0	SMF56LEN	2	binary	Record length. This field and the next field (total of four bytes) form the RDW (record descriptor word). See "Standard and Extended SMF record headers" on page 162 for a detailed description.
2	2	SMF56SEG	2	binary	Segment descriptor (see record length field).
4	4	SMF56FLG	1	binary	System indicator: **Bit** **Meaning when set** **0-2** Reserved **3-6** Version indicators* **7** Reserved. *See "Standard and Extended SMF record headers" on page 162 for a detailed description.
5	5	SMF56RTY	1	binary	Record type 56 (X'38').
6	6	SMF56TME	4	binary	Time since midnight, in hundredths of a second, that the record was moved into the SMF buffer.
10	A	SMF56DTE	4	packed	The date when the record was moved into the SMF buffer, in the form 0*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for a detailed description.
14	E	SMF56SID	4	EBCDIC	System identification (from the SID parameter).
18	12	SMF56SBS	2	binary	Subsystem identification — X'0002' signifies JES2.
20	14	SMF56SUB	2	binary	Record subtype.
22	16	SMF56LRR	2	binary	Length of rest of record, not including this field.
24	18	SMF56NNM	8	EBCDIC	Node name.
32	20	SMF56MEM	1	binary	Member number.
33	21	SMF56FG1	1	binary	Sign-on status flags. **Bit** **Meaning when set** **0** Response sign-on (off = initial sign-on) **1** Reset/concur sign-on **2** Secure sign-on protocol (Line password and node password are not set with this protocol.) **3-7** Reserved.
34	22	SMF56LPW	8	EBCDIC	Line password.

Offsets		Name	Length	Format	Description
42	2A	SMF56NPW	8	EBCDIC	Node password.
50	32	SMF56LNM	8	EBCDIC	Line name.

Record type 57 (X'39') — JES2 Network SYSOUT Transmission

Record type 57 is written to record JES2 SYSOUT transmission information. This record contains original and current job identifiers, transmitter start and stop times, and a count of the records transmitted.

Record mapping

Header/Self-defining Section

This section contains the common SMF record headers fields and the triplet fields (offset/length/number), if applicable, that locate the other sections on the record.

Offsets		Name	Length	Format	Description
0	0	SMF57LEN	2	binary	Record length. This field and the next field (total of four bytes) form the RDW (record descriptor word). See "Standard and Extended SMF record headers" on page 162 for a detailed description.
2	2	SMF57SEG	2	binary	Segment descriptor (see record length field).
4	4	SMF57FLG	1	binary	System indicator: **Bit** **Meaning when set** **0-2** Reserved **3-6** Version indicators (See "Standard and Extended SMF record headers" on page 162 for a detailed description.) **7** Reserved.
5	5	SMF57RTY	1	binary	Record type 57 (X'39').
6	6	SMF57TME	4	binary	Time since midnight, in hundredths of a second, that the record was moved into the SMF buffer.
10	A	SMF57DTE	4	packed	Date when the record was moved into the SMF buffer, in the form 0*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for a detailed description.
14	E	SMF57SID	4	EBCDIC	System identifier (from the SID parameter).
18	12	SMF57SBS	2	binary	Subsystem identifier — X'0002' signifies JES2.
20	14	SMF57SUB	2	binary	Record subtype.
22	16	SMF57LRR	2	binary	Length of rest of record, not including this field.
24	18	SMF57JID	8	EBCDIC	Original job identification.
32	20	SMF57CJD	8	EBCDIC	Current job identification.
40	28	SMF57ONN	8	EBCDIC	Original node name.
48	30	SMF57ENN	8	EBCDIC	Processing node name.
56	38	SMF57NNN	8	EBCDIC	Next node name.
64	40	SMF57DVN	8	EBCDIC	SYSOUT transmitter device name.
72	48	SMF57TSS	4	binary	SYSOUT transmitter start time.
76	4C	SMF57DSS	4	packed	SYSOUT transmitter start date.

Offsets		Name	Length	Format	Description
80	50	SMF57TPS	4	binary	SYSOUT transmitter stop time.
84	54	SMF57DPS	4	packed	SYSOUT transmitter stop date.
88	58	SMF57ACN	8	EBCDIC	Network account number.
96	60	SMF57TSI	4	EBCDIC	SYSOUT transmitter system identification.
100	64	SMF57CNT	4	binary	Count of logical TP records.
104	68	SMF57NTR	2	binary	Number of triplets in record. A triplet is a set of offset/length/ number values that defines a section of the record.
106	6A		2		Reserved.
108	6C	SMF57OSW	4	binary	Offset to Enhanced SYSOUT Support (ESS) section.
112	70	SMF57LSW	4	binary	Length of Enhanced SYSOUT Support (ESS) section.
116	74	SMF57NSW	4	binary	Number of Enhanced SYSOUT Support (ESS) sections.

Enhanced SYSOUT Support (ESS) Section

This section contains the output descriptor (if any) for first offloaded data set in this record.

Offsets		Name	Length	Format	Description
0	0	SMF57LN5	2	binary	Length of ESS section (including this field).
2	2	SMF57SGT	4	binary	Segment identifier.
6	6	SMF57IND	1	binary	Section indicator **Bit** **Meaning when set** **0** Error obtaining scheduler JCL facility (SJF) information. Scheduler work block text unit (SWBTU) data area is not present. **1-7** Reserved.
7	7		1		Reserved.
8	8	SMF57JDT	8	EBCDIC	JCL definition table (JDT) name in JCL definition vector table (JDTV).
16	10	SMF57TUL	2	binary	Text unit (SWBTU) data area length.
18	12	SMF57TU	VAR	binary	Text unit (SWBTU) data area. The data area can be processed using the SWBTUREQ macro.

Record type 57 (X'39') — JES3 Networking Transmission

Record type 57 is written whenever JES3 completes a network transmission and the connection to the next node is BSC. When the connection is SNA, JES3 does not write the record; BDT writes record type 59 instead. Record type 57 contains original and current job identifiers, accounting information, transmission path, and destination.

Macro to Symbolically Address JES3 Record Type 57: The SMF record mapping macro for JES3 record type 57 is **IATYNSM**.

Record environment

The following conditions exist for the generation of this record:

Macro
SMFEWTM, BRANCH=NO (record exit: IEFU83)

Storage Residency
31-bit

Record mapping

Header/Self-defining Section

This section contains the common SMF record headers fields and the triplet fields (offset/length/number), if applicable, that locate the other sections on the record.

Offsets		Name	Length	Format	Description
0	0	SMFNJLEN	2	binary	Record length. This field and the next field (total of four bytes) form the RDW (record descriptor word). See "Standard and Extended SMF record headers" on page 162 for a detailed description.
2	2	SMFNJDES	2	binary	Segment descriptor (see record length field).
4	4	SMFNJFLG	1	binary	System indicator: **Bit** **Meaning when set** **0-2** Reserved **3-6** Version indicators (See "Standard and Extended SMF record headers" on page 162 for a detailed description.) **7** Reserved.
5	5	SMFNJRTY	1	binary	Record type 57 (X'39').
6	6	SMFNJTME	4	binary	Time since midnight, in hundredths of a second, that the record was moved into the SMF buffer.
10	A	SMFNJDTE	4	packed	Date when the record was moved into the SMF buffer, in the form 0*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for a detailed description.
14	E	SMFSYSID	4	EBCDIC	System identifier (from the SID parameter).
18	12	SMFSUBID	2	binary	Subsystem identifier — X'0005' signifies JES3.
20	14		2		Reserved.
22	16	SMFNJLRR	2	binary	Length of the record following this field.
24	18	SMFNJETM	4	binary	Transmission start time, in hundredths of a second.
28	1C	SMFNJEDT	4	packed	Transmission start date, in packed decimal form.
32	20	SMFNJIND	2	EBCDIC	Job type indicator • JB — indicates data is a job stream • OP — indicates data is a SYSOUT data stream.
34	22	SMFNJNAM	8	EBCDIC	Job name, or transaction name (for APPC output).
42	2A	SMFNJNUM	4	EBCDIC	Current JES3-assigned job number if less than 10,000. If the job number is equal to or greater than 10,000, this field contains character zeroes, and the job number appears in SMFNJJID.
46	2E	SMFNJONM	4	binary	Original job number (from submitting node), or transaction ID (for APPC output).
50	32	SMFNJPGM	20	EBCDIC	Programmer name.
70	46	SMFNJUSR	8	EBCDIC	Origin or notify user identifier.
78	4E	SMFNJACT	8	EBCDIC	Networking account number.
86	56	SMFNJDPT	8	EBCDIC	Department number.

Offsets		Name	Length	Format	Description
94	5E	SMFNJBLD	8	EBCDIC	Building number.
102	66	SMFNJLOC	8	EBCDIC	Location number.
110	6E	SMFNJORG	8	EBCDIC	Job origin.
118	76	SMFNJRMT	8	EBCDIC	Secondary job origin.
126	7E	SMFNJXEQ	8	EBCDIC	Processing node name.
134	86	SMFNJEXU	8	EBCDIC	Processing user identifier, or user associated with the transaction (for APPC output).
142	8E	SMFNJDST	8	EBCDIC	Destination node name.
150	96	SMFNJPTH	8	EBCDIC	Transmission path node name.
158	9E	SMFNJRCT	4	binary	Record count.
162	A2	SMFNJCNT	4	binary	Compressed byte count.
166	A6	SMFNJTRN	4	binary	Transmission buffer count.
170	AA	SMFNJJID	8	EBCDIC	JES3-assigned job number in JOB*xxxxx* format.

Record type 58 (X'3A') — JES2 Network SIGNOFF

Record type 58 is written at each node when a networking session is terminated. The record contains the node name, member number, and line name.

Record mapping

Header/Self-defining Section

This section contains the common SMF record headers fields and the triplet fields (offset/length/number), if applicable, that locate the other sections on the record.

Offsets		Name	Length	Format	Description
0	0	SMF58LEN	2	binary	Record length. This field and the next field (total of four bytes) form the RDW (record descriptor word). See "Standard and Extended SMF record headers" on page 162 for a detailed description.
2	2	SMF58SEG	2	binary	Segment descriptor (see record length field).
4	4	SMF58FLG	1	binary	System indicator: **Bit** **Meaning when set** **0-2** Reserved **3-6** Version indicators* **7** Reserved. *See "Standard and Extended SMF record headers" on page 162 for a detailed description.
5	5	SMF58RTY	1	binary	Record type 58 (X'3A').
6	6	SMF58TME	4	binary	Time since midnight, in hundredths of a second, that the record was moved into the SMF buffer.
10	A	SMF58DTE	4	packed	Date when the record was moved into the SMF buffer, in the form 0*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for a detailed description.
14	E	SMF58SID	4	EBCDIC	System identification (from the SID parameter).

Offsets		Name	Length	Format	Description
18	12	SMF58SBS	2	binary	Subsystem identification — X'0002' signifies JES2.
20	14	SMF58SUB	2	binary	Record subtype.
22	16	SMF58LRR	2	binary	Length of rest of record, not including this field.
24	18	SMF58NNM	8	EBCDIC	Node name.
32	20	SMF58MEM	1	binary	Member number.
33	21	SMF58RVI	1		Reserved.
34	22	SMF58LNM	8	EBCDIC	Line name.

Record type 59 (X'3B') — MVS/BDT File-to-File Transmission

Record type 59 is written when MVS/Bulk Data Transfer (MVS/BDT) completes a file-to-file transmission, and the connection to the next node is SNA. When the connection is BSC, BDT does not write the record; JES3 writes record type 57 instead. MVS/BDT writes record type 59 from the global node where the transaction is queued; it produces a record whether the transmission successfully completes.

The record contains sections for:

- MVS/BDT product information
- Transaction identification
- File-to-file (FTF) information (transaction type section)
- Network information (transaction type section)
- Transaction data information (optional)
- Transaction accounting information (optional)
- Transmission information.

There are two 40-byte fields for user information at SMF59US1 (transaction data section) and SMF59US2 (transmission data section).

Macro to Symbolically Address JES3 Record Type 59: IFASMFR uses BDTDSMF, and MVS/BDT macro instructions to generate the mapping. If you want the record type 59 mapping, make sure that both IFASMFR and BDTDSMF reside on the same macro library. BDTDSMF is written in assembler language and is supplied on SYS1.AMODGEN.

MVS/BDT invokes the optional installation exit BDTUX24 before writing the record.

Record environment

The following conditions exist for the generation of this record:

Macro
SMFEWTM, BRANCH=NO (record exit: IEFU84)

Mode
Task

Storage Residency
24-bit

Record mapping

Header/Self-defining Section

This section contains the common SMF record headers fields and the triplet fields (offset/length/number), if applicable, that locate the other sections on the record.

Offsets		Name	Length	Format	Description
0	0	SMF59LEN	2	binary	Record length. This field and the next field (total of four bytes) form the RDW (record descriptor word). See "Standard and Extended SMF record headers" on page 162 for a detailed description.
2	2	SMF59SEG	2	binary	Segment descriptor (see record length field).
4	4	SMF59FLG	1	binary	System indicator: **Bit** **Meaning when set** **0-2** Reserved **3-6** Version indicators* **7** Reserved. *See "Standard and Extended SMF record headers" on page 162 for a detailed description.
5	5	SMF59RTY	1	binary	Record type 59 (X'3B').
6	6	SMF59TME	4	binary	Time since midnight, in hundredths of a second, that the record was moved into the SMF buffer.
10	A	SMF59DTE	4	packed	Date when the record was moved into the SMF buffer, in the form 0*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for a detailed description.
14	E	SMF59SID	4	EBCDIC	System identification (from the SID parameter).
18	12	SMF59SSI	4	EBCDIC	Subsystem identification ('BDT').
22	16	SMF59VER	2	EBCDIC	Version number.
24	18	SMF59OPD	4	binary	Offset to MVS/BDT product section.
28	1C	SMF59LPD	2	binary	Length of MVS/BDT product section.
30	1E	SMF59NPD	2	binary	Number of MVS/BDT product sections.
32	20	SMF59OTI	4	binary	Offset to transaction identifier section.
36	24	SMF59LTI	2	binary	Length of transaction identifier section.
38	26	SMF59NTI	2	binary	Number of transaction identifier sections.
40	28	SMF59OTT	4	binary	Offset to transaction type section.
44	2C	SMF59LTT	2	binary	Length of transaction type section.
46	2E	SMF59NTT	2	binary	Number of transaction type sections.
48	30	SMF59OTD	4	binary	Offset to transaction data section.
52	34	SMF59LTD	2	binary	Length of transaction data section.
54	36	SMF59NTD	2	binary	Number of transaction data sections.
56	38	SMF59OTS	4	binary	Offset to transmission section.
60	3C	SMF59LTS	2	binary	Length of transmission section.
62	3E	SMF59NTS	2	binary	Number of transmission sections.
64	40	SMF59OTA	4	binary	Offset to transaction accounting section (an optional section).
68	44	SMF59LTA	2	binary	Length of transaction accounting section (if present).
70	46	SMF59NTA	2	binary	Number of transaction accounting sections (if any).

MVS/BDT Product Section

Offsets		Name	Length	Format	Description
0	0	SMF59RCD	2	EBCDIC	MVS/BDT version number.
2	2	SMF59BDT	8	EBCDIC	Product name ‘MVS-BDT’.
10	A	SMF59SSN	8	EBCDIC	MVS/BDT node name.
18	12	SMF59TID	2	EBCDIC	Transaction type identifier — “FF” for FTF, “NJ” for NJE.

Transaction Identifier Section

Offsets		Name	Length	Format	Description
0	0	SMF59TNU	4	EBCDIC	MVS/BDT job number.
4	4	SMF59TI1	8		Reserved.
12	C	SMF59T12	8		Reserved.
20	14	SMF59TQS	8	EBCDIC	MVS/BDT transaction queuing node.
28	1C	SMF59T13	8		Reserved.
36	24	SMF59TSP	8	EBCDIC	Transaction source processor name.
44	2C	SMF59TSS	8	EBCDIC	MVS/BDT transaction source node.
52	34	SMF59TUT	2	EBCDIC	Transaction source user ID type: **J3** JES3 (for NJE) **T** TSO/E user **J** JES console **B** Batch job **M** MCS console.
54	36	SMF59T15	2		Reserved.
56	38	SMF59TSU	8	EBCDIC	Transaction source user ID: **NJE** Blank **TSO/E** Userid **JES** Console DD name **Batch** Job name **MCS** Console identified.

Transaction Type Section for FTF

Offsets		Name	Length	Format	Description
0	0	SMF59ONN	8	EBCDIC	MVS/BDT origin node name.
8	8	SMF59OFN	44	EBCDIC	Origin file name if specified in transaction.
52	34	SMF59OMN	8	EBCDIC	PDS member name of origin file if specified in SEQ transaction.
60	3C	SMF59OVI	6	EBCDIC	First volume serial number for origin file if specified in transaction.

Offsets		Name	Length	Format	Description
66	42	SMF59OFG	1	EBCDIC	Origin file flag: ‘D’ — DUMMY specified.
67	43	SMF59TTI	3		Reserved.
70	46	SMF59DNN	8	EBCDIC	MVS/BDT destination node name.
78	48	SMF59DFN	44	EBCDIC	Destination file name if specified in transaction.
122	7A	SMF59DMN	8	EBCDIC	PDS member name of destination file is specified in SEQ transaction.
130	82	SMF59DVI	6	EBCDIC	First volume serial number for destination file is specified in transaction.
136	88	SMF59DFG	1	EBCDIC	Destination file flag: ‘D’ — DUMMY specified, ‘I’ — INTRDR specified.
137	89	SMF59TT2	3		Reserved.

Transaction Type Section for NJE

Offsets		Name	Length	Format	Description
0	0	SMF59NJT	2	EBCDIC	Job type **JB** data is a job stream **OP** data is a complete SYSOUT.
2	2	SMF59NUM	2	binary	Original job number (NJHGJID).
4	4	SMF59NR1	2	binary	Reserved.
6	6	SMF59NAN	8	EBCDIC	Network account number.
14	E	SMF59NAM	8	EBCDIC	Original job name (NJHGJNAM).
22	16	SMF59JID	8	EBCDIC	JES3 job ID.
30	1E	SMF59NUI	8	EBCDIC	Notify user ID (NJHGUSID).
38	26	SMF59NDT	8	binary	Job entry date/time stamp on origin node (NJHGETS).
46	2E	SMF59XQN	8	EBCDIC	Processing node name (NJHGEXQN).
54	36	SMF59XQU	8	EBCDIC	Processing user ID (NJHGUSID).
62	3E	SMF59NPN	20	EBCDIC	Programmer's name (NJHGPRGN).
82	52	SMF59NPR	8	EBCDIC	Programmer's room number (NJHGDEPT).
90	5A	SMF59NP#	8	EBCDIC	Programmer's department number (NJHGDEPT).
98	62	SMF59NPB	8	EBCDIC	Programmer's building number (NJHFBLDG).
106	6A	SMF59NR2	8		Reserved.
114	72	SMF59NR3	8		Reserved.
122	7A	SMF59NR4	8		Reserved.
130	82	SMF59NR5	10		Reserved.

Transaction Data Section

Offsets		Name	Length	Format	Description
0	0	SMF59TTQ	4	binary	Time since midnight, in hundredths of a second, that the transaction was queued (GMT).
4	4	SMF59DTQ	4	packed	Date when the transaction was queued, in the form 0*cyydddF*. See “Standard and Extended SMF record headers” on page 162 for a detailed description.

Offsets		Name	Length	Format	Description
8	8	SMF59TTC	4	binary	Time since midnight, in hundredths of a second, that the transaction was completed (GMT).
12	C	SMF59DTC	4	packed	Date when the transaction was completed, in the form 0*cyydddF*. See “Standard and Extended SMF record headers” on page 162 for a detailed description.
16	10	SMF59BJN	8	EBCDIC	MVS/BDT job name.
24	18	SMF59PNM	20	EBCDIC	Programmer name.
44	2C	SMF59TPR	2	EBCDIC	Transaction priority.
46	2E	SMF59TCM	2	EBCDIC	Transaction completion code **‘00’** normal **‘04’** operator cancelled **‘08’** abnormal.
48	30	SMF59BTC	8	EBCDIC	MVS/BDT transaction code X'51' — NJE transaction Q — self-defining transaction GMJD member name.
56	38	SMF59TD1	4		Reserved.
60	3C	SMF59BCT	8	binary	Number of bytes transferred.
68	44	SMF59US1	40	EBCDIC	User area (initialized with blanks).

Transmission Section

Offsets		Name	Length	Format	Description
0	0	SMF59X01	8		Reserved.
8	8	SMF59X02	8		Reserved.
16	10	SMF59SNN	8	EBCDIC	MVS/BDT sender node.
24	18	SMF59X03	8		Reserved.
32	20	SMF59X04	8		Reserved.
40	28	SMF59X05	8		Reserved.
48	30	SMF59RCN	8	EBCDIC	MVS/BDT receiver node.
56	38	SMF59X06	8		Reserved.
64	40	SMF59XST	4	binary	Time since midnight, in hundredths of a second, that the transmission started (GMT).
68	44	SMF59XSD	4	packed	Date when the transmission started, in the form 0*cyydddF*. See “Standard and Extended SMF record headers” on page 162 for a detailed description.
72	48	SMF59XPT	4	binary	Time since midnight, in hundredths of a second, that the transmission stopped (GMT).
76	4C	SMF59XPD	4	packed	Date when the transmission stopped, in the form 0*cyydddF*. See “Standard and Extended SMF record headers” on page 162 for a detailed description.
80	50	SMF59X08	8		Reserved.
88	58	SMF59X09	4		Reserved.
92	5C	SMF59XOC	5	EBCDIC	Transmission origin completion code.
97	61	SMF59XDC	5	EBCDIC	Transmission destination completion code.
102	66	SMF59X10	2		Reserved.

Offsets		Name	Length	Format	Description
104	68	SMF59US2	40	EBCDIC	User area (initialized with blanks).

Transaction Accounting Section

This section is optional.

Offsets		Name	Length	Format	Description
0	0	SMF59ACT	variable	EBCDIC	User accounting data from ACCT parameter.

Record type 60 (X'3C') — VSAM volume data set updated

Note: Field SMF60CRC is ***not*** part of the programming interface.

Record type 60 is written when a VSAM Volume Record (VVR) or a Non-VSAM Volume Record (NVR) is inserted, updated, or deleted from a VSAM Volume Data Set (VVDS); for example, when a VSAM cluster is defined, closed, or deleted. One type 60 record is written for each VVR or NVR written or deleted.

Record type 60 identifies the VVDS in which the VVR or NVR is written or deleted and gives the new, updated, or deleted VVR or NVR. It identifies the job by job log and user identifiers.

If SMFVER = 2, an 8-byte field is at the end of the VVR/NVR record, which contains the time (recorded in microseconds) needed to complete the VVDS request (ADD, DELETE, or INSERT). This field only exists for an SMF type 60 record.

Macro to Symbolically Address Record Type 60: The SMF record mapping macro for record types 36, 60, 61, 65, and 66 is IFASMFI6. The syntax is as follows:

IFASMFI6 *nn*

nn
: identifies the type of the record you want to map. The mapping macro resides in SYS1.MACLIB.

Record mapping

Header/Self-defining Section

This section contains the common SMF record headers fields and the triplet fields (offset/length/number), if applicable, that locate the other sections on the record.

Offsets		Name	Length	Format	Description
0	0	SMF60LEN	2	binary	Record length. This field and the next field (total of four bytes) form the RDW (record descriptor word). See "Standard and Extended SMF record headers" on page 162 for a detailed description.
2	2	SMF60SEG	2	binary	Segment descriptor (see record length field).
4	4	SMF60SYS	1	binary	System indicator: **Bit** **Meaning when set** **0-2** Reserved **3-6** Version indicators (See "Standard and Extended SMF record headers" on page 162 for a detailed description.) **7** Reserved.
5	5	SMF60RTY	1	binary	Record type 60 (X'3C').

Offsets		Name	Length	Format	Description
6	6	SMF60TME	4	binary	Time since midnight, in hundredths of a second, that the record was moved into the SMF buffer.
10	A	SMF60DTE	4	packed	Date when the record was moved into the SMF buffer, in the form 0*cyydddF*. See “Standard and Extended SMF record headers” on page 162 for a detailed description.
14	E	SMF60CPU	4	EBCDIC	System identification (from the SID parameter).
18	12	SMF60SBS	4		Reserved.
22	16	SMF60SUB	2	EBCDIC	Indicates that the VVR is updated, deleted, or inserted in the VVDS: **Contents** **Meaning** **UP** Updated **DE** Deleted **IN** Inserted
24	18	SMF60POF	4	binary	Offset of product section from start of record, including the record descriptor word (RDW).
28	1C	SMF60PLN	2	binary	Length of product section.
30	1E	SMF60PNO	2	binary	Number of product sections.
32	20	SMF60DOF	4	binary	Offset of data section from start of record, including the record descriptor word (RDW).
36	24	SMF60DLN	2	binary	Length of data section.
38	26	SMF60DNO	2	binary	Number of data sections.
Product and data section:					
40	28	SMF60VER	2	EBCDIC	Version of the type 60 records.
42	2A	SMF60PNM	8	EBCDIC	Catalog management product identifier.
50	32	SMF60JNM	8	EBCDIC	Job name. The job log identification consists of the job name, time, and date that the reader recognized the JOB card (for this job).
58	3A	SMF60RST	4	binary	Time since midnight, in hundredths of a second, that the reader recognized the JOB card (for this job).
62	3E	SMF60RDT	4	packed	Date when the reader recognized the JOB card for this job, in the form 0*cyydddF*. See “Standard and Extended SMF record headers” on page 162 for a detailed description.
66	42	SMF60UID	8	EBCDIC	User-defined identification field (taken from common exit parameter area, not from USER=parameter on job statement).
74	4A	SMF60FNC	1		Reserved.
75	4B	SMF60CNM	44	EBCDIC	Name of VSAM volume data set (VVDS) in which entry is made.

Offsets		Name	Length	Format	Description
119	77	SMF60TYP	1	EBCDIC	Entry type identifier. **Value** **Meaning** **C'A'** NonVSAM data set **C'B'** Generation data group (GDG) base **C'C'** Cluster **C'D'** Data set **C'E'** VSAM extension record **C'F'** Free space **C'G'** Alternate index **C'H'** Active generation data set (GDS) entry in GDG base **C'I'** Index **C'J'** CDG extension record **C'K'** VSAM volume record (VVR) **C'L'** Library control system library record **C'M'** Master catalog **C'N'** NonVSAM record header **C'O'** Object Access Method (OAM) nonVSAM record **C'P'** Page space **C'Q'** VVR header (secondary) **C'R'** Path **C'T'** True name record **C'U'** User catalog **C'V'** Volume **C'W'** Library control system volume **C'X'** Alias record **C'Y'** Upgrade **C'Z'** VVR header (primary) **X'00'** Normal nonVsam record **X'01'** JES3 record.

Offsets		Name	Length	Format	Description
120	78	SMF60ENM	44	EBCDIC	Entry name.
164	A4	SMF60NNM	44		Reserved.
208	D0	SMF60CRC	*variable*	binary	VVR or NVR (the length of the VVR or NVR is contained in the first two bytes of this field). If SMFVER=2, an 8-byte field is at the end of this record which contains the time (recorded in microseconds) needed to complete the VVDS request (ADD, DELETE, or INSERT). This field exists only for an SMF type 60 record.

Record type 61 (X'3D') — Integrated Catalog Facility Define Activity

Record type 61 is written during any processing that results in a DEFINE request to Catalog Management Services, such as:

IDCAMS
DEFINE

IEHPROGM
CATLG

One type 61 record is written for each record inserted or updated in a catalog.

Record type 61 identifies the entry being defined and the catalog in which the catalog record is written and gives the new or updated catalog record. It identifies the job by job log and user identifiers.

Macro to Symbolically Address Record Type 61: The SMF record mapping macro for record types 36, 60, 61, 65 and 66 is IFASMFI6. The syntax is as follows:

IFASMFI6 *nn*

nn
identifies the type of the record you want to map. The mapping macro resides in SYS1.MACLIB.

Record mapping

Header/self-defining section

This section contains the common SMF record headers fields and the triplet fields (offset/length/number), if applicable, that locate the other sections on the record.

Offsets		Name	Length	Format	Description
0	0	SMF61LEN	2	binary	Record length. This field and the next field (total of four bytes) form the RDW (record descriptor word). See "Standard and Extended SMF record headers" on page 162 for a detailed description.
2	2	SMF61SEG	2	binary	Segment descriptor (see record length field).
4	4	SMF61SYS	1	binary	System indicator: **Bit** **Meaning when set** **0-2** Reserved **3-6** Version indicators* **7** Reserved. *See "Standard and Extended SMF record headers" on page 162 for a detailed description.
5	5	SMF61RTY	1	binary	Record type 61 (X'3D').

Offsets		Name	Length	Format	Description
6	6	SMF61TME	4	binary	Time since midnight, in hundredths of a second, that the record was moved into the SMF buffer.
10	A	SMF61DTE	4	packed	Date when the record was moved into the SMF buffer, in the form 0*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for a detailed description.
14	E	SMF61CPU	4	EBCDIC	System identification (from the SID parameter).
18	12	SMF61SBS	4		Reserved.
22	16	SMF61SUB	2	EBCDIC	The action taken on the catalog entry; valid values are: **IN** (INSERT) **DE** (DELETE) **UP** (UPDATE)
24	18	SMF61POF	4	binary	Offset of product section from start of record, including record descriptor word (RDW).
28	1C	SMF61PLN	2	binary	Length of product section.
30	1E	SMF61PNO	2	binary	Number of product sections.
32	20	SMF61DOF	4	binary	Offset of data section from start of record, including record descriptor word (RDW).
36	24	SMF61DLN	2	binary	Length of data section.
38	26	SMF61DNO	2	binary	Number of data sections.
Product and Data Section:					
40	28	SMF61VER	2	EBCDIC	Version of the type 61 records.
42	2A	SMF61PNM	8	EBCDIC	Catalog management product identifier.
50	32	SMF61JNM	8	EBCDIC	Job name. The job log identification consists of the job name, time, and date that the reader recognized for the JOB card (for this job). If a system task caused the record to be written, the job name and user identification fields contain blanks and the time and date fields contain zeros.
58	3A	SMF61RST	4	binary	Time since midnight, in hundredths of a second, the reader recognized the JOB card (for this job).
62	3E	SMF61RDT	4	packed	Date reader recognized the JOB card for this job, in the form 0*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for a detailed description.
66	42	SMF61UID	8	EBCDIC	User-defined identification field (taken from common exit parameter area, not from USER=parameter on job statement).
74	4A	SMF61FNC	1		Reserved.
75	4B	SMF61CNM	44	EBCDIC	Name of catalog in which entry is defined.
119	77	SMF61TYP	1	EBCDIC	Entry type identifier. For a description of this field, see the SMF60TYP field in "Header/Self-defining Section" on page 511.
120	78	SMF61ENM	44	EBCDIC	Entry name.
164	A4	SMF61NNM	44		Reserved.
208	D0	SMF61CRC	*variable*	binary	New catalog record for defined entry (the length of this record is contained in the first two bytes of this field).

Record type 62 (X'3E') — VSAM Component or Cluster Opened

Record type 62 is written at the successful or unsuccessful opening of a VSAM component or cluster.

Record type 62 identifies the VSAM component or cluster and indicates whether it was successfully opened. It names the VSAM catalog in which the object is defined and the volumes on which the catalog and object are stored. It identifies the job that issued the OPEN macro by job log identification and user identification. The job name and the time and date that the reader recognized the JOB card for this job constitute the job log identification.

Note: This record is not generated when a system task issues the OPEN macro.

Record environment

The following conditions exist for the generation of each of the subtypes of this record:

Macro
SMFWTM(1) (record exit: IEFU83)

Storage Residency
24-bit

Record mapping

Header/Self-defining Section

This section contains the common SMF record headers fields and the triplet fields (offset/length/number), if applicable, that locate the other sections on the record.

Offsets		Name	Length	Format	Description
0	0	SMF62LEN	2	binary	Record length. This field and the next field (total of four bytes) form the RDW (record descriptor word). See “Standard and Extended SMF record headers” on page 162 for a detailed description.
2	2	SMF62SEG	2	binary	Segment descriptor (see record length field).
4	4	SMF62FLG	1	binary	System indicator: **Bit** **Meaning when set** **0-2** Reserved **3-6** Version indicators* **7** Reserved. *See “Standard and Extended SMF record headers” on page 162 for a detailed description.
5	5	SMF62RTY	1	binary	Record type 62 (X'3E').
6	6	SMF62TME	4	binary	Time since midnight, in hundredths of a second, that the record was moved into the SMF buffer.
10	A	SMF62DTE	4	packed	Date when the record was moved into the SMF buffer, in the form 0*cyydddF*. See “Standard and Extended SMF record headers” on page 162 for a detailed description.
14	E	SMF62SID	4	EBCDIC	System identification (from the SID parameter).
18	12	SMF62JBN	8	EBCDIC	Job name. The job name, time, and date that the reader recognized the JOB card (for this job) constitute the job log identification, or transaction name (for APPC output).
26	1A	SMF62RST	4	binary	Time since midnight, in hundredths of a second, that the reader recognized the JOB card (for this job).
30	1E	SMF62RSD	4	packed	Date when the reader recognized the JOB card for this job, in the form 0*cyydddF*. See “Standard and Extended SMF record headers” on page 162 for a detailed description.

Offsets		Name	Length	Format	Description
34	22	SMF62UIF	8	EBCDIC	User-defined identification field (taken from common exit parameter area, not from USER=parameter on job statement).
42	2A	SMF62IND	4	binary	Open status indicator. **Bit** **Meaning when set** **0** Component or cluster was successfully opened **1** Security violation, that is, incorrect password **2** Record is a catalog or catalog recovery area (CRA) record **3** Record is for a VSAM volume data set (VVDS) or ICF catalog being opened or closed as a data set. If this bit is set, the catalog name field and the cluster name field may be set to zeroes. **4** SMS class information is included in the record **5** Data set is encrypted **6-31** Reserved.
46	2E	SMF62CNM	44	EBCDIC	Name of the catalog in which the component or cluster is defined.
90	5A	SMF62CVS	6	EBCDIC	Volume serial number of the volume containing the catalog.
96	60	SMF62DNM	44	EBCDIC	Name of the component or cluster being opened.
140	8C	SMF62VCT	2	binary	Number of online volumes containing the component or cluster. (This field is also the number of ten-byte fields that list the volumes.)
For each online volume, there is a ten-byte entry with the following format:					
0	0	SMF62VSR	6	EBCDIC	Volume serial number of the volume containing the component or cluster.
6	6	SMF62DTY	4	binary	Unit type of the volume containing the component or cluster.
After the volume entries, three fields define SMS class information:					
0	0	SMF62MGT	8	binary	SMS management class.
8	8	SMF62STR	8	binary	SMS storage class.
16	10	SMF62DAT	8	binary	SMS data class.
The following two fields define encryption information:					
0	0	SMS62DET	2	binary	Encryption type
0	2	SMS62DKL	64	character	Data set key label

Statistics Section

Offsets		Name	Length	Format	Description
0	0	SMF62TIM	4	binary	Time data set was opened (in hundredths of a second since midnight).
4	4	SMF62DT	4	packed	Date data set was opened, in the form of 0cyydddF (where c is 0 for 19xx and 1 for 20xx, yy is the current year (0-99), ddd is the current day (1-356), and F is the sign).

Offsets		Name	Length	Format	Description
8	8	SMF62MC1	1	binary	First ACB MACRF flag byte: **Bit** **Meaning when set** **0** Record is identified by a key **1** Record is identified by a relative byte address (RBA) **2** Control-Interval processing **3** Sequential processing **4** Direct processing **5** Input processing **6** Output processing **7** User-supplied buffer space
9	9	SMF62MC2	1	binary	Second ACB MACRF flag byte: **Bit** **Meaning when set** **0** Defined only when output and JES format. The system is to ensure that the logical record length will be the same when the data is read. This bit is not defined for input. **1** Control character type **2** Eligible for backup-while-open **3** Skip sequential processing **4** VTAM LOGON indicator **5** Set data set to empty state **6** Shared control blocks **7** Alternate index of the path

Offsets		Name	Length	Format	Description
10	A	SMF62MC3	1	binary	Third ACB MACRF flag byte: **Bit** **Meaning when set** **0** No LSR exclusive control **1** Local shared resources **2** Global shared resources **3** Improved control-interval processing **4** Deferred write **5** Sequential insert strategy **6** Control blocks are fixed in real storage **7** VSAM 31-bit addressing mode I/O buffers
11	B	SMF62MC4	1	binary	Fourth ACB MACRF flag byte: **Bit** **Meaning when set** **0** RLS Processing **1** SNP Option **2-7** Reserved.
12	C	SMF62DET	2	binary	Encryption type
14	E	SMF62DKL	64	EBCDIC	DASD data set key label
78	4E	SMF62JobID	8	EBCDIC	Job ID
86	56	SMF62SysplexName	8	EBCDIC	Sysplex name

Record type 63 (X'3F') — VSAM Catalog Entry Defined

The system no longer collects record type 63 as of January, 2000

Note that because VSAM catalogs are no longer supported and no longer exist, the system does not collect record type 63. However if you are using downlevel versions of SMF files, these explanations may still be useful.

Record type 63 is written when an entry (a component, cluster, catalog, alternate index, path, or non-VSAM data set) in a VSAM catalog is defined by the DEFINE access method services command and when that definition is altered. For example, when an entry in a VSAM catalog is altered with new space allocation information (that is, when the VSAM End-Of-Volume (EOV) routine extends the entire object) or, if the entry is changed by the Alter Access Method Services command. One record type 63 is written for each newly created or altered entry. This record is **not** written when a VSAM catalog is renamed. In that case record type 68 is written.

The record's length includes the length of the catalog records required to describe the entry. The total length can be from 1000 to 4000 bytes or more, depending upon the sizes of the new and old catalog records (offsets 44 and 46 respectively). If you write this record to the SMF data set, you must include the sizes of these catalog records when estimating the additional storage required for the SMF buffer and the SMF data sets.

Record type 63 identifies the catalog in which the object is defined, gives the catalog record for the newly defined object, and, for an alteration, gives the parts of the old catalog record before they were altered. It identifies the job by job log identification and user identification. The job name and the time and date that the reader recognized the JOB card for this job constitute the job log identification. If a system task caused the record to be written, the job-name and the user-identification fields contain blanks and the time and date fields contain zeros.

Note: Field SMF63NCR is **NOT** part of the programming interface.

Record mapping

Header/Self-defining Section

This section contains the common SMF record headers fields and the triplet fields (offset/length/number), if applicable, that locate the other sections on the record.

Offsets		Name	Length	Format	Description
0	0	SMF63LEN	2	binary	Record length. This field and the next field (total of four bytes) form the RDW (record descriptor word). See "Standard and Extended SMF record headers" on page 162 for a detailed description.
2	2	SMF63SEG	2	binary	Segment descriptor (see record length field).
4	4	SMF63FLG	1	binary	System indicator: **Bit** **Meaning when set** **0-2** Reserved **3-6** Version indicators* **7** Reserved. *See "Standard and Extended SMF record headers" on page 162 for a detailed description.
5	5	SMF63RTY	1	binary	Record type 63 (X'3F').
6	6	SMF63TME	4	binary	Time since midnight, in hundredths of a second, that the record was moved into the SMF buffer.
10	A	SMF63DTE	4	packed	Date when the record was moved into the SMF buffer, in the form 0*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for a detailed description.
14	E	SMF63SID	2	EBCDIC	System identification (from the SID parameter).
16	10	SMF63SMI	2	EBCDIC	System model identifier.
18	12	SMF63JBN	8	EBCDIC	Job name. If a system task caused the record to be written, the job name and user identification fields contain blanks and the time and date fields contain zeros. The job name, time, and date that the reader recognized the JOB card (for this job) constitute the job log identification, or transaction name (for APPC output).
26	1A	SMF63RST	4	binary	Time since midnight, in hundredths of a second, that the reader recognized the JOB card (for this job).
30	1E	SMF63RSD	4	packed	Date when the reader recognized the JOB card (for this job), in the form 0*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for a detailed description.

Offsets		Name	Length	Format	Description
34	22	SMF63UIF	8	EBCDIC	User-defined identification field (taken from common exit parameter area, not from USER=parameter on job statement).
42	2A	SMF63FDT	1	binary	Record creator/entry type indicator **Bit** **Meaning when set** **0** New definition **1** Altered definition **2-5** Reserved **6** Path defined or altered **7** Alternate index defined or altered.
43	2B	SMF63TYP	1	binary	Entry type indicator **Bit** **Meaning when set** **0** VSAM cluster **1** VSAM data component **2** VSAM index component **3** VSAM catalog **4** Non-VSAM data set **5** Generation data group **6** Alias **7** Reserved.
44	2C	SMF63NSZ	2	binary	Size of new catalog record. Include the contents of this field when estimating the additional storage required by SMF. A VSAM catalog record is contained in one or more physical catalog records. This field with offset 46 are the sums of the sizes of the physical catalog records that constitute the total logical VSAM catalog record.
46	2E	SMF63OSZ	2	binary	Size of old catalog record. This field contains the size of the old records before they were altered. Include the contents of this field when estimating the additional storage required by SMF.
48	30	SMF63CNM	44	EBCDIC	Name of catalog in which the entry is defined.
92	5C	SMF63ENM	44	EBCDIC	Entry name.
136	88	SMF63NCR	*variable*	binary	New catalog record followed by old catalog record. For the new catalog record, the complete new entry is recorded. For the old catalog record, this field contains only those old records that were altered; it shows what these records were before they were altered.

Record type 64 (X'40') — VSAM Component or Cluster Status

Record type 64 is written when:

1. A VSAM component or cluster (including catalogs) is closed,

2. VSAM must switch to another volume to continue to read or write,
3. There is no more space available for VSAM to continue processing.

If a cluster is closed, one record is written for each component in the cluster.

Record type 64 indicates why the record was created (a component was closed, another volume was switched to, or no additional space was available). It describes the device and volume(s) on which the object is stored, and gives the extents of the object on the volume(s). It gives statistics about various processing events that have occurred since the object was defined, such as the number of records in the data component, the number of records that were inserted, and the number of control intervals that were split.

This record identifies the job by job log identification and user identification. The job name, time, and date that the reader recognized the JOB card (for this job) constitute the job log identification.

Record environment

The following conditions exist for the generation of each of the subtypes of this record:

Macro
SMFWTM(1) (record exit: IEFU83)

Storage Residency
24-bit

Record mapping

Header/Self-defining Section

This section contains the common SMF record headers fields and the triplet fields (offset/length/number), if applicable, that locate the other sections on the record.

Offsets		Name	Length	Format	Description
0	0	SMF64LEN	2	Binary	Record length. This field and the next field (total of four bytes) form the record descriptor word (RDW). See “Standard and Extended SMF record headers” on page 162 for a detailed description.
2	2	SMF64SEG	2	Binary	Segment descriptor (see record length field).
4	4	SMF64FLG	1	Binary	System indicator: **Bit** **Meaning when set** **0-2** Reserved. **3-6** Version indicators*. **7** Reserved. *See “Standard and Extended SMF record headers” on page 162 for a detailed description.
5	5	SMF64RTY	1	Binary	Record type 64 (X'40').
6	6	SMF64TME	4	Binary	Time since midnight, in hundredths of a second, that the record was moved into the SMF buffer.
10	A	SMF64DTE	4	Packed	Date when the record was moved into the SMF buffer, in the form 0*cyydddF*. See “Standard and Extended SMF record headers” on page 162 for a detailed description.
14	E	SMF64SID	4	EBCDIC	System identification (from the SID parameter).

Offsets		Name	Length	Format	Description
18	12	SMF64JBN	8	EBCDIC	Job name. The job name, time, and date that the reader recognized the JOB card (for this job) constitute the job log identification, or transaction name (for APPC output). Consists of the job name, time, and date that the reader recognized the JOB card (for this job).
26	1A	SMF64RST	4	Binary	Time since midnight, in hundredths of a second, that the reader recognized the JOB card (for this job).
30	1E	SMF64RSD	4	Packed	Date when the reader recognized the JOB card (for this job), in the form 0*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for a detailed description.
34	22	SMF64UIF	8	EBCDIC	User-defined identification field (taken from common exit parameter area, not from USER=parameter on job statement).
42	2A	SMF64RIN	1	Binary	Situation indicator **Bit** **Meaning when set** **0** Component closed. **1** Volume switched (see note 1). **2** No space available. **3** Record is a catalog or CRA record. **4** Component closed, TYPE=T. **5** Record written during ABEND processing. **6** Record is for a VVDS or ICF catalog being opened or closed as a data set. If this bit is set, the catalog name field and the cluster name field can be set to zeros. **7** Reserved.
43	2B	SMF64DTY	1	Binary	Indicator of component being processed. **Bit** **Meaning when set** **0** Data set. **1** Index. **2 (SMF64EF)** Extended format. **3 (SMF64CMP)** Compressed. **4 (SMF64RLS)** RLS is in effect. **5 (SMF64DIS)** RLS is in effect, measurement management facility disabled. **6 (SMF64EA)** Extended addressable data set. **7 (SMF64SSR)** Secondary space reduction.
44	2C	SMF64CNM	44	EBCDIC	Name of the catalog in which the component is defined.

Offsets		Name	Length	Format	Description
88	58	SMF64DNM	44	EBCDIC	Name of the component or cluster being processed. For a CRA record, this field does not contain meaningful information. For a catalog record, this field contains the catalog or cluster name.
132	84	SMF64NTR	2	Binary	Number of secondary tracks that were requested but could not be allocated.
134	86	SMF64CHR	4	EBCDIC	Highest used relative byte address (RBA) of the component. See also SMF64CHC.
134	86	SMF64CHC	4	EBCDIC	Highest used control interval (CI) of the component. CI is used in place of RBA for an extended format data set capable of extended addressability.
138	8A	SMF64ESL	2	Binary	Length of extent entry portion of record, excluding this field. (See note 1)

Note:

1. If SMF64RIN=X'01', there will be **no** extended information written for this record (SMF64ESL). For more information, please review APAR OW56162 (for hdz11f0 and hdz11g0 users). For diagnostic purposes, VSAM EOV writes an SMF64 record when there is a record management catalog update request.

Extent Information Section

This section contains the last extent with the high allocated CI for:

- a non-striped component
- each stripe of a striped component

Offsets		Name	Length	Format	Description
0	0	SMF64FCC	4	binary	Beginning cylinder and track, in the form *CCHH* where *CC* is the cylinder number and *HH* is the track number.
4	4	SMF64TCC	4	binary	Ending cylinder and track, in the form *CCHH* where *CC* is the cylinder number and *HH* is the track number.
8	8	SMF64VSN	6	EBCDIC	Volume serial number of the volume containing the extent.
14	E	SMF64CUU	2	binary	Device number.
16	10	SMF64IND	2	EBCDIC	Spindle identification.
18	12	SMF64UTY	4	binary	Unit type.
22	16	SMF64RV1	4		Reserved.

The statistics section contains:

- Accumulative statistics from creation until the current OPEN
- Change in statistics from OPEN to time of EOV and CLOSE
- Data set characteristics
- Hiperbatch I/O statistics
- Compressed data statistics
- CF Cache structure statistics

The statistics section includes information on the number of execute channel programs (EXCP). For more information about how EXCP count is determined, see Chapter 10, “EXCP count,” on page 119.

Statistics Section at OPEN Time

Offsets		Name	Length	Format	Description
0	0	SMF64SLN	4	binary	Length of the statistics section, including this field.
4	4	SMF64NIL	4	binary	Number of levels in the index.
8	8	SMF64NEX	4	binary	Number of extents.
12	C	SMF64NLR	4	binary	Number of logical records in the component.
16	10	SMF64NDE	4	binary	Number of records that were deleted from the component.
20	14	SMF64NIN	4	binary	Number of records that were inserted into the component.
24	18	SMF64NUP	4	binary	Number of records that were updated in the component.
28	1C	SMF64NRE	4	binary	Number of records that were retrieved from the component.
32	20	SMF64NFS	4	binary	Number of unused control intervals in the component. This value is multiplied by the control interval size when the component is not an extended addressable data set.
36	24	SMF64NCS	4	binary	Number of control intervals that were split in the component.
40	28	SMF64NAS	4	binary	Number of control areas that were split in the component.
44	2C	SMF64NEP	4	binary	Number of execute channel programs (EXCPs). When MACRF=RLS, this field contains the number of buffer manager requests.
Change in Statistics from OPEN to time of EOV and CLOSE: **Note:** The statistics might contain accumulated count among all concurrent users if the file is being opened by multiple ACBs or multiple JOBs.					
48	30	SMF64DIL	4	binary	Change in number of levels in the index.
52	34	SMF64DEX	4	binary	Change in number of extents.
56	38	SMF64DLR	4	binary	Change in number of logical records in the component. This field may be negative.
60	3C	SMF64DDE	4	binary	Change in number of records that were deleted from the component. When MACRF=RLS, this field contains the total number of deletes performed by this access-method control block.
64	40	SMF64DIN	4	binary	Change in number of records that were inserted into the component. When MACRF=RLS, this field contains the total number of inserts performed by this access-method control block.
68	44	SMF64DUP	4	binary	Change in number of records that were updated in the component. When MACRF=RLS, this field contains the total number of updates performed by this access-method control block.
72	48	SMF64DRE	4	binary	Change in number of records that were retrieved from the component. When MACRF=RLS, this field contains the total number of retrieves performed by this access-method control block.
76	4C	SMF64DFS	4	binary	Change in number of unused control intervals in the component. This value is multiplied by the control interval size when the component is not an extended addressable data set. This value may be negative.
80	50	SMF64DCS	4	binary	Change in number of control intervals that were split in the component. When MACRF=RLS, this field contains the total number of CI splits performed for this access-method control block.

Offsets		Name	Length	Format	Description
84	54	SMF64DAS	4	binary	Change in number of control areas that were split in the component. When MACRF=RLS, this field contains the total number of CA splits performed for this access-method control block.
88	58	SMF64DEP	4	binary	Change in number of execute channel programs (EXCPs) for the data set. When MACRF=RLS, this field contains the total number of buffer manager calls performed for this access-method control block.
Data Set Characteristics Section:					
92	5C	SMF64DBS	4	binary	Physical block size.
96	60	SMF64DCI	4	binary	Control interval size.
100	64	SMF64DLS	4	binary	Maximum logical record size.
104	68	SMF64DKL	2	binary	Key length.
106	6A	SMF64DDN	8	EBCDIC	DD name. When the record is written for a catalog or catalog recovery area, this field may contain zeros. When the record is written for a volume switch or no space available condition, and the volume is associated with a concatenated TIOT entry, this field contains blanks.
114	72	SMF64STR	1	binary	The number of strings requested by the user. This field may or may not contain the same number as SMF64PLH. It all depends on the data set activity (VSAM will dynamically add strings when necessary).
115	73	SMF64BNO	1	binary	Actual number of buffers requested by the user. VSAM may override the number of data buffers requested by the user based on such things as the amount of buffer space specified at define time. This number may also vary based on whether the data set is using an LSR/GSR buffer pool, and whether or not separate data and index pools were established. When MACRF=RLS, this field is not applicable and it is set to 0.
116	74	SMF64BSP	4	binary	Buffer space. When MACRF=RLS, this field is ignored.
120	78	SMF64BFD	2	binary	The number of data buffers requested by the user. When MACRF=RLS, this field is ignored.
122	7A	SMF64BFI	2	binary	The number of index buffers requested by the user. When MACRF=RLS, this field is ignored.
124	7C	SMF64CLN	44	EBCDIC	Cluster name from JCL.
168	A8	SMF64PLH	2	binary	Actual number of concurrent strings (requested by the user) used. When MACRF=RLS, this field is set to 0.
170	AA	SMF64MAC	3	binary	ACB MACRF fields.

Offsets		Name	Length	Format	Description
170	AA	SMF64MC1	1	binary	First ACB MACRF flag byte **Bit** **Meaning when set** **0** Record is identified by a key **1** Record is identified by a relative byte address (RBA) **2** Control-interval processing **3** Sequential processing **4** Direct processing **5** Input processing **6** Output processing **7** User-supplied buffer space.
171	AB	SMF64MC2	1	binary	Second ACB MACRF flag byte **Bit** **Meaning when set** **0** Defined only when output and JES format. The system is to ensure that the logical record length will be the same when the data is read. This bit is not defined for input. **1** Control character type **2** Reserved **3** Skip sequential processing **4** VTAM LOGON indicator **5** Set data set to empty state **6** Shared control blocks **7** Alternate index of the path.

Offsets		Name	Length	Format	Description
172	AC	SMF64MC3	1	binary	Third ACB MACRF flag byte **Bit** **Meaning when set** **0** Reserved **1** Local shared resource **2** Global shared resource **3** Improved control-interval processing **4** Deferred write **5** Sequential insert strategy **6** Control blocks are fixed in real storage **7** VSAM 31-bit addressing mode I/O buffers.
173	AD	SMF64MC4	1	binary	Fourth ACB MACRF flag byte **Bit** **Meaning when set** **0** RLS Processing **1** SNP Option **2-7** Reserved
174	AE	SMF64SMB	1	binary	SMB ACCESS BIAS Information **Bit** **Meaning when set** **0** User specified AMP ACCBIAS through JCL (ACCBIAS=DOISOIDWISW) **1** User requested through JCL or DATACLAS that SMB is to determine ACCBIAS **2** BIAS=DO used **3** BIAS=SO used **4** BIAS=SW used **5** BIAS=DW used **6** BIAS=CO used **7** BIAS=CR used

Offsets		Name	Length	Format	Description
175	AF	SMF64RSC	1	binary	SMB Information **Bit** **Meaning when set** **0** DO with USER specified SMBVSP **1** DO with USER specified SMBHWT **2** RMODE31=BUFF used **3** RMODE31=CB used **4** Insufficient virtual storage for DO **5-7** Reserved
Hiperbatch I/O Statistics Section:					
176	B0	SMF64SIO	4	binary	Number of requests for I/O issued by the access method for this data set for which Hiperbatch attempted to find the requested data in its buffers (see SMF64HIT and SMF64MIS). When MACRF=RLS, this field is not applicable and it is set to 0.
180	B4	SMF64HIT	4	binary	Number of requests for I/O issued by the access method for this data set satisfied by moving data from Hiperbatch buffers. When MACRF=RLS, this field is not applicable and it is set to 0.
184	B8	SMF64WTS	4	binary	Number of times Hiperbatch temporarily suspended this requester because another user was already reading some or all of the requested data. When MACRF=RLS, this field is not applicable and it is set to 0.
188	BC	SMF64MIS	4	binary	Number of requests for I/O issued by the access method for this data set satisfied by performing DASD I/O. Note that the sum of SMF64HIT and SMF64MIS should equal SMF64SIO. When MACRF=RLS, this field is not applicable and it is set to 0.
192	C0	SMF64IOS	4	binary	Number of DASD I/Os (as recorded in SMF64MIS) for which Hiperbatch copied the data into its buffers. Note that random reads from DASD do not populate the Hiperbatch buffers. When MACRF=RLS, this field is not applicable and it is set to 0.
Compressed Data Statistics Section:					
196	C4	SMF64SDS	8	binary	Source data set size at open for compressed data set. Valid only if SMF64CMP (in SMF64DTY) is set on.
204	CC	SMF64CDS	8	binary	Compressed data set size at open. Valid only if SMF64CMP (in SMF64DTY) is set on.
212	D4	SMF64CSS	8	binary	Change in source data set size in this open for compressed data set. Valid only if SMF64CMP (in SMF64DTY) is set on.
220	DC	SMF64CCS	8	binary	Change in compressed data set size in this open. Valid only if SMF64CMP (in SMF64DTY) is set on.
228	E4	SMF64DTK	36	binary	Dictionary token for compressed data set. Valid only if SMF64CMP (in SMF64DTY) is set on.
264	108	SMF64TRK	4	binary	Number of tracks released during partial release processing.
CF Cache Structure Statistics Section:					
268	10C	SMF64BMH	4	binary	Number of requests where the data was obtained from the local shared buffer pool.

Offsets		Name	Length	Format	Description
272	110	SMF64CFH	4	binary	Number of requests where the data was obtained from the DFSMS coupling facility cache structure.
276	114	SMF64RIO	4	binary	Number of requests where the data was obtained from DASD.
280	118	SMF64TIM	4	binary	Time data set was opened (in hundredths of a second since midnight).
284	11C	SMF64DT	4	packed	Date data set was opened, in the form of 0cyydddF (where c is 0 for 19xx and 1 for 20xx, yy is the current year (0-99), ddd is the current day (1-356), and F is the sign).
288	120	SMF64FG1	1	binary	Miscellaneous flag 1 **Bit** **Meaning when set** **0** CHECKPOINT has been issued **1** EOV diagnostic **2-7** Reserved.
289	121	SMF64FD1	1	binary	EOV diagnostic field 1.
290	122	SMF64FD2	1	binary	EOV diagnostic field 2.
291	123		1	binary	Reserved.
292	124	SMF64DAU	4	binary	Change in the number of CA-reclaimed control areas reused in the KSDS since the last EOV or CLOSE.
296	128	SMF64RLM	4	binary	Number of control areas reclaimed in the KSDS since the last EOV or CLOSE.
300	12C	SMF64NTA	4	binary	Number of tracks acquired during this EOV processing.
304	130	SMF64JobID	8	EBCDIC	Job ID.
312	138	SMF64SysplexName	8	EBCDIC	Sysplex name.

Record type 65 (X'41') — Integrated Catalog Facility Delete Activity

Record type 65 is written during any processing that results in a DELETE request to Catalog management services, such as:

IDCAMS
DELETE

IEHPROGM
UNCATLG

One type 65 record is written for each record updated or deleted from a catalog.

Record type 65 identifies the entry being deleted and the catalog in which the catalog record is updated or deleted, and gives the updated or deleted catalog record. It indicates whether a VSAM cluster or non-VSAM data set was scratched (function indicator = ‘S’), or only catalog information was deleted (function indicator = ‘U’). It identifies the job by job log identification and user identification.

The job name, time, and date that the reader recognized the JOB card (for this job) constitutes the job log identification. If a system task caused the record to be written, the job name and user identification fields contain blanks and the time and date fields contain zeros.

Macro to Symbolically Address Record Type 65: The SMF record mapping macro for record types 36, 60, 61, 65 and 66 is IFASMFI6. The syntax is as follows:

IFASMFI6 *nn*

nn
identifies the type of the record you want to map. The mapping macro resides in SYS1.MACLIB.

Record mapping

Header/self-defining section

This section contains the common SMF record headers fields and the triplet fields (offset/length/number), if applicable, that locate the other sections on the record.

Offsets		Name	Length	Format	Description
0	0	SMF65LEN	2	binary	Record length. This field and the next field (total of four bytes) form the RDW (record descriptor word). See "Standard and Extended SMF record headers" on page 162 for a detailed description.
2	2	SMF65SEG	2	binary	Segment descriptor (see record length field).
4	4	SMF65SYS	1	binary	System indicator: **Bit** **Meaning when set** **0-2** Reserved **3-6** Version indicators* **7** Reserved. *See "Standard and Extended SMF record headers" on page 162 for a detailed description.
5	5	SMF65RTY	1	binary	Record type 65 (X'41').
6	6	SMF65TME	4	binary	Time since midnight, in hundredths of a second, when the record was moved into the SMF buffer.
10	A	SMF65DTE	4	packed	Date when the record was moved into the SMF buffer, in the form 0*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for a detailed description.
14	E	SMF65CPU	4	EBCDIC	System identification (from the SID parameter).
18	12	SMF65SBS	4		Reserved.
22	16	SMF65SUB	2	EBCDIC	The action taken on the catalog entry; valid values are: **IN** (INSERT) **DE** (DELETE) **UP** (UPDATE)
24	18	SMF65POF	4	binary	Offset of product section from start of record, including record descriptor word (RDW).
28	1C	SMF65PLN	2	binary	Length of product section.
30	1E	SMF65PNO	2	binary	Number of product sections.
32	20	SMF65DOF	4	binary	Offset of data section from start of record, including record descriptor word (RDW).
36	24	SMF65DLN	2	binary	Length of data section.
38	26	SMF65DNO	2	binary	Number of data sections.
Product and data section:					
40	28	SMF65VER	2	EBCDIC	Version of the type 65 record.

Offsets		Name	Length	Format	Description
42	2A	SMF65PNM	8	EBCDIC	Catalog management product identifier.
50	32	SMF65JNM	8	EBCDIC	Job name. The job log identification consists of the job name, time, and date that the reader recognized the JOB card (for this job). If a system task caused the record to be written, the job name and user identification fields contain blanks and the time and date fields contain zeros.
58	3A	SMF65RST	4	binary	Time, in hundredths of a second, that the reader recognized the JOB card (for this job).
62	3E	SMF65RDT	4	packed	Date when the reader recognized the JOB card (for this job), in the form 0*cyydddF*. See “Standard and Extended SMF record headers” on page 162 for a detailed description.
66	42	SMF65UID	8	EBCDIC	User-defined identification field (taken from common exit parameter area, not from USER=parameter on job statement).
74	4A	SMF65FNC	1	EBCDIC	Contains ‘S’ if a data set was scratched; ‘U’ if only catalog entries were modified.
75	4B	SMF65CNM	44	EBCDIC	Name of the catalog in which record was updated or deleted.
119	77	SMF65TYP	1	EBCDIC	Entry type identifier. For a description of this field, see the SMF60TYP field in “Header/Self-defining Section” on page 511.
120	78	SMF65ENM	44	EBCDIC	Entry name.
164	A4	SMF65NNM	44		Reserved.
208	D0	SMF65CRC	*variable*	binary	Catalog record for updated or deleted entry (the length of this record is contained in the first two bytes of this field).

Record type 66 (X'42') — Integrated Catalog Facility Alter Activity

Record type 66 is written during any processing that results in an ALTER request to Catalog Management Services, such as:

IDCAMS
ALTER

One type 66 record is written for each record written or deleted from a catalog.

Record type 66 identifies the entry being altered and the catalog in which the catalog record is written or deleted, and gives the new, updated, or deleted catalog record. It indicates if the entry was renamed (function indicator = ‘R’) and, if so, gives the old and new names of the entry. It identifies the job by job log identification and user identification. The job name, time, and date that the reader recognized the JOB card (for this job) constitutes the job log identification. If a system task caused the record to be written, the job name and user identification fields contain blanks and the time and date fields contain zeros.

Macro to Symbolically Address Record Type 66: The SMF record mapping macro for record types 36, 60, 61, 65 and 66 is IFASMFI6. The syntax is as follows:

IFASMFI6 *nn*

nn
identifies the type of the record you want to map. The mapping macro resides in SYS1.MACLIB.

Record mapping

Header/self-defining section

This section contains the common SMF record headers fields and the triplet fields (offset/length/number), if applicable, that locate the other sections on the record.

Offsets		Name	Length	Format	Description
0	0	SMF66LEN	2	binary	Record length. This field and the next field (total of four bytes) form the RDW (record descriptor word). See "Standard and Extended SMF record headers" on page 162 for a detailed description.
2	2	SMF66SEG	2	binary	Record descriptor word descriptor (see record length field).
4	4	SMF66SYS	1	binary	System indicator: **Bit** **Meaning when set** **0-2** Reserved **3-6** Version indicators* **7** Reserved. *See "Standard and Extended SMF record headers" on page 162 for a detailed description.
5	5	SMF66RTY	1	binary	Record type 66 (X'42').
6	6	SMF66TME	4	binary	Time since midnight, in hundredths of a second, that the record was moved into the SMF buffer.
10	A	SMF66DTE	4	packed	Date when the record was moved into the SMF buffer, in the form 0*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for a detailed description.
14	E	SMF66CPU	4	EBCDIC	System identification (from the SID parameter).
18	12	SMF66SBS	4		Reserved.
22	16	SMF66SUB	2	EBCDIC	The action taken on the catalog entry; valid values are: **IN** (INSERT) **DE** (DELETE) **UP** (UPDATE)
24	18	SMF66POF	4	binary	Offset of product section from start of record, including record descriptor word (RDW).
28	1C	SMF66PLN	2	binary	Length of product section.
30	1E	SMF66PNO	2	binary	Number of product sections.
32	20	SMF66DOF	4	binary	Offset of data section from start of record, including record descriptor word (RDW).
36	24	SMF66DLN	2	binary	Length of data section.
38	26	SMF66DNO	2	binary	Number of data sections.
Product and data section:					
40	28	SMF66VER	2	EBCDIC	Version of the type 66 record.
42	2A	SMF66PNM	8	EBCDIC	Catalog management product identifier.
50	32	SMF66JNM	8	EBCDIC	Job name. The job log identification consists of the job name, time, and date that the reader recognized the JOB card (for this job). If a system task caused the record to be written, the job name and user identification fields contain blanks and the time and date fields contain zeros.
58	3A	SMF66RST	4	binary	Time since midnight, in hundredths of a second, that the reader recognized the JOB card (for this job).

Offsets		Name	Length	Format	Description
62	3E	SMF66RDT	4	packed	Date when the reader recognized the JOB card (for this job), in the form 0*cyydddF*. See “Standard and Extended SMF record headers” on page 162 for a detailed description.
66	42	SMF66UID	8	EBCDIC	User-defined identification field (taken from common exit parameter area, not from USER=parameter on job statement).
74	4A	SMF66FNC	1	EBCDIC	Contains “R” if catalog entry is renamed.
75	4B	SMF66CNM	44	EBCDIC	Name of catalog in which record was updated or deleted.
119	77	SMF66TYP	1	EBCDIC	Entry type identifier. For a description of this field, see the SMF60TYP field in “Header/Self-defining Section” on page 511.
120	78	SMF66ENM	44	EBCDIC	Current entry name.
164	A4	SMF66NNM	44	EBCDIC	New entry name.
208	D0	SMF66CRC	*variable*	binary	Catalog record for updated or deleted entry (the length of this record is contained in the first two bytes of this field).

Record type 67 (X'43') — VSAM Catalog Entry Deleted

The system no longer collects record type 67 as of January, 2000

Note that because VSAM catalogs are no longer supported and no longer exist, the system does not collect record type 67. However if you are using downlevel versions of SMF files, these explanations may still be useful.

Record type 67 is written when an entry (a component, cluster, catalog, alternate index, path, or non-VSAM data set) in a VSAM catalog is deleted. A type 67 record is written for each entry affected by the DELETE access method services command. For example, three records are written for an indexed cluster: one for the relationship between the components of the cluster, one for the data component, and one for the index component.

Record type 67 identifies the deleted entry, the VSAM catalog in which the entry was defined and the deleted catalog records. A VSAM catalog record is contained in one or more physical catalog records (SMF67CRC). Field SMF67RSZ at offset 132 is the sum of the sizes of the physical catalog records that constitute the total logical VSAM catalog record. The length of this SMF record can be from 1000 to 4000 bytes or more, depending upon the sizes of the catalog records that describe the entry. If you are writing this record to the SMF data set, be sure to include the sizes of these catalog records when estimating the additional storage SMF will need for the buffers and the data sets. It identifies the job by job log identification and user identification.

The job name, time, and date that the reader recognized the JOB card (for this job) constitute the job log identification. If a system task caused the record to be written, the job-name and the user-identification fields contain blanks and the time and date fields contain zeroes.

Record mapping

Header/Self-defining Section

This section contains the common SMF record headers fields and the triplet fields (offset/length/number), if applicable, that locate the other sections on the record.

Offsets		Name	Length	Format	Description
0	0	SMF67LEN	2	binary	Record length. This field and the next field (total of four bytes) form the RDW (record descriptor word). See “Standard and Extended SMF record headers” on page 162 for a detailed description.
2	2	SMF67SEG	2	binary	Segment descriptor (see record length field).

Offsets		Name	Length	Format	Description
4	4	SMF67FLG	1	binary	System indicator: **Bit** **Meaning when set** **0-2** Reserved **3-6** Version indicators* **7** Reserved. *See “Standard and Extended SMF record headers” on page 162 for a detailed description.
5	5	SMF67RTY	1	binary	Record type 67 (X'43').
6	6	SMF67TME	4	binary	Time since midnight, in hundredths of a second, that the record was moved into the SMF buffer.
10	A	SMF67DTE	4	packed	Date when the record was moved into the SMF buffer, in the form 0*cyydddF*. See “Standard and Extended SMF record headers” on page 162 for a detailed description.
14	E	SMF67SID	2	EBCDIC	System identification (from the SID parameter).
16	10	SMF67SMI	2	EBCDIC	System model identifier.
18	12	SMF67JBN	8	EBCDIC	Job name. If a system task caused the record to be written, the job name and user identification fields contain blanks and the time and date fields contain zeros. The job name, time, and date that the reader recognized the JOB card (for this job) constitute the job log identification, or transaction name (for APPC output).
26	1A	SMF67RST	4	binary	Time since midnight, in hundredths of a second, that the reader recognized the JOB card (for this job).
30	1E	SMF67RSD	4	packed	Date when the reader recognized the JOB card (for this job), in the form 0*cyydddF*. See “Standard and Extended SMF record headers” on page 162 for a detailed description.
34	22	SMF67UIF	8	EBCDIC	User-defined identification field (taken from common exit parameter area, not from USER=parameter on job statement).
42	2A	SMF67FDT	1	binary	Record creator/entry type indicator **Bit** **Meaning when set** **0** Uncataloged **1** Scratched **2-7** Reserved. The uncataloged and scratched indicators are set for VSAM component or cluster entries. For all other VSAM entries, only the uncataloged bit is set. For non-VSAM entries, the uncataloged bit is always set and the scratched bit is set if the physical non-VSAM space was deleted.

Offsets		Name	Length	Format	Description
43	2B	SMF67IOD	1	binary	Entry type indicator **Bit** **Meaning when set** **0** VSAM cluster **1** VSAM data component **2** VSAM index component **3** VSAM catalog **4** Non-VSAM data set **5** Generation data group **6** Alias **7** Reserved. A data or index component can only be deleted as one of the three catalog records deleted when a cluster is deleted.
44	2C	SMF67CNM	44	EBCDIC	Name of catalog in which the entry was defined.
88	58	SMF67DEN	44	EBCDIC	Entry name.
132	84	SMF67RSZ	2	binary	Size of catalog record that defined the entry. A VSAM catalog record is contained in one or more physical catalog records. Offset 132 is the sum of the sizes of the physical catalog records that constitute the total logical VSAM catalog record.
134	86	SMF67CRC	*variable*	binary	Catalog record.

Record type 68 (X'44') — VSAM Catalog Entry Renamed

The system no longer collects record type 68 as of January, 2000

Note that because VSAM catalogs are no longer supported and no longer exist, the system does not collect record type 68. However if you are using downlevel versions of SMF files, these explanations may still be useful.

Record type 68 is written when an entry (a component, cluster, catalog, alternate index, path, or non-VSAM data set) in a VSAM catalog is renamed using the ALTER access method services command. This record identifies the VSAM catalog in which the object is defined, and gives the old and new names for the object. It identifies the job log identification and user identification. The job name, time, and date that the reader recognized the JOB card (for this job) constitute the job log identification.

If a system task caused the record to be written, the job-name and user-identification fields contain blanks and the time and date fields contain zeros.

Record mapping

Header/Self-defining Section

This section contains the common SMF record headers fields and the triplet fields (offset/length/number), if applicable, that locate the other sections on the record.

Offsets		Name	Length	Format	Description
0	0	SMF68LEN	2	binary	Record length. This field and the next field (total of four bytes) form the RDW (record descriptor word). See “Standard and Extended SMF record headers” on page 162 for a detailed description.
2	2	SMF68SEG	2	binary	Segment descriptor (see record length field).
4	4	SMF68FLG	1	binary	System indicator: **Bit** **Meaning when set** **0-2** Reserved **3-6** Version indicators* **7** Reserved. *See “Standard and Extended SMF record headers” on page 162 for a detailed description.
5	5	SMF68RTY	1	binary	Record type 68 (X'44').
6	6	SMF68TME	4	binary	Time since midnight, in hundredths of a second, that the record was moved into SMF buffer.
10	A	SMF68DTE	4	packed	Date when the record was moved into the SMF buffer, in the form 0*cyydddF*. See “Standard and Extended SMF record headers” on page 162 for a detailed description.
14	E	SMF68SID	4	EBCDIC	System identification (from the SID parameter).
18	12	SMF68JBN	8	EBCDIC	Job name. If a system task caused the record to be written, the job name and user identification fields contain blanks and the time and date fields contain zeros. The job name, time, and date that the reader recognized the JOB card (for this job) constitute the job log identification, or transaction name (for APPC output).
26	1A	SMF68RST	4	binary	Time since midnight, in hundredths of a second, that the reader recognized the JOB card (for this job).
30	1E	SMF68RSD	4	packed	Date when the reader recognized the JOB card (for this job), in the form 0*cyydddF*. See “Standard and Extended SMF record headers” on page 162 for a detailed description.
34	22	SMF68UIF	8	EBCDIC	User-defined identification field (taken from common exit parameter area, not from USER=parameter on job statement).
42	2A	SMF68CNM	44	EBCDIC	Name of catalog in which the entry is defined.
86	56	SMF68ONM	44	EBCDIC	Old name of the entry (obtained from the ALTER command).
130	82	SMF68NNM	44	EBCDIC	New name of the entry (obtained from the ALTER command).

Record type 69 (X'45') — VSAM Data Space Defined, Extended, or Deleted

The system no longer collects record type 69 as of January, 2000

Note that because VSAM catalogs are no longer supported and no longer exist, the system does not collect record type 69. However if you are using downlevel versions of SMF files, these explanations may still be useful.

Record type 69 is written when a VSAM data space is defined, extended, or deleted using the DEFINE or DELETE Access Method Services commands. Record type 69 is not written when a catalog or a unique data set is defined or deleted.

This record identifies the catalog in which the VSAM data space is defined and the volume on which it is (or was) allocated. It gives the number of free data space extents and the amount of unallocated space on the affected volume after the definition, extension, or deletion. It identifies the job by job log identification and user identification. The job name, time, and date that the reader recognized the JOB card (for this job) constitute the job log identification.

If a system task caused the record to be written, the job-name and user-identification fields contain blanks and the time and date fields contain zeros.

Record mapping

Header/Self-defining Section

This section contains the common SMF record headers fields and the triplet fields (offset/length/number), if applicable, that locate the other sections on the record.

Offsets		Name	Length	Format	Description
0	0	SMF69LEN	2	binary	Record length. This field and the next field (total of four bytes) form the RDW (record descriptor word). See "Standard and Extended SMF record headers" on page 162 for a detailed description.
2	2	SMF69SEG	2	binary	Segment descriptor (see record length field).
4	4	SMF69FLG	1	binary	System indicator: **Bit** **Meaning when set** **0-2** Reserved **3-6** Version indicators* **7** Reserved. *See "Standard and Extended SMF record headers" on page 162 for a detailed description.
5	5	SMF69RTY	1	binary	Record type 69 (X'45').
6	6	SMF69TME	4	binary	Time since midnight, in hundredths of a second, that the record was moved into SMF buffer.
10	A	SMF69DTE	4	packed	Date when the record was moved into the SMF buffer, in the form 0*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for a detailed description.
14	E	SMF69SID	4	EBCDIC	System identification (from the SID parameter).
18	12	SMF69JBN	8	EBCDIC	Job name. If a system task caused the record to be written, the job name and user identification fields contain blanks and the time and date fields contain zeros. The job name, time, and date that the reader recognized the JOB card (for this job) constitute the job log identification, or transaction name (for APPC output).
26	1A	SMF69RST	4	binary	Time since midnight, in hundredths of a second, that the reader recognized the JOB card (for this job).
30	1E	SMF69RSD	4	packed	Date when the reader recognized the JOB card (for this job), in the form 0*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for a detailed description.
34	22	SMF69UIF	8	EBCDIC	User-defined identification field (taken from common exit parameter area, not from USER=parameter on job statement).

Offsets		Name	Length	Format	Description
42	2A	SMF69CUU	2	binary	Device number.
44	2C	SMF69IND	2	binary	Spindle identification.
46	2E	SMF69NDS	2	binary	Number of free data space extents on the affected volume after the data space is defined, extended, or deleted.
48	30	SMF69NUC	2	binary	Number of unallocated cylinders in all of the data spaces on the volume.
50	32	SMF69NUT	2	binary	Number of unallocated tracks in all of the data spaces on the volume in addition to the number of unallocated cylinders.
52	34	SMF69LNC	2	binary	Number of cylinders in the largest continuous unallocated area in any data space on the volume.
54	36	SMF69LNT	2	binary	Number of tracks (in addition to the number of cylinders) in the largest continuous unallocated area in any data space on the volume.
56	38	SMF69CNM	44	EBCDIC	Name of catalog in which the data space is defined.
100	64	SMF69VSR	6	EBCDIC	Volume serial number of the volume on which the data space is defined.

Record type 70 (X'46') — RMF Processor Activity

Record type 70 has the following subtypes:

- **Subtype 1** — contains measurement data for general and special purpose processors, logical partitions, and internal coupling facilities. It has the following sections:

  CPU control section
  Contains general CPU related information.

  CPU data section
  Contains general information on CPU use during the interval.

  ASID Data Area section
  Contains address space use during the interval.

  PR/SM Partition data section
  Contains a configured logical partition.

  PR/SM Logical Processor data section
  Contains a PR/SM logical processor data block.

  CPU Identification section
  Identifies a CPU type.

  Logical Core data section
  Contains logical core measurements in a multithreading environment.

  Tenant Resource Group data section
  Contains CPU activity data for tenant resource groups.

- **Subtype 2** — contains measurement data for cryptographic coprocessors and accelerators. It has the following sections:

  Cryptographic CCA Coprocessor data section
  Contains measurement data for cryptographic CCA coprocessors.

  Cryptographic Accelerator data section
  Contains measurement data for cryptographic accelerators.

  ICSF Services data section
  Contains measurement data of selected Integrated Cryptographic Service Facility (ICSF) activities.

  Cryptographic PKCS11 Coprocessor data section
  Contains measurement data for cryptographic PKCS11 coprocessors.

Record type 70 is written for each measurement interval and when the session terminates. As with all SMF records produced by RMF, it contains a header section followed by the RMF product section.

Macro to Symbolically Address Record Type 70: The SMF record mapping macro for all records produced by RMF is ERBSMFR. Its format is ERBSMFR (*n1*,*n2*,...) where *n1*,*n2*, ... are the SMF record types you want to map. Note that the parentheses are required only when two or more record types are specified. The mapping macro resides in SYS1.MACLIB.

For information on using RMF, see *z/OS RMF Reporter User's Guide*. For information on Monitor I and II, see *z/OS RMF Report Analysis*.

Record environment

The following conditions exist for the generation of this record:

Macro
SMFWTM (record exit: IEFU83)

Mode
Task

Storage Residency
31-bit

Record mapping

Header/Self-defining Section

This section contains the common SMF record headers fields and the triplet fields (offset/length/number), if applicable, that locate the other sections on the record.

Offsets		Name	Length	Format	Description
0	0	SMF70LEN	2	binary	Record length. This field and the next field (total of four bytes) form the RDW (record descriptor word). See "Standard and Extended SMF record headers" on page 162 for a detailed description.
2	2	SMF70SEG	2	binary	Segment descriptor (see record length field).
4	4	SMF70FLG	1	binary	System indicator: **Bit** **Meaning when set** **0** New record format **1** Subtypes used **2** Reserved. **3-6** Version indicators* **7** System is running in PR/SM mode. *See "Standard and Extended SMF record headers" on page 162 for a detailed description.
5	5	SMF70RTY	1	binary	Record type 70 (X'46').
6	6	SMF70TME	4	binary	Time since midnight, in hundredths of a second, that the record was moved into the SMF buffer.
10	A	SMF70DTE	4	packed	Date when the record was moved into the SMF buffer, in the form 0*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for a detailed description.
14	E	SMF70SID	4	EBCDIC	System identification (from the SMFPRMxx SID parameter).

Offsets		Name	Length	Format	Description
18	12	SMF70SSI	4	EBCDIC	Subsystem identification (‘RMF’).
22	16	SMF70STY	2	binary	Record subtype.
24	18	SMF70TRN	2	binary	Number of triplets in this record. A triplet is a set of three SMF fields (offset/length/number values) that defines a section of the record. The offset is the offset from the RDW.
26	1A		2		Reserved.
28	1C	SMF70PRS	4	binary	Offset to RMF product section from the RDW.
32	20	SMF70PRL	2	binary	Length of RMF product section.
34	22	SMF70PRN	2	binary	Number of RMF product sections.
Individual header extension for subtype 1:					
36	24	SMF70CCS	4	binary	Offset to CPU control section from RDW.
40	28	SMF70CCL	2	binary	Length of CPU control section.
42	2A	SMF70CCN	2	binary	Number of CPU control section.
44	2C	SMF70CPS	4	binary	Offset to CPU data section from RDW.
48	30	SMF70CPL	2	binary	Length of CPU data section.
50	32	SMF70CPN	2	binary	Number of CPU data sections in this record.
52	34	SMF70ASS	4	binary	Offset to ASID Data Area section from RDW.
56	38	SMF70ASL	2	binary	Length of ASID Data Area section.
58	3A	SMF70ASN	2	binary	Number of ASID Data Area sections.
60	3C	SMF70BCS	4	binary	Offset to PR/SM Partition data section from RDW.
64	40	SMF70BCL	2	binary	Length of PR/SM Partition data section.
66	42	SMF70BCN	2	binary	Number of PR/SM Partition data sections.
68	44	SMF70BVS	4	binary	Offset to PR/SM Logical Processor data section from RDW.
72	48	SMF70BVL	2	binary	Length of PR/SM Logical Processor data section.
74	4A	SMF70BVN	2	binary	Number of PR/SM Logical Processor data sections.
76	4C	SMF70CNS	4	binary	Offset to CPU-identification name sections.
80	50	SMF70CNL	2	binary	Length of CPU-identification name section.
82	52	SMF70CNN	2	binary	Number of CPU-identification name sections.
84	54	SMF70COS	4	binary	Offset to Logical Core data section from RDW.
88	58	SMF70COL	2	binary	Length of Logical Core data section.
90	5A	SMF70CON	2	binary	Number of Logical Core data sections.
92	5C	SMF70TNS	4	binary	Offset to Tenant Resource Group data section from RDW.
96	60	SMF70TNL	2	binary	Length of Tenant Resource Group data section.
98	62	SMF70TNN	2	binary	Number of Tenant Resource Group data sections.
Individual header extension for subtype 2:					
36	24	SMF7023S	4	binary	Offset to Cryptographic CCA Coprocessor data section.
40	28	SMF7023L	2	binary	Length of Cryptographic CCA Coprocessor data section.
42	2A	SMF7023N	2	binary	Number of Cryptographic CCA Coprocessor data sections.
44	2C	SMF7024S	4	binary	Offset to Cryptographic Accelerator data section.
48	30	SMF7024L	2	binary	Length of Cryptographic Accelerator data section.
50	32	SMF7024N	2	binary	Number of Cryptographic Accelerator data sections.

Offsets		Name	Length	Format	Description
52	34	SMF702CS	4	binary	Offset to ICSF Services data section.
56	38	SMF702CL	2	binary	Length of ICSF Services data section.
58	3A	SMF702CN	2	binary	Number of ICSF Services data sections.
60	3C	SMF7025S	4	binary	Offset to Cryptographic PKCS11 Coprocessor data section.
64	40	SMF7025L	2	binary	Length of Cryptographic PKCS11 Coprocessor data section.
66	42	SMF7025N	2	binary	Number of Cryptographic PKCS11 Coprocessor data sections.

RMF Product Section

Offsets		Name	Length	Format	Description
0	0	SMF70MFV	2	packed	RMF version number.
2	2	SMF70PRD	8	EBCDIC	Product name (‘RMF’).
10	A	SMF70IST	4	packed	Time that the RMF measurement interval started, in the form 0*hhmmssF*, where *hh* is the hours, *mm* is the minutes, *ss* is the seconds, and *F* is the sign.
14	E	SMF70DAT	4	packed	Date when the RMF measurement interval started, in the form 0*cyydddF*. See “Standard and Extended SMF record headers” on page 162 for a detailed description.
18	12	SMF70INT	4	packed	Duration of the RMF measurement interval, in the form *mmsstttF* where *mm* is the minutes, *ss* is the seconds, *ttt* is the milliseconds, and *F* is the sign. (The end of the measurement interval is the sum of the recorded start time and this field.)
22	16		2		Reserved.
24	18	SMF70SAM	4	binary	Number of RMF samples.
28	1C		2		Reserved.
30	1E	SMF70FLA	2	binary	Flags **Bit** **Meaning when set** **0** Reserved. **1** Samples have been skipped. **2** Record was written by RMF Monitor III. **3** Interval was synchronized with SMF. **4 - 8** Reserved. **9** zIIP boost was active during entire interval. **10** Speed boost was active during entire interval. **11 - 12** Reserved. **13 - 15** Boost class: 001: IPL 010: Shutdown 011: Recovery process **Note:** The boost class value is valid only when one or more boosts is active; that is, a boost active bit is also on.
32	20		4		Reserved.

Offsets		Name	Length	Format	Description
36	24	SMF70CYC	4	packed	Sampling cycle length, in the form 000*tttt**F*, where *tttt* is the milliseconds and *F* is the sign (taken from CYCLE option). The range of values is 0.050 to 9.999 seconds.
40	28	SMF70MVS	8	EBCDIC	z/OS software level (consists of an acronym and the version, release, and modification level - ZV*vvrrmm*).
48	30	SMF70IML	1	binary	Indicates the type of processor complex on which data measurements were taken. **Value** **Meaning** **3** 9672, zSeries
49	31	SMF70PRF	1	binary	Processor flags. **Bit** **Meaning when set** **0** The system has expanded storage **1** The processor is enabled for ES connection architecture (ESCA) **2** There is an ES connection director in the configuration **3** System is running in z/Architecture® mode **4** At least one zAAP is currently installed **5** At least one zIIP is currently installed **6** Enhanced DAT facility 1 available **7** Enhanced DAT facility 2 available
50	32	SMF70PTN	1	binary	PR/SM partition number of the partition that wrote this record.
51	33	SMF70SRL	1	binary	SMF record level change number (X'8E' for subtype 1 records or X'8F' for subtype 2 records for z/OS V2R4 RMF with RMF Data Gatherer APAR OA59330). This field enables processing of SMF record level changes in an existing release.
52	34	SMF70IET	8	char	Interval expiration time token. This token can be used to identify other than RMF records that belong to the same interval (if interval was synchronized with SMF).
60	3C	SMF70LGO	8	binary	Offset GMT to local time (STCK format).
68	44	SMF70RAO	4	binary	Offset to reassembly area relative to start of RMF product section.
72	48	SMF70RAL	2	binary	Length of reassembly area. Area consists of a fixed header and a variable number of information blocks. Length depends on the record type/subtype, but is fixed for a specific type/subtype.

Offsets		Name	Length	Format	Description
74	4A	SMF70RAN	2	binary	Reassembly area indicator. **Value** **Meaning** **0** Record is not broken. **1** Record is broken. **Note:** This field is used to indicate whether an SMF record is a broken record. Therefore, offset (SMF70RAO) and length (SMF70RAL) are only valid if SMF70RAN = 1. A reassembly area is only present in broken records.
76	4C	SMF70OIL	2	binary	Original interval length as defined in the session or by SMF (in seconds).
78	4E	SMF70SYN	2	binary	SYNC value in seconds.
80	50	SMF70GIE	8	binary	Projected gathering interval end (STCK format) GMT time.
88	58	SMF70XNM	8	EBCDIC	Sysplex name as defined in parmlib member COUPLExx.
96	60	SMF70SNM	8	EBCDIC	System name for current system as defined in parmlib member IEASYSxx SYSNAME parameter.
Reassembly Area:					
0	0	SMF70RBR	2	binary	Total number of broken records built from the original large record.
2	2	SMF70RSQ	2	binary	Sequence number of this broken record. Every broken record built from the same large record must have a unique sequence number, it is in the range from 1 to SMF70RBR.
4	4	SMF70RIO	4	binary	Offset to first reassembly information block relative to start of reassembly area header.
8	8	SMF70RIL	2	binary	Length of reassembly information block.
10	A	SMF70RIN	2	binary	Number of reassembly information blocks (same value as SMF70TRN in header section).
12	C		4		Reserved.
Reassembly Area Information Block:					
0	0	SMF70RNN	2	binary	Total number of sections in the original large record. This field contains information of how many sections of a specific type were contained in the original SMF record. This field is a copy of the number field of the triplet in the original (non broken) record.
2	2	SMF70RPP	2	binary	Position of the first of one or more consecutive sections described by this block as in the original record. Values in the range of 1 to SMF70RNN are valid for correct processing. A value of 0 will skip processing of this information block. This field provides information where the sections that are part of this broken record were placed in the original record before the split took place. The actual number of consecutive sections contained in this record is available from the actual triplet in the header extension.

Subtype 1 — CPU, PR/SM, and ICF Activity

CPU Control Section

There is one section per record.

Offsets		Name	Length	Format	Description
0	0	SMF70MOD	2	binary	CPU processor family.

Offsets		Name	Length	Format	Description
2	2	SMF70VER	1	binary	CPU version number — meaning varies with model number.
3	3	SMF70BNP	1	binary	Number of physical processors assigned for use by PR/SM.
4	4	SMF70INB	1	binary	PR/SM indicator bits **Bit** **Meaning when set** **0** PR/SM diagnose X'204' failure. **1** Number of physical processors has changed. **2** Dispatch interval time has been changed. **3** An additional partition, that is not included in the count of configured partitions, is presented with a name of “PHYSICAL”. This partition includes all of the uncaptured time that was used by the LPAR management time support feature but could not be attributed to a specific logical partition. **4** PR/SM - Diagnose X'204' extended data is supported. **5** Simplified Diagnose X'204' data provided for system running as z/VM® guest. CPU consumption by z/VM itself provided with partition data section for logical partition named `PHYSICAL`. **6-7** Reserved.
5	5	SMF70STF	1	binary	Flag **Bit** **Meaning when set** **0** The STSI facility is available for the CPC. **1** Physical CPU adjustment factor has been changed. **2** Service units available to MVS image have been changed. **3** SMF70LAC is provided for systems running in LPAR mode or as a z/VM guest. The value does no longer include CPU wait times. **4** SMF70MDL is the model-capacity identifier and SMF70HWM is the physical model. If this bit is OFF, SMF70MDL represents both model-capacity and physical model. **5** OPT parameter BLWLTRPCT changed. **6** OPT parameter BLWLINTHD changed. **7** Field SMF70GAU is valid.
6	6	SMF70GTS	2	binary	Dispatch accumulated interval time in milliseconds. A zero value indicates that the dispatch interval was dynamically determined.

Offsets		Name	Length	Format	Description
8	8	SMF70MDL	16	EBCDIC	CPC model identifier. See bit 4 of SMF70STF.
24	18	SMF70DSA	2	binary	Number of Diagnose samples.
26	1A	SMF70IFA	2	binary	Number of zAAPs online at the end of the interval.
28	1C	SMF70CPA	4	binary	Physical CPU adjustment factor based on alternate CPU capability. This value is replaced by SMF70CPA_actual and SMF70CPA_scaling_factor.
32	20	SMF70WLA	4	binary	Processor capacity available to MVS image measured in MSUs (millions of service units) per hour. The value takes into account whether or not the image has a defined capacity limit. (For systems running as VM guest, this is the VM capacity).
36	24	SMF70LAC	4	binary	Long-term average of CPU service (millions of service units). Scope of the value depends on bit 3 of SMF70STF.
40	28	SMF70HOF	8	binary	Hypervisor date/time offset in STCK format (aka Sysplex timer offset).
48	30	SMF70HWM	16	EBCDIC	CPC physical model identifier. Valid if bit 4 of SMF70STF is set.
64	40	SMF70SUP	2	binary	Number of zIIPs online at the end of the interval.
66	42	SMF70GJT	8	EBCDIC	Time in STCK format when the partition that wrote this record has joined or left a capacity group (last change of group name). Also set at IPL time, when the partition is not a member of a capacity group.
74	4A	SMF70POM	4	EBCDIC	EBCDIC plant code that identifies the plant of manufacture for the configuration. The plant code is left-justified with trailing blank characters if necessary.
78	4E	SMF70CSC	16	EBCDIC	EBCDIC sequence code of the configuration. The sequence code is right-justified with leading EBCDIC zeroes if necessary.
94	5E	SMF70HHF	1	binary	Additional flags. **Bit** **Meaning when set** **0** HiperDispatch mode supported **1** HiperDispatch mode is active **2** HiperDispatch mode changed during interval **3** Failure returned by HISMT service. Values in Logical Core data section and values provided in SMF70MCF, SMF70MCFS, SMF70MCFI, SMF70CF, SMF70CFS, SMF70CFI, SMF70ATD, SMF70ATDS, and SMF70ATDI are invalid. **4** Absolute MSU capping is active for this partition. **5** SMF70OS_PRTCT is valid. **6-7** Reserved.
95	5F	SMF70CR	1	binary	ZEP field 0.
96	60	SMF70PMI	4	binary	Accumulated number of blocked dispatchable units per second that may get promoted in their dispatch priority. To get the average promote event rate, divide SMF70PMI by SMF70SAM.

Offsets		Name	Length	Format	Description
100	64	SMF70PMU	4	binary	Number of blocked dispatchable units being promoted during the interval.
104	68	SMF70PMW	4	binary	Accumulated number of address spaces and enclaves being blocked during the interval. To get the average number of waiters for promote, divide SMF70PMW by SMF70SAM.
108	6C	SMF70PMP	4	binary	Maximum number of address spaces and enclaves found being blocked during the interval.
112	70	SMF70PMT	2	binary	1/1000s of the CPU capacity for promote slices (OPT parameter BLWLTRPCT).
114	72	SMF70PML	2	binary	Swapped-in starvation threshold. When an address space or enclave has not received CPU service within this time interval although it has ready-to-run work, it is considered being blocked (OPT parameter BLWLINTHD).
116	74	SMF70MPC	16	EBCDIC	CPC model identifier indicating the permanent capacity of the CPC, without the temporarily increased capacity and the temporarily available replacement capacity. The identifier is left justified with trailing blanks if necessary. This field is zero, if not supported by the hardware.
132	84	SMF70MTC	16	EBCDIC	CPC model identifier indicating the temporary capacity of the CPC, which is the total of permanent capacity and temporarily increased capacity, without the temporarily available replacement capacity. The identifier is left justified with trailing blanks if necessary. This field is zero, if not supported by the hardware.
148	94	SMF70MCR	4	binary	CPC model capacity rating associated with the model as identified by SMF70MDL. This field is zero, if not supported by the hardware.
152	98	SMF70MPR	4	binary	CPC permanent model capacity rating associated with the model as identified by SMF70MPC. This field is zero, if not supported by the hardware.
156	9C	SMF70MTR	4	binary	CPC temporary model capacity rating associated with the model as identified by SMF70MTC. This field is zero, if not supported by the hardware.
160	A0	SMF70ZEP	4	binary	ZEP field 1.
164	A4	SMF70ZER	8	binary	ZEP field 2.
172	AC	SMF70ZEE	8	binary	ZEP field 3.
180	B4	SMF70ZEC	8	binary	ZEP field 4.
188	BC	SMF70NRM	4	binary	Normalization factor for zIIP. Multiply zIIP time by this value and divide by 256 to get the equivalent time on a CP.
192	C0	SMF70GAU	4	binary	Long-term average of CPU service in millions of service units which would be allowed by the limit of the capacity group but is not used by its members. If the value is negative, the group is capped. Valid if bit 7 of SMF70STF is set.
196	C4	SMF70ZEI	8	binary	ZEP field 5.
204	CC	SMF70NCR	4	binary	Nominal model-capacity rating in MSU/hour. When non-zero, this value is associated with the nominal model capacity as identified in field SMF70MDL. When field SMF70CAI contains a value of 100, this value equals the value in field SMF70MCR.

Offsets		Name	Length	Format	Description
208	D0	SMF70NPR	4	binary	Nominal permanent model-capacity rating in MSU/ hour. When non-zero, this value is associated with the nominal permanent model capacity as identified in field SMF70MPC. When field SMF70CAI contains a value of 100, this value equals the value in field SMF70MPR.
212	D4	SMF70NTR	4	binary	Nominal temporary model-capacity rating in MSU/ hour. When non-zero, this value is associated with the nominal temporary model capacity as identified in field SMF70MTC. When field SMF70CAI contains a value of 100, this value equals the value in field SMF70MTR.
216	D8	SMF70CAI	1	binary	Capacity-adjustment indication. When zero, the indication is not reported. When in the range from 1 to 99, some amount of reduction is indicated. When 100, the machine is operating at its normal capacity. Temporary capacity changes that affect machine performance (for example, CBU or OOCoD) are not included.
217	D9	SMF70CCR	1	binary	Capacity-change reason. Valid if SMF70CAI is non-zero. When 0, no capacity change took place. When 1, the capacity change is due to the setting of a manual control. When greater than 1, the capacity change is due to an internal machine condition or due to an external machine exception.
218	DA	SMF70MCP	2	binary	Maximum CPU ID available for this IPL.
220	DC	SMF70ICP	2	binary	Highest CPU ID installed at IPL time.
222	DE	SMF70CCP	2	binary	Highest CPU ID currently installed. This number can increase upon dynamic CPU addition.
224	E0	SMF70CPA_actual	4	binary	Physical CPU adjustment factor based on Model Capacity Rating (will be used for converting processor time to service units). This value together with SMF70CPA_scaling_factor replaces SMF70CPA.
228	E4	SMF70CPA_scaling_ factor	4	binary	Scaling factor for SMF70CPA_actual.
232	E8	SMF70MCF	4	binary	Multithreading maximum capacity numerator for general purpose processors. Divide this value by 1024 to get the multithreading maximum capacity factor for all general purpose processors that were configured ONLINE for the complete interval.
236	EC	SMF70MCFS	4	binary	Multithreading maximum capacity numerator for zIIP. Divide this value by 1024 to get the multithreading maximum capacity factor for all zIIPs that were configured ONLINE for the complete interval. A zero value is reported if no zIIP is currently installed.
240	F0	SMF70MCFI	4	binary	Multithreading maximum capacity numerator for zAAP. Divide this value by 1024 to get the multithreading maximum capacity factor for all zAAPs that were configured ONLINE for the complete interval. A zero value is reported if no zAAP is currently installed.
244	F4	SMF70CF	4	binary	Multithreading capacity numerator for general purpose processors. Divide this value by 1024 to get the multithreading capacity factor for all general purpose processors that were configured ONLINE for the complete interval.

Offsets		Name	Length	Format	Description
248	F8	SMF70CFS	4	binary	Multithreading capacity numerator for zIIP. Divide this value by 1024 to get the multithreading capacity factor for all zIIPs that were configured ONLINE for the complete interval. A zero value is reported if no zIIP is currently installed.
252	FC	SMF70CFI	4	binary	Multithreading capacity numerator for zAAP. Divide this value by 1024 to get the multithreading capacity factor for all zAAPs that were configured ONLINE for the complete interval. A zero value is reported if no zAAP is currently installed.
256	100	SMF70ATD	4	binary	Average Thread Density numerator for general purpose processors . Divide this value by 1024 to get the average number of active threads for all general purpose processors that were dispatched to physical hardware and configured ONLINE for the complete interval.
260	104	SMF70ATDS	4	binary	Average Thread Density numerator for zIIP. Divide this value by 1024 to get the average number of active threads for all zIIPs that were dispatched to physical hardware and configured ONLINE for the complete interval. A zero value is reported if no zIIP is currently installed.
264	108	SMF70ATDI	4	binary	Average Thread Density numerator for zAAP. Divide this value by 1024 to get the average number of active threads for all zAAPs that were dispatched to physical hardware and configured ONLINE for the complete interval. A zero value is reported if no zAAP is currently installed.
268	10C	SMF70LACM	4	binary	Long-term average of CPU service (millions of service units) consumed by transactions classified with reporting attribute MOBILE. If an address space or enclave is part of a tenant resource group, it will not contribute to SMF70LACM.
272	110	SMF70LACA	4	binary	Long-term average of CPU service (millions of service units) consumed by transactions classified with reporting attribute CATEGORYA. If an address space or enclave is part of a tenant resource group, it will not contribute to SMF70LACA.
276	114	SMF70LACB	4	binary	Long-term average of CPU service (millions of service units) consumed by transactions classified with reporting attribute CATEGORYB. If an address space or enclave is part of a tenant resource group, it will not contribute to SMF70LACB.
280	118	SMF70ADJ	4	binary	Logical adjustment factor for CPU rate.
284	11C	SMF70LACCR	4	binary	Long-term average of CPU service (millions of service units) consumed by DFSMS data set encryption. Valid only for IBM z14® and later CPCs.
288	120	SMF70MaxPU	2	binary	When non-zero, this field indicates how many processor cores are physically available in this particular machine. When the value is 0, it is not defined for this model.
290	122	SMF70OS_PRTCT	1	binary	When non-zero, the OSPROTECT system parameter with a value other than SYSTEM is in effect. X'01' indicates OSPROTECT=1. For machines after IBM z14, may be 0 with OSPROTECT=1.
291	123	*	1	binary	Reserved.
292	124	SMF70MDL_CBP	16	EBCDIC	Reserved for future use.

Offsets		Name	Length	Format	Description
308	134	SMF70MCR_CBP	4	binary	Reserved for future use.
312	138	SMF70NCR_CBP	4	binary	Reserved for future use.
316	13C	SMF70LAC_CBP	4	binary	Reserved for future use.
320	140	SMF70CPA_actual_CBP	4	binary	Reserved for future use.
324	144	SMF70_IPL_TIME	8	binary	IPL time of partition, in TOD format.
332	14C	SMF70_TRG_M_CNT	4	binary	Number of times sampling of tenant resource group memory consumption happened.
336	150	SMF70CRW	4	binary	Reserved.
340	154	SMF70CPC_TYPE	4	binary	CPC Type.

CPU Data Section

This section contains general information on CPU use during the interval. All measurements are provided on a per logical processor basis.

Offsets		Name	Length	Format	Description
0	0	SMF70WAT	8	binary	CPU wait time, where bit 51 = 1 microsecond. That is, the amount of time that the CPU is not processing instructions (PSW wait state bit is on). Data could be incorrect if a SET CLOCK occurred during the RMF interval. SMF70WAT is used in RMF report calculations **Note:** This field is incorrect if MVS is running under VM.
8	8	SMF70CID	2	binary	CPU identification
10	A	SMF70CNF	1	binary	Configuration activity indicator **Bit** **Meaning when set** **0-3** Reserved **4** Data available for complete interval **5** CPU reconfigured during post processor duration interval **6** CPU reconfigured during the measurement interval (data for this CPU is incorrect) **7** CPU online at end of interval.
11	B		1		Reserved.
12	C	SMF70SER	3	packed	CPU serial number (6 hexadecimal digits).
15	F	SMF70TYP	1	binary	CPU type. **Value** **Meaning** **0** General purpose CP **1** zAAP **2** zIIP
16	10	SMF70SLH	4	binary	Number of entries to the I/O SLIH; number of I/O interruptions that this processor handled by entry into the I/O interrupt handler.

Offsets		Name	Length	Format	Description
20	14	SMF70TPI	4	binary	Number of TPI (test pending interrupt) with CC=1; number of I/O interruptions that this processor handled from issuing the TPI instruction.
24	18	SMF70VFS	4	binary	Number of samples when the vector bit in the PSA image was on, which is used to determine the percentage of time vector affinity was on.
28	1C	SMF70V	1	binary	Vector configuration **Bit** **Meaning when set** **0** Vector was online **1-7** Reserved.
29	1D		3		Reserved.
32	20	SMF70PAT	8	binary	CPU parked time, where bit 51 = 1 microsecond.
40	28	SMF70TCB	8	binary	Number of TCB dispatches for this CPU.
48	30	SMF70SRB	8	binary	Number of SRB dispatches for this CPU.
56	38	SMF70NIO	8	binary	Number of I/Os for this CPU.
64	40	SMF70SIG	8	binary	Total number of SIGPs done by this CPU.
72	48	SMF70WTD	8	binary	Wait dispatch count for this CPU.
80	50	SMF70WTS	4	binary	The number of times PR/SM issued a warning-track interruption to a logical processor and z/OS was able to return the logical processor within the grace period.
84	54	SMF70WTU	4	binary	The number of times PR/SM issued a warning-track interruption to a logical processor and z/OS was unable to return the logical processor within the grace period.
88	58	SMF70WTI	4	binary	Amount of time in milliseconds that a logical processor was yielded to PR/SM due to warning-track processing.

ASID Data Area Section

This section contains address space use during the interval.

Offsets		Name	Length	Format	Description
0	0	SMF70RMN	2	binary	Ready minimum value over interval.
2	2	SMF70RMM	2	binary	Ready maximum value over interval.
4	4	SMF70RTT	4	binary	Ready total value over interval.
8	8	SMF70R00	4	binary	Count of times ready value was zero.
12	C	SMF70R01	4	binary	Count of times ready value was 1.
16	10	SMF70R02	4	binary	Count of times ready value was 2.
20	14	SMF70R03	4	binary	Count of times ready value was 3.
24	18	SMF70R04	4	binary	Count of times ready value was 4.
28	1C	SMF70R05	4	binary	Count of times ready value was 5.
32	20	SMF70R06	4	binary	Count of times ready value was 6.
36	24	SMF70R07	4	binary	Count of times ready value was 7.
40	28	SMF70R08	4	binary	Count of times ready value was 8.
44	2C	SMF70R09	4	binary	Count of times ready value was 9.
48	30	SMF70R10	4	binary	Count of times ready value was 10.

Offsets		Name	Length	Format	Description
52	34	SMF70R11	4	binary	Count of times ready value was 11.
56	38	SMF70R12	4	binary	Count of times ready value was 12.
60	3C	SMF70R13	4	binary	Count of times ready value was 13.
64	40	SMF70R14	4	binary	Count of times ready value was 14.
68	44	SMF70R15	4	binary	Count of times ready value was 15 or more.
72	48	SMF70IMN	2	binary	IN users minimum over interval.
74	4A	SMF70IMM	2	binary	IN users maximum over interval.
76	4C	SMF70ITT	4	binary	IN users total value over interval.
80	50	SMF70I00	4	binary	Count of times IN users was zero.
80	54	SMF70I01	4	binary	Count of times IN users was 1 or 2.
88	58	SMF70I02	4	binary	Count of times IN users was 3 or 4.
92	5C	SMF70I03	4	binary	Count of times IN users was 5 or 6.
96	60	SMF70I04	4	binary	Count of times IN users was 7 or 8.
100	64	SMF70I05	4	binary	Count of times IN users was 9 or 10.
104	68	SMF70I06	4	binary	Count of times IN users was 11 - 15.
108	6C	SMF70I07	4	binary	Count of times IN users was 16 - 20.
112	70	SMF70I08	4	binary	Count of times IN users was 21 - 25.
116	74	SMF70I09	4	binary	Count of times IN users was 26 - 30.
120	78	SMF70I10	4	binary	Count of times IN users was 31 - 35.
124	7C	SMF70I11	4	binary	Count of times IN users was 36 or more.
128	80	SMF70OMN	2	binary	Out users minimum over interval.
130	82	SMF70OMM	2	binary	Out users maximum over interval.
132	84	SMF70OTT	4	binary	Out users total value over interval.
136	88	SMF70O00	4	binary	Count of times out users was zero.
140	8C	SMF70O01	4	binary	Count of times out users was 1 or 2.
144	90	SMF70O02	4	binary	Count of times out users was 3 or 4.
148	94	SMF70O03	4	binary	Count of times out users was 5 or 6.
152	98	SMF70O04	4	binary	Count of times out users was 7 or 8.
156	9C	SMF70O05	4	binary	Count of times out users was 9 or 10.
160	A0	SMF70O06	4	binary	Count of times out users was 11 - 15.
164	A4	SMF70O07	4	binary	Count of times out users was 16 - 20.
168	A8	SMF70O08	4	binary	Count of times out users was 21 - 25.
172	AC	SMF70O09	4	binary	Count of times out users was 26 - 30.
176	B0	SMF70O10	4	binary	Count of times out users was 31 - 35.
180	B4	SMF70O11	4	binary	Count of times out users was 36 or more.
184	B8	SMF70WMN	2	binary	Wait user minimum over interval.
186	BA	SMF70WMM	2	binary	Wait users maximum over interval.
188	BC	SMF70WTT	4	binary	Wait users total value over interval.
192	C0	SMF70W00	4	binary	Count of times wait users was zero.
196	C4	SMF70W01	4	binary	Count of times wait users was 1 or 2.

Offsets		Name	Length	Format	Description
200	C8	SMF70W02	4	binary	Count of times wait users was 3 or 4.
204	CC	SMF70W03	4	binary	Count of times wait users was 5 or 6.
208	D0	SMF70W04	4	binary	Count of times wait users was 7 or 8.
212	D4	SMF70W05	4	binary	Count of times wait users was 9 or 10.
216	D8	SMF70W06	4	binary	Count of times wait users was 11 - 15.
220	DC	SMF70W07	4	binary	Count of times wait users was 16 - 20.
224	E0	SMF70W08	4	binary	Count of times wait users was 21 - 25.
228	E4	SMF70W09	4	binary	Count of times wait users was 26 - 30.
232	E8	SMF70W10	4	binary	Count of times wait users was 31 - 35.
236	EC	SMF70W11	4	binary	Count of times wait users was 36 or more.
240	F0	SMF70BMN	2	binary	Batch users minimum over interval.
242	F2	SMF70BMM	2	binary	Batch users maximum over interval.
244	F4	SMF70BTT	4	binary	Batch users total value over interval.
248	F8	SMF70B00	4	binary	Count of times batch users was zero.
252	FC	SMF70B01	4	binary	Count of times batch users was 1 or 2.
256	100	SMF70B02	4	binary	Count of times batch users was 3 or 4.
260	104	SMF70B03	4	binary	Count of times batch users was 5 or 6.
264	108	SMF70B04	4	binary	Count of times batch users was 7 or 8.
268	10C	SMF70B05	4	binary	Count of times batch users was 9 or 10
272	110	SMF70B06	4	binary	Count of times batch users was 11 - 15.
276	114	SMF70B07	4	binary	Count of times batch users was 16 - 20.
280	118	SMF70B08	4	binary	Count of times batch users was 21 - 25.
284	11C	SMF70B09	4	binary	Count of times batch users was 26 - 30.
288	120	SMF70B10	4	binary	Count of times batch users was 31 - 35.
292	124	SMF70B11	4	binary	Count of times batch users was 36 or more.
296	128	SMF70SMN	2	binary	Started users minimum over interval.
298	12A	SMF70SMM	2	binary	Started users maximum over interval.
300	12C	SMF70STT	4	binary	Started users total value over interval.
304	130	SMF70S00	4	binary	Count of times users was zero.
308	134	SMF70S01	4	binary	Count of times users was 1 or 2.
312	138	SMF70S02	4	binary	Count of times users was 3 or 4.
316	13C	SMF70S03	4	binary	Count of times users was 5 or 6.
320	140	SMF70S04	4	binary	Count of times users was 7 or 8.
324	144	SMF70S05	4	binary	Count of times users was 9 or 10.
328	148	SMF70S06	4	binary	Count of times users was 11 - 15.
332	14C	SMF70S07	4	binary	Count of times users was 16 - 20.
336	150	SMF70S08	4	binary	Count of times users was 21 - 25.
340	154	SMF70S09	4	binary	Count of times users was 26 - 30.
344	158	SMF70S10	4	binary	Count of times users was 31 - 35.
348	15C	SMF70S11	4	binary	Count of times users was 36 or more.

Offsets		Name	Length	Format	Description
352	160	SMF70TMN	2	binary	TSO/E users minimum over interval.
354	162	SMF70TMM	2	binary	TSO/E users maximum over interval.
356	164	SMF70TTT	4	binary	TSO/E users total value over interval.
360	168	SMF70T00	4	binary	Count of times TSO/E users was zero.
364	16C	SMF70T01	4	binary	Count of times TSO/E users was 1 or 2.
368	170	SMF70T02	4	binary	Count of times TSO/E users was 3 or 4.
372	174	SMF70T03	4	binary	Count of times TSO/E users was 5 or 6.
376	178	SMF70T04	4	binary	Count of times TSO/E users was 7 or 8.
380	17C	SMF70T05	4	binary	Count of times TSO/E users was 9 or 10.
384	180	SMF70T06	4	binary	Count of times TSO/E users was 11 - 15.
388	184	SMF70T07	4	binary	Count of times TSO/E users was 16 - 20.
392	188	SMF70T08	4	binary	Count of times TSO/E users was 21 - 25.
396	18C	SMF70T09	4	binary	Count of times TSO/E users was 26 - 30.
400	190	SMF70T10	4	binary	Count of times TSO/E users was 31 - 35.
404	194	SMF70T11	4	binary	Count of times TSO/E users was 36 or more.
408	198	SMF70LMN	2	binary	Logical ready users minimum over interval.
410	19A	SMF70LMM	2	binary	Logical ready users maximum over interval.
412	19C	SMF70LTT	4	binary	Logical ready users total value over interval.
416	1A0	SMF70L00	4	binary	Count of times the number of logical ready users was zero.
420	1A4	SMF70L01	4	binary	Count of times the number of logical ready users was 1 or 2.
424	1A8	SMF70L02	4	binary	Count of times the number of logical ready users was 3 or 4.
428	1AC	SMF70L03	4	binary	Count of times the number of logical ready users was 5 or 6.
432	1B0	SMF70L04	4	binary	Count of times the number of logical ready users was 7 or 8.
436	1B4	SMF70L05	4	binary	Count of times the number of logical ready users was 9 or 10.
440	1B8	SMF70L06	4	binary	Count of times the number of logical ready users was 11 - 15.
444	1BC	SMF70L07	4	binary	Count of times the number of logical ready users was 16 - 20.
448	1C0	SMF70L08	4	binary	Count of times the number of logical ready users was 21 - 25.
452	1C4	SMF70L09	4	binary	Count of times the number of logical ready users was 26 - 30.
456	1C8	SMF70L10	4	binary	Count of times the number of logical ready users was 31 - 35.
460	1CC	SMF70L11	4	binary	Count of times the number of logical ready users was 36 or more.
464	1D0	SMF70AMN	2	binary	Logical wait users minimum over interval.
466	1D2	SMF70AMM	2	binary	Logical wait users maximum over interval.
468	1D4	SMF70ATT	4	binary	Logical wait users total value over interval.
472	1D8	SMF70A00	4	binary	Count of times the number of logical wait users was zero.
476	1DC	SMF70A01	4	binary	Count of times the number of logical wait users was 1 or 2.
480	1E0	SMF70A02	4	binary	Count of times the number of logical wait users was 3 or 4.
484	1E4	SMF70A03	4	binary	Count of times the number of logical wait users was 5 or 6.
488	1E8	SMF70A04	4	binary	Count of times the number of logical wait users was 7 or 8.
492	1EC	SMF70A05	4	binary	Count of times the number of logical wait users was 9 or 10.
496	1F0	SMF70A06	4	binary	Count of times the number of logical wait users was 11 - 15.

Offsets		Name	Length	Format	Description
500	1F4	SMF70A07	4	binary	Count of times the number of logical wait users was 16 - 20.
504	1F8	SMF70A08	4	binary	Count of times the number of logical wait users was 21 - 25.
508	1FC	SMF70A09	4	binary	Count of times the number of logical wait users was 26 - 30.
512	200	SMF70A10	4	binary	Count of times the number of logical wait users was 31 - 35.
516	204	SMF70A11	4	binary	Count of times the number of logical wait users was 36 or more.
520	208	SMF70PMN	2	binary	Minimum number of ASCH address spaces. An ASCH address space is scheduled by the APPC/MVS transaction scheduler.
522	20A	SMF70PMM	2	binary	Maximum number of ASCH address spaces.
524	20C	SMF70PTT	4	binary	Total number of ASCH address spaces.
528	210	SMF70P00	4	binary	Number of times when 0 ASCH address spaces were found.
532	214	SMF70P01	4	binary	Number of times when 1 - 2 ASCH address spaces were found.
536	218	SMF70P02	4	binary	Number of times when 3 - 4 ASCH address spaces were found.
540	21C	SMF70P03	4	binary	Number of times when 5 - 6 ASCH address spaces were found.
544	220	SMF70P04	4	binary	Number of times when 7 - 8 ASCH address spaces were found.
548	224	SMF70P05	4	binary	Number of times when 9 - 10 ASCH address spaces were found.
552	228	SMF70P06	4	binary	Number of times when 11 - 15 ASCH address spaces were found.
556	22A	SMF70P07	4	binary	Number of times when 16 - 20 ASCH address spaces were found.
560	230	SMF70P08	4	binary	Number of times when 21 - 25 ASCH address spaces were found.
564	234	SMF70P09	4	binary	Number of times when 26 - 30 ASCH address spaces were found.
568	238	SMF70P10	4	binary	Number of times when 31 - 35 ASCH address spaces were found.
572	23A	SMF70P11	4	binary	Number of times when 36 or more ASCH address spaces were found.
576	240	SMF70XMN	2	binary	Minimum number of OMVS address spaces.
578	242	SMF70XMM	2	binary	Maximum number of OMVS address spaces.
580	244	SMF70XTT	4	binary	Total number of OMVS address spaces.
584	248	SMF70X00	4	binary	Number of times when zero OMVS address spaces were found.
588	24C	SMF70X01	4	binary	Number of times when 1 - 2 OMVS address spaces were found.
592	250	SMF70X02	4	binary	Number of times when 3 - 4 OMVS address spaces were found.
596	254	SMF70X03	4	binary	Number of times when 5 - 6 OMVS address spaces were found.
600	258	SMF70X04	4	binary	Number of times when 7 - 8 OMVS address spaces were found.
604	25C	SMF70X05	4	binary	Number of times when 9 - 10 OMVS address spaces were found.
608	260	SMF70X06	4	binary	Number of times when 11 - 15 OMVS address spaces were found.
612	264	SMF70X07	4	binary	Number of times when 16 - 20 OMVS address spaces were found.
616	268	SMF70X08	4	binary	Number of times when 21 - 25 OMVS address spaces were found.
620	26C	SMF70X09	4	binary	Number of times when 26 - 30 OMVS address spaces were found.
624	270	SMF70X10	4	binary	Number of times when 31 - 35 OMVS address spaces were found.
628	274	SMF70X11	4	binary	Number of times when 36 or more OMVS address spaces were found.
Fields SMF70Q00 to SMF70Q12 count the In Ready users based on the number **N** of logical processors being online when the sample was taken. With HiperDispatch mode active and an SMF record level SMF70SRL ≥ X'55'(85), **N** is the number of logical processors being ***online and not parked*** when the sample was taken.					
632	278	SMF70Q00	4	binary	Count of times In Ready users was less or equal N.
636	27C	SMF70Q01	4	binary	Count of times In Ready users was N+1.

Offsets		Name	Length	Format	Description
640	280	SMF70Q02	4	binary	Count of times In Ready users was N+2.
644	284	SMF70Q03	4	binary	Count of times In Ready users was N+3.
648	288	SMF70Q04	4	binary	Count of times In Ready users was N+4 or N+5.
652	28C	SMF70Q05	4	binary	Count of times In Ready users was N+6 to N+10.
656	290	SMF70Q06	4	binary	Count of times In Ready users was N+11 to N+15.
660	294	SMF70Q07	4	binary	Count of times In Ready users was N+16 to N+20.
664	298	SMF70Q08	4	binary	Count of times In Ready users was N+21 to N+30.
668	29C	SMF70Q09	4	binary	Count of times In Ready users was N+31 to N+40.
672	2A0	SMF70Q10	4	binary	Count of times In Ready users was N+41 to N+60.
676	2A4	SMF70Q11	4	binary	Count of times In Ready users was N+61 or N+80.
680	2A8	SMF70Q12	4	binary	Count of times In Ready users was greater than N+80.
684	2AC	SMF70SRM	4	binary	Number of samples taken by SRM
688	2B0	SMF70CMN	4	binary	Minimum number of work units for general purpose processors over interval.
692	2B4	SMF70CMM	4	binary	Maximum number of work units for general purpose processors over interval.
696	2B8	SMF70CTT	4	binary	Total number of work units for general purpose processors over interval.
700	2BC	SMF70DMN	4	binary	Minimum number of work units for zAAPs over interval.
704	2C0	SMF70DMM	4	binary	Maximum number of work units for zAAPs over interval.
708	2C4	SMF70DTT	4	binary	Total number of work units for zAAPs over interval.
712	2C8	SMF70EMN	4	binary	Minimum number of work units for zIIPs over interval.
716	2CC	SMF70EMM	4	binary	Maximum number of work units for zIIPs over interval.
720	2D0	SMF70ETT	4	binary	Total number of work units for zIIPs over interval.
Fields SMF70U00 to SMF7U015 count the number of work units based on the number N of logical processors being online when the sample was taken. With HiperDispatch mode active, **N** is the number of logical processors being ***online and not parked*** when the sample was taken.					
724	2D4	SMF70U00	4	binary	Count of times the number of work units was less or equal N.
728	2D8	SMF70U01	4	binary	Count of times the number of work units was N+1.
732	2DC	SMF70U02	4	binary	Count of times the number of work units was N+2.
736	2E0	SMF70U03	4	binary	Count of times the number of work units was N+3.
740	2E4	SMF70U04	4	binary	Count of times the number of work units was N+4 or N+5.
744	2E8	SMF70U05	4	binary	Count of times the number of work units was between N+6 and N +10.
748	2EC	SMF70U06	4	binary	Count of times the number of work units was between N+11 and N +15.
752	2F0	SMF70U07	4	binary	Count of times the number of work units was between N+16 and N +20.
756	2F4	SMF70U08	4	binary	Count of times the number of work units was between N+21 and N +30.
760	2F8	SMF70U09	4	binary	Count of times the number of work units was between N+31 and N +40.
764	2FC	SMF70U10	4	binary	Count of times the number of work units was between N+41 and N +60.

Offsets		Name	Length	Format	Description
768	300	SMF70U11	4	binary	Count of times the number of work units was between N+61 and N +80.
772	304	SMF70U12	4	binary	Count of times the number of work units was between N+81 and N +100.
776	308	SMF70U13	4	binary	Count of times the number of work units was between N+101 and N+120.
780	30C	SMF70U14	4	binary	Count of times the number of work units was between N+121 and N+150.
784	310	SMF70U15	4	binary	Count of times the number of work units was greater N+150.

PR/SM Partition Data Section

This section contains a configured logical partition. There is one for each logical partition. The measurements are on a per logical processor basis when multithreading is disabled and on a per logical core basis when multithreading is enabled for the reporting interval. In the latter case, the terms logical processor and logical CPU refer to a logical core.

Offsets		Name	Length	Format	Description
0	0	SMF70LPM	8	EBCDIC	Logical partition name.
8	8	SMF70LPN	1	binary	Logical partition number.
9	9	SMF70PFG	1	binary	Partition flags **Bit** **Meaning when set** **0** Partition has changed from activated to deactivated, or vice versa, during interval **1** Number of logical processors in partition has changed **2** Number of dedicated processors in partition has changed **3** Number of shared processors in partition has changed **4** WLM LPAR management is active for this partition. **5** Wait time field (SMF70WST) is defined. **6** Defined capacity limit has been changed. **7** Reserved.
10	A	SMF70BDN	2	binary	Number of logical CPUs assigned to this partition. This count matches the number of subsequent PR/SM Partition data sections. Starting with z900 processors, SMF70BDN has a different meaning if bit 4 of SMF70INB is set. It then contains the maximum logical processors defined as shown at the HMC. Active logical processors have an online time SMF70ONT greater than zero.
12	C	SMF70BDS	4	binary	The PR/SM logical processor data blocks for all partitions are grouped together in the record. PR/SM logical processor data blocks for a given partition are grouped together. To get to the first logical processor data block associated with this partition, skip over the number of logical processor data blocks specified by this field, starting at the first logical processor data block in the record.

Offsets		Name	Length	Format	Description
16	10	SMF70BDA	4	binary	Accumulated number of active logical processors at a WLM partition. This value is updated at each measurement cycle. It does not cover the logical processors for a non WLM managed partition. (A partition is WLM managed, if bit 4 of SMF70PFG is set.) To get the average number of logical CPUs, this value has to be divided by the number of Diagnose samples (field SMF70DSA in the CPU control section).
20	14	SMF70SPN	8	EBCDIC	LPAR cluster name. For z/OS, the LPAR cluster name is the sysplex name. For any other logical partition, the LPAR cluster name is the name provided in the HMC definition of this logical partition. Blank, if partition is not a cluster member.
28	1C	SMF70STN	8	EBCDIC	System name. Blank, if not provided or supported by the operating system in the logical partition.
36	24		4		Reserved.
40	28	SMF70CSF	4	binary	Number of megabytes of central storage currently online to this partition.
44	2C		4		Reserved.
48	30	SMF70ESF	4	binary	Number of megabytes of expanded storage currently online to this partition.
52	34	SMF70MSU	4	binary	Defined capacity limit (in millions of service units).
56	38	SMF70PFL	2	binary	Additional partition flags. **Bit** **Meaning when set** **0** Content of SMF70UPI is valid. **1** Group flag. This partition is member of a capacity group. **2** Polarization flag. This partition is vertically polarized. That is, HiperDispatch mode is active. The SMF70POW fields in the logical processor data section are valid for CPUs of this partition. **3** Initial weight instead of current weight should be used to project usage of the members in the capacity group. **4 -15** Reserved.
58	3A	SMF70UPI	1	binary	User partition ID. Valid if bit 0 of SMF70PFL is set.
59	3B	SMF70MTID	1	binary	Maximum Thread Identification. A non-zero value indicates that PROCVIEW CORE is effective for this partition and the hardware supports multithreading.
60	3C	SMF70GNM	8	EBCDIC	Name of the capacity group to which this partition belongs. Valid if bit 1 of SMF70PFL is set.
68	44	SMF70GMU	4	binary	Maximum licensing units of a group. The maximum number of processor licensing units for the group of logical partitions of which this partition is a member, and which may be consumed per unit of time, on average. Valid if bit 1 of SMF70PFL is set.
72	48	SMF70HWGr_Name	8	EBCDIC	Name of the hardware group to which this partition belongs.

Offsets		Name	Length	Format	Description
80	50	SMF70_BoostInfo	1	binary	Boost information **Bit** **Meaning when set** **0** zIIP boost was active at some point within the interval. **1** Speed boost was active at some point within the interval. **2-7** Reserved.
81	51		3		Reserved

PR/SM Logical Processor Data Section

This section contains a PR/SM logical processor data block. There is one for each logical processor in each configured partition. The terms logical processor and logical CPU refer to a logical core if multithreading is enabled for the reporting interval.

Offsets		Name	Length	Format	Description
0	0	SMF70PDT	8	binary	Logical processor dispatch time, in microseconds. This is the number of microseconds that were accumulated during the measurement interval (during which a physical CPU was assigned to this logical CPU). When associated with partition name PHYSICAL, this field contains the accumulated number of microseconds during which a physical CPU was busy, but the time could not be attributed to a specific logical partition. This time includes the time PR/SM was controlling the physical processor (LPAR management time), as well as any other time the processor was busy for any reason such as managing coupling facility traffic.
8	8	SMF70VPA	2	binary	Logical processor address.
10	A	SMF70BPS	2	binary	Partition processor resource weight factor. If the value is X‘FFFF’, then the partition has been assigned dedicated processors.
12	C	SMF70VPF	1	binary	Logical processor flags **Bit** **Meaning when set** **0** Wait completion is enabled **1** Wait completion status has changed during interval **2** Weight has changed during interval **3** 'Initial Capping' was set to 'ON' on the Hardware Management Console **4** 'Initial Capping' status has changed during the interval **5** Logical processor varied online during the measurement interval **6** SMF70HW_Cap_Limit has changed during the interval **7** SMF70HWGr_Name or SMF70HWGr_Cap_Limit has changed during the interval.

Offsets		Name	Length	Format	Description
13	D	SMF70POF	1	binary	Polarization flags **Bit** **Meaning when set** **0 - 1** Polarization indicator: **00** Horizontally polarized or polarization not indicated **01** Vertically polarized with low entitlement **10** Vertically polarized with medium entitlement **11** Vertically polarized with high entitlement **2** Polarization indication changed during interval **3-7** Reserved.
14	E	SMF70CIX	2	binary	Index to the CPU-identification name section that contains the EBCDIC name corresponding to the CPU type of the logical processor. This field is zero if there is no information available.
16	10	SMF70EDT	8	binary	Logical processor effective dispatch time, in microseconds. The number of microseconds that were accumulated during the measurement interval (excluding LPAR management time), during which a physical CPU was assigned to this logical CPU. When associated with partition name PHYSICAL, this field contains the accumulated number of microseconds during which a physical CPU was busy, but the time could not be attributed to a specific logical partition or to LPAR management of the physical processor. One example is time used for managing coupling facility traffic. This field is zero, if not supported by the hardware. LPAR management time is the time from SMF70PDT associated with partition name PHYSICAL minus the contents of this field.
24	18	SMF70ACS	4	binary	Accumulated processor actual share. To get the average processor actual share, this value has to be divided by the number of Diagnose samples (field SMF70DSA in the CPU control section).
28	1C	SMF70MIS	2	binary	Processor minimum share.
30	1E	SMF70MAS	2	binary	Processor maximum share.
32	20	SMF70NSI	4	binary	Number of samples within 10% of the specified minimum.
36	24	SMF70NSA	4	binary	Number of samples within 10% of the specified maximum.
40	28	SMF70ONT	8	binary	Logical processor online time.
48	30	SMF70WST	8	binary	Logical processor wait state time. SMF70WST is used only for internal purposes.
56	38	SMF70PMA	4	signed	Average adjustment weight for pricing management. This value may be negative.
60	3C	SMF70NSW	4	binary	Number of diagnose samples where WLM considers to cap the set of logical CPUs of type SMF70CIX within the logical partition (see also SMF70NCA).
64	40	SMF70POW	4	binary	Polarization weight for the logical CPU when HiperDispatch mode is active. See bit 2 of SMF70PFL. Multiplied by a factor of 4096 for more granularity. The value may be the same or different for all shared CPUs of type SMF70CIX. This is an accumulated value. Divide by the number of Diagnose samples SMF70DSA to get average weight value for the interval.
68	44	SMF70NCA	4	binary	Number of diagnose samples where capping actually limited the usage of processor resources for the set of logical CPUs of type SMF70CIX within the logical partition.
72	48	SMF70HW_Cap_Limit	4	binary	If not zero, absolute limit on partition usage of all CPUs of the type indicated in SMF70CIX in terms of a number specified in hundredths of a CPU. For example, a value of 250 indicates that the partition is limited to using 2.5 CPUs.
76	4C	SMF70HWGr_Cap_Limit	4	binary	If not zero, absolute limit on partition usage of all CPUs of the type indicated in SMF70CIX that are members of the same hardware group, in terms of a number specified in hundredths of a CPU. For example, a value of 250 indicates that the hardware group is limited to using 2.5 CPUs.

Offsets		Name	Length	Format	Description
80	50	SMF70MTIT	8	binary	Multithreading Idle Time in microseconds accumulated for all threads of a dispatched core. This field is only valid if SMF70MTID is not zero for this partition.

CPU Identification section

There is one section per EBCDIC name that identifies a CPU type. 'CP' and 'ICF', with appropriate trailing blanks, are examples of EBCDIC names describing a General Purpose CPU and an Internal Coupling Facility CPU, respectively.

Offsets		Name	Length	Format	Description
0	0	SMF70CIN	16	EBCDIC	CPU-identification name.
16	10	SMF70CTN	2	binary	Number of physical CPUs of this type at interval end.
18	12	*	2		Reserved.
20	14	SMF70CAN	4	binary	Accumulated number of physical CPUs. Divide by SMF70DSA to get the average number of physical CPUs of this type applicable during the interval.

Logical Core Data Section

This section contains usage information for a logical core in a multithreading environment (when the LOADxx PROCVIEW CORE parameter is in effect).

Offsets		Name	Length	Format	Description
0	0	SMF70_CORE_ID	2	binary	Core identification.
2	2	SMF70_CORE_FLG	1	binary	Logical Core Information **Bit** **Meaning when set** **0** Core LPAR Busy time is valid. **1-7** Reserved.
3	3		1		Reserved.
4	4	SMF70_CPU_SKIP	2	binary	The CPU data sections for this core are grouped together in the record. To get to the first CPU data section associated with this logical core, skip over the number of CPU data sections specified by this field, starting at the first CPU data section in the record.
6	6	SMF70_CPU_NUM	2	binary	Number of CPU data sections for this core. This value represents the number of threads that are active on this core.
8	8	SMF70_PROD	4	binary	Multithreading core productivity numerator. Divide this value by 1024 to get the multithreading core productivity. A zero value is reported if the core was not configured ONLINE for the complete interval. If SMF70_CPU_NUM is greater than 1, the core productivity represents the percentage of how much work the core resources accomplished while dispatched to physical hardware over the maximum amount of work the core resources could have accomplished while dispatched to physical hardware.
12	C	SMF70_LPAR_BUSY	4	binary	Multithreading core LPAR Busy Time in milliseconds. This field is valid if bit 0 of SMF70_CORE_FLG is set.

Tenant Resource Group data section

This section contains general tenant resource group and tenant information as well as processor consumption measurements for the interval.

Offsets		Name	Length	Format	Description
0	0	SMF70_TRG_NAME	8	EBCDIC	Tenant resource group name.
8	8	SMF70_TRG_DESC	32	EBCDIC	Tenant resource group description.
40	28	SMF70_TRG_TNTID	8	EBCDIC	Tenant identifier.

Offsets		Name	Length	Format	Description
48	30	SMF70_TRG_TNTNAME	32	EBCDIC	Tenant name.
80	50	SMF70_TRG_SBID	64	EBCDIC	Solution ID.
144	90	SMF70_TRG_SUCP	8	binary	Service units on CPs consumed by tenant resource group.
152	98	SMF70_TRG_SUIFA	8	binary	Service units on zAAPs consumed by tenant resource group.
160	A0	SMF70_TRG_SUSUP	8	binary	Service units on zIIPs consumed by tenant resource group.
168	A8	SMF70_TRG_LAC	4	binary	Long-term average service on general purpose processors in millions of service units per hour consumed by tenant resource group.
172	AC	SMF70_TRG_LAC_CBP	4	binary	Reserved for future use.
176	B0	SMF70_TRG_FLAGS	2	binary	Reserved for future use.
178	B2		2		Reserved.
180	B4	SMF70_TRG_MEM	8	binary	Memory consumption of tenant resource group in units of 4K frames.

Subtype 2 — Cryptographic Hardware Activity

Cryptographic CCA Coprocessor Data Section

There is one section per cryptographic CCA coprocessor.

Offsets		Name	Length	Format	Description
0	0	R7023AX	1	binary	Crypto processor index.
1	1	R7023CT	1	binary	Crypto processor type: **Value** **Meaning** **7** CEX2C **9** CEX3C **10** CEX4C **11** CEX5C **12** CEX6C **13** CEX7C
2	2	R7023MSK	1	binary	Validity bit mask. Each bit position represents the validity of a timer-counter pair that measures the execution time and number of operations on a cryptographic coprocessor card. **Bit** **Meaning when set** **0** Valid data for all operations **1** Valid data for RSA-key-generation operations **2-7** Reserved. Valid with SMF70SRL ≥ X'61'(97).
3	3	R7023MT	1	binary	Reserved for diagnostic purposes.
4	4	*	4		Reserved.

Offsets		Name	Length	Format	Description
8	8	R7023SF	8	floating	Scaling factor for this cryptographic coprocessor. Execution times in this data section have to be multiplied by this scaling factor to achieve a value in seconds.
16	10	R7023T0	8	floating	Execution time of all operations on the specified cryptographic coprocessor.
24	18	R7023C0	8	floating	Number of all operations on the specified cryptographic coprocessor.
32	20	*	8		Reserved.
40	28	R7023C1	8	floating	Number of all RSA-key-generation operations.
48	30	R7023SCOPE	1	binary	Specifies the scope of the cryptographic CCA coprocessor data section. **Value** **Meaning** **0** Data with CPC scope **1** Data with System scope
49	31	R7023DID	1	binary	Domain ID
50	42	*	2		Reserved

Cryptographic Accelerator Data Section

There is one section per cryptographic accelerator.

Offsets		Name	Length	Format	Description
0	0	R7024AX	1	binary	Crypto processor index.
1	1	R7024CT	1	binary	Crypto processor type: **Value** **Meaning** **6** CEX2A **8** CEX3A **10** CEX4A **11** CEX5A **12** CEX6A **13** CEX7A

Offsets		Name	Length	Format	Description
2	2	R7024MSK	1	binary	Validity bit mask. Each bit position represents the validity of a timer-counter pair that measures the execution time and number of operations on a cryptographic accelerator card for a certain type of RSA operations. **Bit** **Meaning when set** **0** Valid data for 1024-bit ME-format RSA operations **1** Valid data for 2048-bit ME-format RSA operations **2** Valid data for 1024-bit CRT-format RSA operations **3** Valid data for 2048-bit CRT-format RSA operations **4** Valid data for 4096-bit ME-format RSA operations **5** Valid data for 4096-bit CRT-format RSA operations **6-7** Reserved Valid with SMF70SRL ≥ X'5B'(91).
3	3	R7024MT	1	binary	Reserved for diagnostic purposes.
4	4	R7024EN	4	binary	Number of engines on the Crypto accelerator card. Specifies the number of valid entries in the R7024TC array.
8	8	R7024SF	8	floating	Scaling factor for this cryptographic accelerator. Execution times in this data section have to be multiplied by this scaling factor to achieve a value in seconds.
The following block of data (R7024TC) exists five times for up to five engines of a cryptographic accelerator. Unused blocks are allocated with values set to 0.					
16	10	R7021MET	8	floating	Execution time for all operations in 1024-bit-ME format.
24	18	R7021MEC	8	floating	Number of all operations in 1024-bit-ME format.
32	20	R7022MET	8	floating	Execution time for all operations in 2048-bit-ME format.
40	28	R7022MEC	8	floating	Number of all operations in 2048-bit-ME format.
48	30	R7021CRT	8	floating	Execution time for all operations in 1024-bit-CRT format.
56	38	R7021CRC	8	floating	Number of all operations in 1024-bit-CRT format.
64	40	R7022CRT	8	floating	Execution time for all operations in 2048-bit-CRT format.
72	48	R7022CRC	8	floating	Number of all operations in 2048-bit-CRT format.
End of five instances of the R7024TC data block.					
336	150	R7023MET	8	floating	Execution time for all operations in 4096-bit ME-format.
344	158	R7023MEC	8	floating	Number of all operations in 4096-bit ME-format.
352	160	R7023CRT	8	floating	Execution time for all operations in 4096-bit CRT-format.
360	168	R7023CRC	8	floating	Number of all operations in 4096-bit CRT-format.
368	170	R7024SCOPE	1	binary	Specifies the scope of the cryptographic accelerator data section. **Value** **Meaning** **0** Data with CPC scope **1** Data with System scope
369	171	R7024DID	1	binary	Domain ID

Offsets		Name	Length	Format	Description
370	172	*	2		Reserved

ICSF Services Data Section

There is either one or no section containing measurement data of selected Integrated Cryptographic Service Facility (ICSF) activities.

Offsets		Name	Length	Format	Description
0	0	R702SNEC	8	floating	Single DES: Number of calls to encipher the data.
8	8	R702SNEB	8	floating	Single DES: Number of bytes of data enciphered.
16	10	R702SNEI	8	floating	Single DES: Number of instructions used to encipher the data.
24	18	R702TNEC	8	floating	Triple DES: Number of calls to encipher the data.
32	20	R702TNEB	8	floating	Triple DES: Number of bytes of data enciphered.
40	28	R702TNEI	8	floating	Triple DES: Number of instructions used to encipher the data.
48	30	R702SNDC	8	floating	Single DES: Number of calls to decipher the data.
56	38	R702SNDB	8	floating	Single DES: Number of bytes of data deciphered.
64	40	R702SNDI	8	floating	Single DES: Number of instructions used to decipher the data.
72	48	R702TNDC	8	floating	Triple DES: Number of calls to decipher the data.
80	50	R702TNDB	8	floating	Triple DES: Number of bytes of data deciphered.
88	58	R702TNDI	8	floating	Triple DES: Number of instructions used to decipher the data.
96	60	R702NMGC	8	floating	Number of calls to generate the message authentication code (MAC).
104	68	R702NMGB	8	floating	Number of bytes of data for which the MAC was generated.
112	70	R702NMGI	8	floating	Number of PCMF instructions used to generate the MAC.
120	78	R702NMVC	8	floating	Number of calls to verify the MAC.
128	80	R702NMVB	8	floating	Number of bytes of data for which the MAC was verified.
136	88	R702NMVI	8	floating	Number of PCMF instructions used to verify the MAC.
144	90	R702NHAC	8	floating	For SHA-1 hashing: Number of calls to hash the data.
152	98	R702NHAB	8	floating	For SHA-1 hashing: Number of bytes of data which was hashed.
160	A0	R702NHAI	8	floating	For SHA-1 hashing: Number of PCMF instructions used to hash the data.
168	A8	R702NPTC	8	floating	Number of calls to translate the PIN.
176	B0	R702NPVC	8	floating	Number of calls to verify the PIN.
184	B8	R702NH2C	8	floating	For SHA-224 and SHA-256 hashing: Number of calls to hash the data.
192	C0	R702NH2B	8	floating	For SHA-224 and SHA-256 hashing: Number of bytes of data which was hashed.
200	C8	R702NH2I	8	floating	For SHA-224 and SHA-256 hashing: Number of PCMF instructions used to hash the data.
208	D0	R702NH5C	8	floating	For SHA-384 and SHA-512 hashing: Number of calls to hash the data.
216	D8	R702NH5B	8	floating	For SHA-384 and SHA-512 hashing: Number of bytes of data which was hashed.
224	E0	R702NH5I	8	floating	For SHA-384 and SHA-512 hashing: Number of PCMF instructions used to hash the data.
232	E8	R702CDLV	4	binary	ICSF data level.

Offsets		Name	Length	Format	Description
AES measurements. Fields are valid only if R702CDLV is greater than 11.					
236	EC	R702AESC	8	floating	Number of AES encipher calls sent to a coprocessor.
244	F4	R702AESB	8	floating	Number of bytes processed by the AES encipher services handled by a coprocessor.
252	FC	R702AESI	8	floating	Number of operations required to complete the AES encipher service calls to a coprocessor.
260	104	R702ASDC	8	floating	Number of AES decipher calls sent to a coprocessor.
268	10C	R702ASDB	8	floating	Number of bytes processed by the AES decipher services handled by a coprocessor.
276	114	R702ASDI	8	floating	Number of operations required to complete the AES decipher service calls to a coprocessor.
Digital Signatures measurements. Fields are valid only if R702CDLV is greater than 13.					
284	11C	R702DRGC	8	floating	Number of calls to generate the RSA digital signatures.
292	124	*	16		Reserved.
308	134	R702DRVC	8	floating	Number of calls to verify the RSA digital signatures.
316	13C	*	16		Reserved.
332	14C	R702DEGC	8	floating	Number of calls to generate the ECC digital signatures.
340	154	*	16		Reserved.
356	164	R702DEVC	8	floating	Number of calls to verify the ECC digital signatures.
364	16C		16		Reserved.
AES MAC measurements. Fields are valid only if R702CDLV is greater than 17					
380	17C	R702AMGC	8	floating	Number of calls to generate the AES MACs.
388	184	R702AMGB	8	floating	Number of bytes of data for which the AES MACs were generated.
396	18C	R702AMGI	8	floating	Number of instructions used to generate the AES MACs.
404	194	R702AMVC	8	floating	Number of calls to verify the AES MACs.
412	19C	R702AMVB	8	floating	Number of bytes of data for which the AES MACs were verified.
420	1A4	R702AMVI	8	floating	Number of instructions used to verify the AES MACs.
FPE measurements. Fields are valid only if R702CDLV is greater than 19					
428	1AC	R702FPEC	8	floating	Number of calls to encipher data using FPE.
436	1B4	R702FPEB	8	floating	Number of bytes of data enciphered using FPE.
444	1BC	R702FPEI	8	floating	Number of instructions used to encipher the data using FPE.
452	1C4	R702FPDC	8	floating	Number of calls to decipher data using FPE.
460	1CC	R702FPDB	8	floating	Number of bytes of data deciphered using FPE.
468	1D4	R702FPDI	8	floating	Number of instructions used to decipher the data using FPE.
476	1DC	R702FPTC	8	floating	Number of calls to translate data using FPE.
484	1E4	R702FPTB	8	floating	Number of bytes of data translated using FPE.
492	1EC	R702FPTI	8	floating	Number of instructions used to translate the data using FPE.
FFX measurements. Fields are only valid if R702CDLV is greater than 22.					
500	1F4	R702FXEC	8	floating	Number of calls to encipher data using FFX.
508	1FC	R702FXEB	8	floating	Number of bytes of data enciphered using FFX.
516	204	R702FXEI	8	floating	Number of instructions used to encipher the data using FFX.
524	20C	R702FXDC	8	floating	Number of calls to decipher data using FFX.

Offsets		Name	Length	Format	Description
532	214	R702FXDB	8	floating	Number of bytes of data deciphered using FFX.
540	21C	R702FXDI	8	floating	Number of instructions used to decipher the data using FFX.
548	224	R702FXTC	8	floating	Number of calls to translate data using FFX.
556	22C	R702FXTB	8	floating	Number of bytes of data translated using FFX.
564	234	R702FXTI	8	floating	Number of instructions used to translate the data using FFX.
572	23C	R702DQGC	8	floating	Number of calls to generate the QSA digital signatures.
580	244	*	16		Reserved.
596	254	R702DQVC	8	floating	Number of calls to verify the QSA digital signatures.
604	25C	*	16		Reserved.

Cryptographic PKCS11 Coprocessor Data Section

There is one section per cryptographic PKCS11 coprocessor.

Offsets		Name	Length	Format	Description
0	0	R7025AX	1	binary	Crypto processor index.
1	1	R7025CT	1	binary	Crypto processor type: **Value** **Meaning** **10** CEX4P **11** CEX5P **12** CEX6P **13** CEX7P
2	2	R7025MSK	1	binary	Validity bit mask. Each bit position represents the validity of a timer-counter pair that measures the execution time and number of operations by functions on a cryptographic PKCS11 coprocessor. **Bit** **Meaning when set** **0** Valid data for operations by slow asymmetric-key functions **1** Valid data for operations by fast asymmetric-key functions **2** Valid data for operations by symmetric-key functions (partial or incremental results) **3** Valid data for operations by symmetric-key functions (complete or final result) **4** Valid data for operations by asymmetric-key generation functions **5-7** Reserved
3	3	R7025MT	1	binary	Reserved for diagnostic purposes.
4	4	*	4	binary	Reserved.
8	8	R7025SF	8	floating	Scaling factor for this cryptographic PKCS11 coprocessor. Execution times in this data section have to be multiplied by this scaling factor to achieve a value in seconds.

Offsets		Name	Length	Format	Description
16	10	R7025SAT	8	floating	Aggregate execution time of operations by slow asymmetric-key functions.
24	18	R7025SAC	8	floating	Number of operations by slow asymmetric-key functions.
32	20	R7025FAT	8	floating	Aggregate execution time of operations by fast asymmetric-key functions.
40	28	R7025FAC	8	floating	Number of operations by fast asymmetric-key functions.
48	30	R7025SPT	8	floating	Aggregate execution time of operations by symmetric-key functions that return partial or incremental results.
56	38	R7025SPC	8	floating	Number of operations by symmetric-key functions that return partial or incremental results.
64	40	R7025SCT	8	floating	Aggregate execution time of operations by symmetric-key functions that return a complete or final result.
72	48	R7025SCC	8	floating	Number of operations by symmetric-key functions that return a complete or final result.
80	50	R7025AGT	8	floating	Aggregate execution time of operations by asymmetric-key generation function.
88	58	R7025AGC	8	floating	Number of operations by asymmetric-key generation function.
96	60	R7025SCOPE	1	binary	Specifies the scope of the cryptographic PKCS11 coprocessor data section. **Value** **Meaning** **0** Data with CPC scope **1** Data with System scope
97	61	R7025DID	1	binary	Domain ID
98	62	*	2		Reserved

Record type 71 (X'47') — RMF Paging Activity

Reference information:

- For information on using RMF, see *z/OS RMF Reporter User's Guide*.
- For information on Monitor I and II, see *z/OS RMF Report Analysis*.

Record type 71 is written for each measurement interval and when the session is terminated. Record type 71 contains information about the demands made on the system paging facilities and the utilization of central storage and external page storage during the reporting interval.

As with all the SMF records RMF produces, it contains a header section followed by the RMF product section. These are followed by:

Paging data section
Includes information on central storage pages for SQA, SPA, CSA, LSQA and REGIONS+SWA.

Macro to symbolically address record type 71

The SMF record mapping macro for all records produced by RMF is ERBSMFR. Its format is ERBSMFR (*n1*,*n2*,...) where *n1*,*n2*,... are the SMF record types you want to map. Note that the parentheses are required only when two or more record types are specified. The mapping macro resides in SYS1.MACLIB.

Record environment

The following conditions exist for the generation of this record:

Macro
SMFWTM (record exit: IEFU83)

Mode
Task

Storage Residency
31-bit

Record mapping

Header/Self-defining Section

This section contains the common SMF record headers fields and the triplet fields (offset/length/number), if applicable, that locate the other sections on the record.

Offsets		Name	Length	Format	Description
0	0	SMF71LEN	2	binary	Record length. This field and the next field (total of four bytes) form the RDW (record descriptor word). See "Standard and Extended SMF record headers" on page 162 for a detailed description.
2	2	SMF71SEG	2	binary	Segment descriptor (see record length field).
4	4	SMF71FLG	1	binary	System indicator: **Bit** **Meaning when set** **0** New record format **1** Subtypes used **2** Reserved **3-6** Version indicators* **7** System is running in PR/SM mode. *See "Standard and Extended SMF record headers" on page 162 for a detailed description.
5	5	SMF71RTY	1	binary	Record type 71 (X'47').
6	6	SMF71TME	4	binary	Time since midnight, in hundredths of a second, when the record was moved into the SMF buffer.
10	A	SMF71DTE	4	packed	Date when the record was moved into the SMF buffer, in the form 0*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for a detailed description.
14	E	SMF71SID	4	EBCDIC	System identification (from the SMFPRMxx SID parameter).
18	12	SMF71SSI	4	EBCDIC	Subsystem identification ('RMF').
22	16	SMF71STY	2	binary	Record subtype=1.
24	18	SMF71TRN	2	binary	Number of triplets in this record. A triplet is a set of three SMF fields (offset/length/number values) that defines a section of the record.
26	1A		2		Reserved.
28	1C	SMF71PRS	4	binary	Offset to RMF product section.
32	20	SMF71PRL	2	binary	Length of RMF product section.

Offsets		Name	Length	Format	Description
34	22	SMF71PRN	2	binary	Number of RMF product sections.
36	24	SMF71PDS	4	binary	Offset to Paging data sections.
40	28	SMF71PDL	2	binary	Length of Paging data section.
42	2A	SMF71PDN	2	binary	Number of Paging data section.
44	2C	SMF71SWS	4	binary	Offset to Swap Placement section.
48	30	SMF71SWL	2	binary	Length of Swap Placement section.
50	32	SMF71SWN	2	binary	Number of Swap Placement sections.

RMF Product Section

Offsets		Name	Length	Format	Description
0	0	SMF71MFV	2	packed	RMF version number.
2	2	SMF71PRD	8	EBCDIC	Product name (‘RMF’).
10	A	SMF71IST	4	packed	Time that the RMF measurement interval started, in the form 0*hhmmssF*, where *hh* is the hours, *mm* is the minutes, *ss* is the seconds, and *F* is the sign.
14	E	SMF71DAT	4	packed	Date when the RMF measurement interval started, in the form 0*cyydddF*. See “Standard and Extended SMF record headers” on page 162 for a detailed description.
18	12	SMF71INT	4	packed	Duration of RMF measurement interval, in the form *mmsstttF* where *mm* is the minutes, *ss* is the seconds, *ttt* is the milliseconds, and *F* is the sign. The end of the measurement interval is the sum of the record start time (and this field).
22	16		2		Reserved.
24	18	SMF71SAM	4	binary	Number of RMF samples.
28	1C		2		Reserved.
30	1E	SMF71FLA	2	binary	Flags **Bit** **Meaning when set** **0** Reserved. **1** Samples have been skipped. **2** Record was written by RMF Monitor III. **3** Interval was synchronized with SMF. **4 - 15** Reserved.
32	20		4		Reserved.
36	24	SMF71CYC	4	packed	Sampling cycle length, in the form 000*ttttF*, where *tttt* is the milliseconds and *F* is the sign (taken from CYCLE option). The range of values is 0.050 to 9.999 seconds.
40	28	SMF71MVS	8	EBCDIC	z/OS software level (consists of an acronym and the version, release, and modification level - ZV*vvrrmm*).
48	30	SMF71IML	1	binary	Indicates the type of processor complex on which data measurements were taken. **Value** **Meaning** **3** 9672, zSeries

Offsets		Name	Length	Format	Description
49	31	SMF71PRF	1	binary	Processor flags. **Bit** **Meaning when set** **0** The system has expanded storage **1** The system has ESCON channels in the configuration **2** There is an ESCON director in the configuration **3** System is running in z/Architecture mode **4** At least one zAAP is currently installed **5** At least one zIIP is currently installed **6** Enhanced DAT facility 1 available **7** Enhanced DAT facility 2 available
50	32	SMF71PTN	1	binary	PR/SM partition number of the partition that wrote this record.
51	33	SMF71SRL	1	binary	SMF record level change number (X'8E' for z/OS V2R4 RMF with RMF Data Gatherer APAR OA59330). This field enables processing of SMF record level changes in an existing release.
52	34	SMF71IET	8	char	Interval expiration time token. This token can be used to identify other than RMF records that belong to the same interval (if interval was synchronized with SMF).
60	3C	SMF71LGO	8	binary	Offset GMT to local time (STCK format).
68	44	SMF71RAO	4	binary	Offset to reassembly area relative to start of RMF product section.
72	48	SMF71RAL	2	binary	Length of reassembly area. Area consists of a fixed header and a variable number of information blocks. Length depends on the record type/subtype, but is fixed for a specific type/subtype.
74	4A	SMF71RAN	2	binary	Reassembly area indicator. **Value** **Meaning** **0** Record is not broken. **1** Record is broken. **Note:** This field is used to indicate whether an SMF record is a broken record. Therefore, offset (SMF71RAO) and length (SMF71RAL) are only valid if SMF71RAN = 1. A reassembly area is only present in broken records.
76	4C	SMF71OIL	2	binary	Original interval length as defined in the session or by SMF (in seconds).
78	4E	SMF71SYN	2	binary	SYNC value in seconds.
80	50	SMF71GIE	8	binary	Projected gathering interval end (STCK format) GMT time.
88	58	SMF71XNM	8	EBCDIC	Sysplex name as defined in parmlib member COUPLExx.
96	60	SMF71SNM	8	EBCDIC	System name for current system as defined in parmlib member IEASYSxx SYSNAME parameter.
Reassembly Area:					
0	0	SMF71RBR	2	binary	Total number of broken records built from the original large record.

Offsets		Name	Length	Format	Description
2	2	SMF71RSQ	2	binary	Sequence number of this broken record. Every broken record built from the same large record must have a unique sequence number, it is in the range from 1 to SMF71RBR.
4	4	SMF71RIO	4	binary	Offset to first reassembly information block relative to start of reassembly area header.
8	8	SMF71RIL	2	binary	Length of reassembly information block.
10	A	SMF71RIN	2	binary	Number of reassembly information blocks (same value as SMF71TRN in header section).
12	C		4		Reserved.
Reassembly Area Information Block:					
0	0	SMF71RNN	2	binary	Total number of sections in the original large record. This field contains information of how many sections of a specific type were contained in the original SMF record. This field is a copy of the number field of the triplet in the original (non broken) record.
2	2	SMF71RPP	2	binary	Position of the first of one or more consecutive sections described by this block as in the original record. Values in the range of 1 to SMF71RNN are valid for correct processing. A value of 0 will skip processing of this information block. This field provides information where the sections that are part of this broken record were placed in the original record before the split took place. The actual number of consecutive sections contained in this record is available from the actual triplet in the header extension.

Paging Data Section

Offsets		Name	Length	Format	Description
0	0	SMF71PIN	4	binary	Number of non-VIO page-ins from auxiliary to central storage. This field includes page-ins required through page faults, specific page requests, and page fixes. It does not include page reclaims or page-ins for VIO data sets.
4	4	SMF71POT	4	binary	Number of non-VIO page-outs from central to auxiliary storage. This field includes page-outs required through specific page requests and those pages stolen by the paging supervisor through infrequent use. It does not include page-outs for VIO data sets.
8	8	*	4		Reserved.
12	C	SMF71SSQ	4	binary	Number of address space swap sequences. (A swap sequence consists of an address space swap-out and swap-in.)
16	10	SMF71SIN	4	binary	Number of pages swapped in. This field includes: LSQA, fixed pages, and those pages that the real storage manager determined to be active when the address space was swapped in. It does not include page reclaims.
20	14	SMF71SOT	4	binary	Number of pages swapped out. This field includes: LSQA, private area fixed pages, and private area non-fixed changed pages.
24	18	SMF71VIN	4	binary	Number of VIO page-ins from auxiliary to central storage. This field includes page-ins resulting from page faults or specific page requests on a VIO window. It does not include VIO swap-ins or page-ins for the common area.
28	1C	SMF71VOT	4	binary	Number of VIO page-outs from central to auxiliary storage. This field includes page-outs resulting from specific page requests on a VIO window and those pages stolen by the paging supervisor through infrequent use. It does not include VIO swap-outs or page-outs for the common area.
32	20	*	4		Reserved.
36	24	SMF71SNI	4	binary	Number of non-VIO page-ins (from auxiliary to central storage) performed in common area (LPA/CSA).

Offsets		Name	Length	Format	Description
40	28	SMF71SNO	4	binary	Number of non-VIO page-outs (from central to auxiliary storage) performed in common area (LPA/CSA).
44	2C	*	4		Reserved.
48	30	SMF71LNI	4	binary	Number of non-VIO page-ins performed in LPA.
52	34	*	4		Reserved.
56	38	SMF71AFC	4	binary	End-of-interval snapshot value of the number of unused central storage page frames.
60	3C	SMF71TFC	4	binary	Number of page frames defined in central storage. (This field does not include frames occupied by the nucleus, frames marked as bad or offline, or frames used by HSA or PR/SM.)
64	40	SMF71TSC	4	binary	Total number of local page data set slots.
68	44	SMF71DSC	4	binary	Number of local page data set slots allocated to VIO private area pages.
72	48	SMF71VSC	4	binary	Number of local page data set slots allocated to non-VIO private area pages.
76	4C	SMF71NSC	4	binary	Number of usable local page data set slots that have not been allocated.
80	50	SMF71FIN	4	binary	Number of central storage frames in nucleus.
84	54	SMF71MNF	4	binary	Minimum number of unused central storage page frames.
88	58	SMF71MXF	4	binary	Maximum number of unused central storage page frames.
92	5C	SMF71AVF	4	binary	Average number of unused central storage page frames.
96	60	SMF71MNP	4	binary	Minimum number of CSA central storage frames used, including restricted use common service area (RUCSA).
100	64	SMF71MXP	4	binary	Maximum number of CSA central storage frames used, including RUCSA.
104	68	SMF71AVP	4	binary	Average number of CSA central storage frames used, including RUCSA.
108	6C	SMF71MNS	4	binary	Minimum number of pageable address space central storage frames in the private address space.
112	70	SMF71MXS	4	binary	Maximum number of pageable address space central storage frames in the private address space.
116	74	SMF71AVS	4	binary	Average number of pageable address space central storage frames in the private address space.
120	78	SMF71MNT	4	binary	Minimum total number of central storage frames used.
124	7C	SMF71MXT	4	binary	Maximum total number of central storage frames used.
128	80	SMF71AVT	4	binary	Average total number of central storage frames used.
132	84	SMF71MNQ	4	binary	Minimum number of SQA fixed frames in central storage.
136	88	SMF71MXQ	4	binary	Maximum number of SQA fixed frames in central storage.
140	8C	SMF71AVQ	4	binary	Average number of SQA fixed frames in central storage.
144	90	SMF71MNC	4	binary	Minimum number of CSA fixed frames in central storage, including RUCSA.
148	94	SMF71MXC	4	binary	Maximum number of CSA fixed frames in central storage, including RUCSA.
152	98	SMF71AVC	4	binary	Average number of CSA fixed frames in central storage, including RUCSA.
156	9C	SMF71MNR	4	binary	Minimum number of non-LSQA fixed central storage frames in the private address space.

Offsets		Name	Length	Format	Description
160	A0	SMF71MXR	4	binary	Maximum number of non-LSQA fixed central storage frames in the private address space.
164	A4	SMF71AVR	4	binary	Average number of non-LSQA fixed central storage frames in the private address space.
168	A8	SMF71MNX	4	binary	Minimum total number of fixed central storage frames used.
172	AC	SMF71MXX	4	binary	Maximum total number of fixed central storage frames used.
176	B0	SMF71AVX	4	binary	Average total number of fixed central storage frames used.
180	B4	SMF71MNU	4	binary	Minimum number of usable local page data set slots that have not been allocated.
184	B8	SMF71MXU	4	binary	Maximum number of usable local page data set slots that have not been allocated.
188	BC	SMF71AVU	4	binary	Average number of usable local page data set slots that have not been allocated.
192	C0	SMF71MNV	4	binary	Minimum number of local page data set slots allocated to VIO private area pages.
196	C4	SMF71MXV	4	binary	Maximum number of local page data set slots allocated to VIO private area pages.
200	C8	SMF71AVV	4	binary	Average number of local page data set slots allocated to VIO private area pages.
204	CC	SMF71MNM	4	binary	Minimum number of local page data set slots allocated to non-VIO private area pages.
208	D0	SMF71MXM	4	binary	Maximum number of local page data set slots allocated to non-VIO private area pages.
212	D4	SMF71AVM	4	binary	Average number of local page data set slots allocated to non-VIO private area pages.
216	D8	SMF71MNB	4	binary	Minimum number of unusable local page data set slots.
220	DC	SMF71MXB	4	binary	Maximum number of unusable local page data set slots.
224	E0	SMF71AVB	4	binary	Average number of unusable local page data set slots.
228	E4	SMF71MNA	4	binary	Minimum total number of local page data set slots.
232	E8	SMF71MXA	4	binary	Maximum total number of local page data set slots.
236	EC	SMF71IS1	2	binary	Number of samples skipped due to invalid fixed frame counts. Fields affected are SMF71MNC, MXC, AVC, MNR, MXR, and AVR.
238	EE	SMF71IS2	2	binary	Number of incorrect samples resulting from negative calculations. Fields affected are the same as SMF71IS1.
240	F0	*	60		Reserved.
300	12C	SMF71NLP	4	binary	Minimum number of LPA frames in central storage.
304	130	SMF71XLP	4	binary	Maximum number of LPA frames in central storage.
308	134	SMF71ALP	4	binary	Average number of LPA frames in central storage.
312	138	SMF71NLF	4	binary	Minimum number of LPA fixed frames in central storage.
316	13C	SMF71XLF	4	binary	Maximum number of LPA fixed frames in central storage.
320	140	SMF71ALF	4	binary	Average number of LPA fixed frames in central storage.
324	144	SMF71NLS	4	binary	Minimum number of LSQA fixed frames in central storage.
328	148	SMF71XLS	4	binary	Maximum number of LSQA fixed frames in central storage.
332	14C	SMF71ALS	4	binary	Average number of LSQA fixed frames in central storage.
336	150	SMF71MNL	4	binary	Minimum number of fixed frames in central storage (less than 16 megabytes).

Offsets		Name	Length	Format	Description
340	154	SMF71MXL	4	binary	Maximum number of fixed frames in central storage (less than 16 megabytes).
344	158	SMF71AVL	4	binary	Average number of fixed frames in central storage (less than 16 megabytes).
348	15C	SMF71PMV	4	binary	Total number of pages moved within central storage.
352	160	SMF71OPT	8	EBCDIC	SRM opt member name.
360	168	*	20		Reserved.
380	17C	SMF71LIC	4	binary	Minimum high UIC. A value from 0 to 2540 that indicates the age (in seconds) of the oldest unreferenced frame in central storage.
384	180	SMF71HIC	4	binary	Maximum high UIC. A value from 0 to 2540 that indicates the age (in seconds) of the oldest unreferenced frame in central storage.
388	184	SMF71ACA	4	binary	Average high UIC (scale factor= -1). Scale factor -1 means the field has been multiplied by 10 to give a result in tenths and must be multiplied by 10^{-1} to get the correct value.
392	188	*	24		Reserved.
416	1A0	SMF71MSR	4	binary	Minimum number SQA pages in central storage.
420	1A4	SMF71XSR	4	binary	Maximum number SQA pages in central storage.
424	1A8	SMF71ASR	4	binary	Average number of SQA pages in central storage.
428	1AC	*	36		Reserved.
464	1D0	SMF71MLR	4	binary	Minimum number of LSQA pages in central storage.
468	1D4	SMF71XLR	4	binary	Maximum number of LSQA pages in central storage.
472	1D8	SMF71ALR	4	binary	Average number of LSQA pages in central storage.
476	1DC	*	24		Reserved.
500	1F4	SMF71ISC	4	binary	Number of incorrect samples returned from collector service.
504	1F8	SMF71HME	12	binary	Reserved.
516	204	SMF71HOT	4	binary	Number of hiperspace page-outs from central to auxiliary storage.
520	208	SMF71HIN	4	binary	Number of hiperspace page-ins from auxiliary to central storage.
524	20C	*	12		Reserved.
536	218	SMF71BLP	4	binary	Number of blocked pages paged in (this does not include VIO or hiperspace pages).
540	21C	SMF71BLK	4	binary	Number of blocks paged in.
544	220	*	8		Reserved.
552	228	SMF71PMT	8	binary	Steal timer - the elapsed time spent in a preferred steal in CPU-timer units. The interval of CPU time needed to steal the page includes the time to move the contents of the stolen page and any time spent in frame steal processing of any type. Some examples of the types of steal routines whose CPU time gets included in SMF71PMT are non-preferred above, non-preferred below, preferred above, preferred below, storage buffer frame queue, bottom double frame queue, and V=R waiting frame. No matter what type of steal processing occurs, the steal module records it all, and it gets included in this field. Note that SMF71PMT does not include the time to move the new contents into the page.
560	230	SMF71SBI	4	binary	Number of system pageable areas block page ins.
564	234	SMF71LBI	4	binary	Number of LPA block page ins.
568	238	SMF71ASI	8	floating	Number of page-ins from auxiliary storage for shared pages.
576	240	SMF71ASO	8	floating	Number of page-outs to auxiliary storage for shared pages.

Offsets		Name	Length	Format	Description
584	248		16		Reserved.
600	258	SMF71MGT	8	floating	Minimum number of shared pages in the system.
608	260	SMF71XGT	8	floating	Maximum number of shared pages in the system.
616	268	SMF71AGT	8	floating	Average number of shared pages in the system.
624	270	SMF71MGC	8	floating	Minimum number of shared pages in the central storage.
632	278	SMF71XGC	8	floating	Maximum number of shared pages in the central storage.
640	280	SMF71AGC	8	floating	Average number of shared pages in the central storage.
648	288	SMF71MGE	24	floating	Reserved.
672	2A0	SMF71MGA	8	floating	Minimum number of auxiliary DASD slots in use for shared pages.
680	2A8	SMF71XGA	8	floating	Maximum number of auxiliary DASD slots in use for shared pages.
688	2B0	SMF71AGA	8	floating	Average number of auxiliary DASD slots in use for shared pages.
696	2B8	SMF71MGF	8	floating	Minimum number of shared pages fixed in the system.
704	2C0	SMF71XGF	8	floating	Maximum number of shared pages fixed in the system.
712	2C8	SMF71AGF	8	floating	Average number of shared pages fixed in the system.
720	2D0	SMF71MGB	8	floating	Minimum number of shared pages fixed below 16 MB in the system.
728	2D8	SMF71XGB	8	floating	Maximum number of shared pages fixed below 16 MB in the system.
736	2E0	SMF71AGB	8	floating	Average number of shared pages fixed below 16 MB in the system.
744	2E8	SMF71CAM	8	floating	Minimum number of available central storage frames.
752	2F0	SMF71CAX	8	floating	Maximum number of available central storage frames.
760	2F8	SMF71CAA	8	floating	Average number of available central storage frames.
768	300	SMF71CLM	8	floating	Minimum number of low-impact central storage frames.
776	308	SMF71CLX	8	floating	Maximum number of low-impact central storage frames.
784	310	SMF71CLA	8	floating	Average number of low-impact central storage frames.
792	318	SMF71CMM	8	floating	Minimum number of medium-impact central storage frames.
800	320	SMF71CMX	8	floating	Maximum number of medium-impact central storage frames.
808	328	SMF71CMA	8	floating	Average number of medium-impact central storage frames.
816	330	SMF71CHM	8	floating	Minimum number of high-impact central storage frames.
824	338	SMF71CHX	8	floating	Maximum number of high-impact central storage frames.
832	340	SMF71CHA	8	floating	Average number of high-impact central storage frames.
840	348	SMF71EAM	96	floating	Reserved.
936	3A8	SMF71MVI	8	floating	Minimum number of VIO pages in central storage.
944	3B0	SMF71XVI	8	floating	Maximum number of VIO pages in central storage.
952	3B8	SMF71AVI	8	floating	Average number of VIO pages in central storage.
960	3C0	SMF71MHI	8	floating	Minimum number of hiperspace pages in central storage.
968	3C8	SMF71XHI	8	floating	Maximum number of hiperspace pages in central storage.
976	3D0	SMF71AHI	8	floating	Average number of hiperspace pages in central storage.
984	3D8	SMF71VWS	8	floating	Number of VIO pages written to central storage.
992	3E0	SMF71VRS	8	floating	Number of VIO pages read from central storage.
1000	3E8	SMF71HWS	8	floating	Number of hiperspace pages written to central storage.
1008	3F0	SMF71HRS	8	floating	Number of hiperspace pages read from central storage.

	Offsets	Name	Length	Format	Description
1016	3F8	SMF71MFB	8	floating	Minimum number of pages fixed between 16M and 2G.
1024	400	SMF71XFB	8	floating	Maximum number of pages fixed between 16M and 2G.
1032	408	SMF71AFB	8	floating	Average number of pages fixed between 16M and 2G.
1040	410	SMF71PTH	8	floating	Average number of pages in the system used by shared memory objects.
1048	418	SMF71PCH	8	floating	Average number of shared pages in central storage (with virtual storage address above the bar including high virtual DAT).
1056	420	SMF71PAH	8	floating	Average number of shared pages in auxiliary storage (with virtual storage address above the bar).
1064	428	SMF71BLG	8	floating	Maximum number of shared bytes from large virtual memory in a memory object for the entire system.
1072	430	SMF71PIH	8	floating	Number of page-ins from auxiliary storage for shared pages.
1080	438	SMF71POH	8	floating	Number of page-outs to auxiliary storage for shared pages (with virtual storage address above the bar).
1088	440	SMF71ULM	4	binary	Lowest minimum system UIC during the interval (from MCTMinSystemUIC).
1092	444	SMF71ULC	4	binary	Lowest current system UIC during the interval (from MCTCurSystemUIC).
1096	448	SMF71UHC	4	binary	Highest current system UIC during the interval (from MCTCurSystemUIC).
1100	44C	SMF71UHX	4	binary	Highest maximum system UIC during the interval (from MCTMaxSystemUIC).
1104	450	SMF71UAM	4	binary	Average minimum system UIC during the interval (from MCTMinSystemUIC).
1108	454	SMF71UAC	4	binary	Average current system UIC during the interval (from MCTCurSystemUIC).
1112	458	SMF71UAX	4	binary	Average maximum system UIC during the interval (from MCTMaxSystemUIC).
1116	45C	SMF71LOM	8	floating	Minimum number of fixed memory objects that are allocated in the system and can be backed in 1 MB frames.
1124	464	SMF71LOX	8	floating	Maximum number of fixed memory objects that are allocated in the system and can be backed in 1 MB frames.
1132	46C	SMF71LOA	8	floating	Average number of fixed memory objects that are allocated in the system and can be backed in 1 MB frames.
1140	474	SMF71LRM	8	floating	Minimum number of 1 MB pages fixed in central storage.
1148	47C	SMF71LRX	8	floating	Maximum number of 1 MB pages fixed in central storage.
1156	484	SMF71LRA	8	floating	Average number of 1 MB pages fixed in central storage.
1164	48C	SMF71COM	8	floating	Minimum number of memory objects allocated in the high virtual common storage of the system.
1172	494	SMF71COX	8	floating	Maximum number of memory objects allocated in the high virtual common storage of the system.
1180	49C	SMF71COA	8	floating	Average number of memory objects allocated in the high virtual common storage of the system.
1188	4A4	SMF71CRM	8	floating	Minimum number of pages from high virtual common storage that are backed in central storage (in units of 4 KB).
1196	4AC	SMF71CRX	8	floating	Maximum number of pages from high virtual common storage that are backed in central storage (in units of 4 KB).
1204	4B4	SMF71CRA	8	floating	Average number of pages from high virtual common storage that are backed in central storage (in units of 4 KB).

Offsets		Name	Length	Format	Description
1212	4BC	SMF71CFM	8	floating	Minimum number of fixed pages from high virtual common storage that are backed in central storage (in units of 4 KB).
1220	4C4	SMF71CFX	8	floating	Maximum number of fixed pages from high virtual common storage that are backed in central storage (in units of 4 KB).
1228	4CC	SMF71CFA	8	floating	Average number of fixed pages from high virtual common storage that are backed in central storage (in units of 4 KB).
1236	4D4	SMF71CSM	8	floating	Minimum number of auxiliary storage slots used for high virtual common pages that are backed on DASD.
1244	4DC	SMF71CSX	8	floating	Maximum number of auxiliary storage slots used for high virtual common pages that are backed on DASD.
1252	4E4	SMF71CSA	8	floating	Average number of auxiliary storage slots used for high virtual common pages that are backed on DASD.
1260	4EC	SMF71SOM	8	floating	Minimum number of memory objects allocated in the high virtual shared storage of the system.
1268	4F4	SMF71SOX	8	floating	Maximum number of memory objects allocated in the high virtual shared storage of the system.
1276	4FC	SMF71SOA	8	floating	Average number of memory objects allocated in the high virtual shared storage of the system.
1284	504	SMF71SRM	8	floating	Minimum number of pages from high virtual shared storage that are backed in central storage (in units of 4 KB).
1292	50C	SMF71SRX	8	floating	Maximum number of pages from high virtual shared storage that are backed in central storage (in units of 4 KB).
1300	514	SMF71SRA	8	floating	Average number of pages from high virtual shared storage that are backed in central storage (in units of 4 KB).
1308	51C	SMF71GRN	4	binary	Number of GETMAIN requests that have been issued.
1312	520	SMF71FBN	4	binary	Number of pages backed during GETMAIN requests that have been issued.
1316	524	SMF71FRN	4	binary	Number of fix requests that have been issued for storage (address spaces only) below 2 GB.
1320	528	SMF71FFN	4	binary	Number of pages that were requested to be fixed for storage (address spaces only) below 2 GB.
1324	52C	SMF711RN	4	binary	Number of first reference faults taken.
1328	530	SMF71NRN	4	binary	Number of non-first reference faults taken.
1332	534	SMF71RFL	4	binary	Flags: **Bit** **Meaning when set** **0** SCM support enabled **1** Pageable large pages support enabled **2-31** Reserved.
1336	538	SMF71LFA	8	floating	The maximum number of fixed 1 MB pages that can be allocated as specified in the LFAREA parameter.
1344	540	SMF71L1M	8	floating	Lowest maximum number of 1 MB frames that can be used by fixed 1 MB pages.
1352	548	SMF71L1X	8	floating	Highest maximum number of 1 MB frames that can be used by fixed 1 MB pages.
1360	550	SMF71L1A	8	floating	Average maximum number of 1 MB frames that can be used by fixed 1 MB pages.
1368	558	SMF71L2M	8	floating	Reserved. Value is now in SMF71L7M.

Offsets		Name	Length	Format	Description
1376	560	SMF71L2X	8	floating	Reserved. Value is now in SMF71L7X.
1384	568	SMF71L2A	8	floating	Reserved. Value is now in SMF71L7A.
1392	570	SMF71L3M	8	floating	Minimum number of 1 MB frames that are in-use and are no longer available for fixed 1 MB pages.
1400	578	SMF71L3X	8	floating	Maximum number of 1 MB frames that are in-use and are no longer available for fixed 1 MB pages.
1408	580	SMF71L3A	8	floating	Average number of 1 MB frames that are in-use and are no longer available for fixed 1 MB pages.
1416	588	SMF71L4M	8	floating	Reserved
1424	590	SMF71L4X	8	floating	Reserved
1432	598	SMF71L4A	8	floating	Reserved
1440	5A0	SMF71L5M	8	floating	Reserved
1448	5A8	SMF71L5X	8	floating	Reserved
1456	5B0	SMF71L5A	8	floating	Reserved
1464	5B8	SMF71L6M	8	floating	Reserved
1472	5C0	SMF71L6X	8	floating	Reserved
1480	5C8	SMF71L6A	8	floating	Reserved
1488	5D0	SMF71L7M	8	floating	Minimum number of available 1 MB frames that can be used by fixed 1 MB pages. Same as SMF71L2M.
1496	5D8	SMF71L7X	8	floating	Maximum number of available 1 MB frames that can be used by fixed 1 MB pages. Same as SMF71L2X.
1504	5E0	SMF71L7A	8	floating	Average number of available 1 MB frames that can be used by fixed 1 MB pages. Same as SMF71L2A.
1512	5E8	SMF71S1M	8	floating	Minimum total number of high virtual shared memory pages (in units of 4 KB).
1520	5F0	SMF71S1X	8	floating	Maximum total number of high virtual shared memory pages (in units of 4 KB).
1528	5F8	SMF71S1A	8	floating	Average total number of high virtual shared memory pages (in units of 4 KB).
1536	600	SMF71S2M	8	floating	Minimum number of shared memory objects that are allocated in the system and can be backed in 1 MB frames
1544	608	SMF71S2X	8	floating	Maximum number of shared memory objects that are allocated in the system and can be backed in 1 MB frames
1552	610	SMF71S2A	8	floating	Average number of shared memory objects that are allocated in the system and can be backed in 1 MB frames
1560	618	SMF71S3M	8	floating	Minimum number of frames in use for shared high virtual 4K pages
1568	620	SMF71S3X	8	floating	Maximum number of frames in use for shared high virtual 4K pages
1576	628	SMF71S3A	8	floating	Average number of frames in use for shared high virtual 4K pages
1584	630	SMF71S4M	8	floating	Minimum number of 1 MB pages used for shared memory objects backed in central storage.
1592	638	SMF71S4X	8	floating	Maximum number of 1 MB pages used for shared memory objects backed in central storage.
1600	640	SMF71S4A	8	floating	Average number of 1 MB pages used for shared memory objects backed in central storage.
1608	648	SMF71S5M	8	floating	Minimum number of auxiliary storage slots used for high virtual shared memory pages backed on DASD.
1616	650	SMF71S5X	8	floating.	Maximum number of auxiliary storage slots used for high virtual shared memory pages backed on DASD.

Offsets		Name	Length	Format	Description
1624	658	SMF71S5A	8	floating	Average number of auxiliary storage slots used for high virtual shared memory pages backed on DASD.
1632	660	SMF71S6M	8	floating	Minimum number of high virtual shared memory pages backed on SCM storage.
1640	668	SMF71S6X	8	floating	Maximum number of high virtual shared memory pages backed on SCM storage.
1648	670	SMF71S6A	8	floating	Average number of high virtual shared memory pages backed on SCM storage.
1656	678	SMF71C1M	8	floating	Minimum total number of high virtual common memory pages (in units of 4 KB).
1664	680	SMF71C1X	8	floating	Maximum total number of high virtual common memory pages (in units of 4 KB).
1672	688	SMF71C1A	8	floating	Average total number of high virtual common memory pages (in units of 4 KB).
1680	690	SMF71C2M	8	floating	Minimum number of high virtual common memory 1 MB fixed pages
1688	698	SMF71C2X	8	floating	Maximum number of high virtual common memory 1 MB fixed pages
1696	6A0	SMF71C2A	8	floating	Average number of high virtual common memory 1 MB fixed pages
1704	6A8	SMF71C3M	8	floating	Minimum number of high virtual common memory 1 MB pages backed in central storage
1712	6B0	SMF71C3X	8	floating	Maximum number of high virtual common memory 1 MB pages backed in central storage
1720	6B8	SMF71C3A	8	floating	Average number of high virtual common memory 1 MB pages backed in central storage
1728	6C0	SMF71C4M	8	floating	Minimum number of high virtual common memory pages backed on SCM storage
1736	6C8	SMF71C4X	8	floating	Maximum number of high virtual common memory pages backed on SCM storage.
1744	6D0	SMF71C4A	8	floating	Average number of high virtual common memory pages backed on SCM storage.
1752	6D8	SMF71TSM	8	floating	Minimum total number of 4K SCM blocks available to ASM.
1760	6E0	SMF71TSX	8	floating	Maximum total number of 4K SCM blocks available to ASM.
1768	6E8	SMF71TSA	8	floating	Average total number of 4K SCM blocks available to ASM.
1776	6F0	SMF71ASM	8	floating	Minimum number of available (not in-use) SCM blocks.
1784	6F8	SMF71ASX	8	floating	Maximum number of available (not in-use) SCM blocks.
1792	700	SMF71ASV	8	floating	Average number of available (not in-use) SCM blocks.
1800	708	SMF71BSM	8	floating	Minimum number of bad SCM blocks.
1808	710	SMF71BSX	8	floating	Maximum number of bad SCM blocks.
1816	718	SMF71BSA	8	floating	Average number of bad SCM blocks.
1824	720	SMF71USM	8	floating	Minimum number of SCM blocks in-use.
1832	728	SMF71USX	8	floating	Maximum number of SCM blocks in-use.
1840	730	SMF71USA	8	floating	Average number of SCM blocks in-use.
1848	738	SMF71TLS	4	binary	Total number of logical swaps.
1852	73C	*	4	binary	Not used.
1856	740	SMF71S7M	8	floating	Minimum number of shared pages backed on SCM storage.
1864	748	SMF71S7X	8	floating	Maximum number of shared pages backed on SCM storage.

Offsets		Name	Length	Format	Description
1872	750	SMF71S7A	8	floating	Average number of shared pages backed on SCM storage.
1880	758	SMF71LVF	8	floating	Average number of unused central storage page frames. Same as SMF71AVF, but long floating point format.
1888	760	SMF71LVS	8	floating	Average number of pageable address space central storage frames in the private address space. Same as SMF71AVS, but long floating point format.
1896	768	SMF71LVT	8	floating	Average total number of central storage frames used. Same as SMF71AVT, but long floating point format.
1904	770	SMF71LVR	8	floating	Average number of non-LSQA fixed central storage frames in the private address space. Same as SMF71AVR, but long floating point format.
1912	778	SMF71LVX	8	floating	Average total number of fixed central storage frames used. Same as SMF71AVX, but long floating point format.
1920	780	SMF71LVU	8	floating	Average number of usable local page data set slots that have not been allocated. Same as SMF71AVU, but long floating point format.
1928	788	SMF71LVV	8	floating	Average number of local page data set slots allocated to VIO private area pages. Same as SMF71AVV, but long floating point format.
1936	790	SMF71LVM	8	floating	Average number of local page data set slots allocated to non-VIO private area pages. Same as SMF71AVM, but long floating point format.
1944	798	SMF71LVB	8	floating	Average number of unusable local page data set slots. Same as SMF71AVB, but long floating point format.
1952	7A0	SMF71MCF	4	binary	Multithreading maximum capacity numerator for general purpose processors. Divide this value by 1024 to get the multithreading maximum capacity factor for all general purpose processors that were configured ONLINE for the complete interval.
1956	7A4		4		Reserved
1960	7A8	SMF71CPM	8	floating	Minimum number of high virtual common pages in-use
1968	7B0	SMF71CPX	8	floating	Maximum number of high virtual common pages in-use
1976	7B8	SMF71CPA	8	floating	Average number of high virtual common pages in-use
1984	7C0	SMF714KM	8	floating	Reserved
1992	7C8	SMF714KX	8	floating	Reserved
2000	7D0	SMF714KA	8	floating	Reserved
2008	7D8	SMF71PLM	8	floating	Minimum number of 1 MB frames that are in-use by pageable 1 MB pages.
2016	7E0	SMF71PLX	8	floating	Maximum number of 1 MB frames that are in-use by pageable 1 MB pages.
2024	7E8	SMF71PLA	8	floating	Average number of 1 MB frames that are in-use by pageable 1 MB pages.
2032	7F0	SMF71GOM	8	floating	Minimum number of fixed 2 GB memory objects allocated in the system
2040	7F8	SMF71GOX	8	floating	Maximum number of fixed 2 GB memory objects allocated in the system
2048	800	SMF71GOA	8	floating	Average number of fixed 2 GB memory objects allocated in the system
2056	808	SMF71GRM	8	floating	Minimum number of 2 GB pages fixed in central storage (same as SMF71GUM)
2064	810	SMF71GRX	8	floating	Maximum number of 2 GB pages fixed in central storage (same as SMF71GUX)
2072	818	SMF71GRA	8	floating	Average number of 2 GB pages fixed in central storage (same as SMF71GUA)

Offsets		Name	Length	Format	Description
2080	820	SMF71GUM	8	floating	Minimum number of 2 GB frames in the Large Frame Area that are in-use by fixed memory objects (same as SMF71GRM)
2088	828	SMF71GUX	8	floating	Maximum number of 2 GB frames in the Large Frame Area that are in-use by fixed memory objects (same as SMF71GRX)
2096	830	SMF71GUA	8	floating	Average number of 2 GB frames in the Large Frame Area that are in-use by fixed memory objects (same as SMF71GRA)
2104	838	SMF71GUH	8	floating	High water mark for the number of 2 GB frames that are used by the system
2112	840	SMF71GAM	8	floating	Minimum number of 2 GB frames in the Large Frame Area that are not in-use
2120	848	SMF71GAX	8	floating	Maximum number of 2 GB frames in the Large Frame Area that are not in-use
2128	850	SMF71GAA	8	floating	Average number of 2 GB frames in the Large Frame Area that are not in-use
2136	858	SMF71GFM	8	floating	Lowest maximum number of 2 GB frames that can be used by fixed 2 GB pages.
2144	860	SMF71GFX	8	floating	Highest maximum number of 2 GB frames that can be used by fixed 2 GB pages.
2152	868	SMF71GFA	8	floating	Average maximum number of 2 GB frames that can be used by fixed 2 GB pages.
2160	870	SMF71NNF	8	floating	Average number of non-nucleus frames comprising permanent storage.
2168	878	SMF71LSI	8	floating	Average number of system-initiated demotions from pageable large frame groups to 4K page frames.
2176	880	SMF71LRI	8	floating	Average number of request-initiated demotions from pageable large frame groups to 4K page frames.
2184	888	SMF71MHW	8	floating	High water mark of the number of 1 MB frames that were used to satisfy fixed 1 MB page requests.
2192	890	SMF71PIS	8	floating	Average total number of page-ins of 4 KB pages from SCM.
2200	898	SMF71POS	8	floating	Average total number of page-outs of 4 KB pages to SCM.
2208	8A0	SMF71PI1	8	floating	Average total number of page-ins of 1 MB pages from SCM.
2216	8A8	SMF71PO1	8	floating	Average total number of page-outs of 1 MB pages to SCM.
2224	8B0	SMF71L8M	8	floating	Minimum total number of 1 MB frames in central storage.
2232	8B8	SMF71L8X	8	floating	Maximum total number of 1 MB frames in central storage.
2240	8C0	SMF71L8A	8	floating	Average total number of 1 MB frames in central storage.
2248	8C8	SMF71L9M	8	floating	Minimum number of available 1 MB frames in central storage.
2256	8D0	SMF71L9X	8	floating	Maximum number of available 1 MB frames in central storage.
2264	8D8	SMF71L9A	8	floating	Average number of available 1 MB frames in central storage.
2272	8E0	SMF71L10M	8	floating	Minimum number of 1 MB frames that are in-use by memory objects.
2280	8E8	SMF71L10X	8	floating	Maximum number of 1 MB frames that are in-use by memory objects.
2288	8F0	SMF71L10A	8	floating	Average number of 1 MB frames that are in-use by memory objects.
2296	8F8	SMF71M6C	8	floating	Minimum number of frames backing 64-bit shared page groups.
2304	900	SMF71X6C	8	floating	Maximum number of frames backing 64-bit shared page groups.
2312	908	SMF71A6C	8	floating	Average number of frames backing 64-bit shared page groups.
2320	910	SMF71M6F	8	floating	Minimum number of fixed frames backing 64-bit shared page groups.

Offsets		Name	Length	Format	Description
2328	918	SMF71X6F	8	floating	Maximum number of fixed frames backing 64-bit shared page groups.
2336	920	SMF71A6F	8	floating	Average number of fixed frames backing 64-bit shared page groups.
2344	928	SMF71M6B	8	floating	Minimum number of 24-bit frames backing 64-bit shared page groups.
2352	930	SMF71X6B	8	floating	Maximum number of 24-bit frames backing 64-bit shared page groups.
2360	938	SMF71A6B	8	floating	Average number of 24-bit frames backing 64-bit shared page groups.
2368	940	SMF71M6A	8	floating	Minimum number of auxiliary DASD slots used to back 64-bit shared page groups.
2376	948	SMF71X6A	8	floating	Maximum number of auxiliary DASD slots used to back 64-bit shared page groups.
2384	950	SMF71A6A	8	floating	Average number of auxiliary DASD slots used to back 64-bit shared page groups.
2392	958	SMF71M6S	8	floating	Minimum number of SCM blocks used to back 64-bit shared page groups.
2400	960	SMF71X6S	8	floating	Maximum number of SCM blocks used to back 64-bit shared page groups.
2408	968	SMF71A6S	8	floating	Average number of SCM blocks used to back 64-bit shared page groups.
2416	970	SMF71M6T	8	floating	Minimum number of 64-bit shared page groups in the system.
2424	978	SMF71X6T	8	floating	Maximum number of 64-bit shared page groups in the system.
2432	980	SMF71A6T	8	floating	Average number of 64-bit shared page groups in the system.

Swap Placement Section

Starting with z/OS V1R13, this section does no longer contain valid values.

Offsets		Name	Length	Format	Description
0	0		24		Reserved.

Record type 72 (X'48') — Workload Activity, Storage Data, and Serialization Delay

Record type 72 has the following subtypes:

- **Subtype 3: Workload Activity** — is written for each service class and active report class in the active service policy. A report class becomes active as soon as work has been assigned to that report class.

  Workload Manager control section
  Identifies the policy, workload and service/report class name and contains workload data.

  Service Class Served data section
  Contains information about the service classes being served.

  Resource Group data section
  Contains information about the resource group to which the service class or tenant report class belongs.

  Service/Report Class Period data section
  Contains goals and actual measured values for each service and report class period. In addition, there are pointers to the corresponding Response Time Distribution data section and Work/Resource Manager State section.

Response Time Distribution data section
Contains the response time distribution map and count tables for each service class period with a response time goal or execution velocity goal.

Work/Resource Manager State section
Contains the subsystem work manager delay array with two entries for each subsystem.

- **Subtype 4: Storage Data —** is written from the Monitor III data gatherer for each service class period of each service class defined in the active service policy.

Service Class Period data section
Contains Monitor III specific using and delay counts and storage frame counts for each service class period.

Swap Reason data section
Contains swap reason information.

- **Subtype 5: Serialization Delay —** is written from the Monitor III data gatherer. It contains serialization delay data on address space level, used as input for the RMF Postprocessor to create the Serialization Delay Report. One record is written for each measurement interval and when the session terminates.

Subtype 5 contains one control section and several data sections. While the ***Serialization control section*** contains summary data for system-wide serialization delays, the data sections contain serialization delay data for up to twenty address spaces sorted by total contention time.

The ***GRS QScan Statistics data section*** contains measurements about GQSCAN and ISGQUERY REQINFO=QSCAN requests used to obtain the status of resources and requestors of those resources. This section contains data for up to twenty address spaces sorted by the total request execution time.

Serialization control section
Contains system-wide serialization delay data (see “Serialization Control Section” on page 608).

CMS Lock data section
Contains CMS lock data per address space. This section is mapped by “CMS lock type data” on page 610.

CMS Enqueue/Dequeue Lock data section
Contains CMS ENQ/DEQ lock data per address space. This section is mapped by “CMS lock type data” on page 610.

CMS Latch Lock data section
Contains CMS Latch lock data per address space. This section is mapped by “CMS lock type data” on page 610.

CMS SMF Lock data section
Contains CMS SMF lock data per address space. This section is mapped by “CMS lock type data” on page 610.

Local Lock data section
Contains local lock data per address space (see “Local Lock Data Section” on page 611).

CML Lock Owner data section
Contains CML lock owner data per address space (see “CML lock owner data section” on page 611).

CML Lock Requestor data section
Contains CML lock requestor data per address space (see “CML Lock Requestor Data Section” on page 612).

GRS Latch Set Creator data section
Contains GRS latch set creator data per address space. This section is mapped by “GRS latch type data” on page 613.

GRS Latch Requestor data section
Contains GRS latch requestor data per address space. This section is mapped by “GRS latch type data” on page 613.

GRS Enqueue Step data section
Contains data for GRS ENQ SCOPE=STEP requests per address space. This section is mapped by "GRS enqueue data" on page 613.

GRS Enqueue System data section
Contains data for GRS ENQ SCOPE=SYSTEM requests per address space. This section is mapped by "GRS enqueue data" on page 613.

GRS Enqueue Systems data section
Contains data for GRS ENQ SCOPE=SYSTEMS requests per address space. This section is mapped by "GRS enqueue data" on page 613.

GRS QScan Statistics data section
Contains data about GQSCAN and ISGQUERY REQINFO=QSCAN requests per address space (see "GRS QScan statistics data section" on page 614).

Each subtype contains a header section followed by the RMF Product section.

Macro to Symbolically Address Record Type 72: The SMF record mapping macro for all records produced by RMF is ERBSMFR. Its format is ERBSMFR (*n1*,*n2*,...) where *n1*,*n2*, ... are the SMF record types you want to map. Note that the parentheses are required only when two or more record types are specified. The mapping macro resides in SYS1.MACLIB.

For information on using RMF, see *z/OS RMF Reporter User's Guide*. For more information on Monitor I, II, and III, see *z/OS RMF Report Analysis*. For information on the MVS workload manager, see *z/OS MVS Planning: Workload Management* and *z/OS MVS Programming: Workload Management Services*.

Record environment

The following conditions exist for the generation of this record:

Macro
SMFWTM (record exit: IEFU83)

Mode
Task

Storage Residency
31-bit

Record mapping

Header/self-defining section

This section contains the common SMF record headers fields and the triplet fields (offset/length/number), if applicable, that locate the other sections on the record.

Offsets		Name	Length	Format	Description
0	0	SMF72LEN	2	binary	Record length. This field and the next field (total of four bytes) form the RDW (record descriptor word). See "Standard and Extended SMF record headers" on page 162 for a detailed description.
2	2	SMF72SEG	2	binary	Segment descriptor (see record length field).

Offsets		Name	Length	Format	Description
4	4	SMF72FLG	1	binary	System indicator: **Bit** **Meaning when set** **0** New SMF record format **1** Subtypes used **2** Reserved **3-6** Version indicators* **7** System is running in PR/SM mode *See “Standard and Extended SMF record headers” on page 162 for a detailed description.
5	5	SMF72RTY	1	binary	Record type 72(X'48').
6	6	SMF72TME	4	binary	Time since midnight, in hundredths of a second, that the record was moved into the SMF buffer.
10	A	SMF72DTE	4	packed	Date when the record was moved into the SMF buffer, in the form 0*cyydddF*. See “Standard and Extended SMF record headers” on page 162 for a detailed description.
14	E	SMF72SID	4	EBCDIC	System identification (from the SMFPRMxx SID parameter).
18	12	SMF72SSI	4	EBCDIC	Subsystem identification (RMF).
22	16	SMF72STY	2	binary	Record subtype.
24	18	SMF72TRN	2	binary	Number of triplets in this record. A triplet is a set of three SMF fields (offset/length/number values) that defines a section of the record. The offset is the offset from the RDW.
26	1A		2		Reserved.
28	1C	SMF72PRS	4	binary	Offset to RMF Product section from RDW.
32	20	SMF72PRL	2	binary	Length of RMF Product section.
34	22	SMF72PRN	2	binary	Number of RMF Product sections.
Individual header extension for subtype 3:					
36	24	SMF72WMS	4	binary	Offset to Workload Manager control section.
40	28	SMF72WML	2	binary	Length of Workload Manager control section.
42	2A	SMF72WMN	2	binary	Number of Workload Manager control sections.
44	2C	SMF72SSS	4	binary	Offset to Service Class Served data section.
48	30	SMF72SSL	2	binary	Length of Service Class Served data section.
50	32	SMF72SSN	2	binary	Number of Service Class Served data sections.
52	34	SMF72RGS	4	binary	Offset to Resource Group data section.
56	38	SMF72RGL	2	binary	Length of Resource Group data section.
58	3A	SMF72RGN	2	binary	Number of Resource Group data sections.
60	3C	SMF72SCS	4	binary	Offset to Service/Report Class Period data section.
64	40	SMF72SCL	2	binary	Length of Service/Report Class Period data section.
66	42	SMF72SCN	2	binary	Number of Service/Report Class Period data sections.
68	44	SMF72RTS	4	binary	Offset to Response Time Distribution data section.
72	48	SMF72RTL	2	binary	Length of Response Time Distribution data section.
74	4A	SMF72RTN	2	binary	Number of Response Time Distribution data sections.

Offsets		Name	Length	Format	Description
76	4C	SMF72WRS	4	binary	Offset to Work/Resource Manager State section.
80	50	SMF72WRL	2	binary	Length of Work/Resource Manager State section.
82	52	SMF72WRN	2	binary	Number of Work/Resource Manager State sections.
84	54	SMF72DNS	4	binary	Offset to Resource Delay Type Names sections.
88	58	SMF72DNL	2	binary	Length of Resource Delay Type Names sections.
90	5A	SMF72DNN	2	binary	Number of Resource Delay Type Names sections.
Individual header extension for subtype 4:					
36	24	SMF72CPS	4	binary	Offset to Service Class Period data section.
40	28	SMF72CPL	2	binary	Length of Service Class Period data section.
42	2A	SMF72CPN	2	binary	Number of Service Class Period data sections.
44	2C	SMF72SPS	4	binary	Offset to Swap Reason data section.
48	30	SMF72SPL	2	binary	Length of Swap Reason data section.
50	32	SMF72SPN	2	binary	Number of Swap Reason data sections.
Individual header extension for subtype 5:					
36	24	SMF72SES	4	binary	Offset to Serialization control section.
40	28	SMF72SEL	2	binary	Length of Serialization control section.
42	2A	SMF72SEN	2	binary	Number of Serialization control sections.
System suspend lock data sections:					
44	2C	SMF72CMS	4	binary	Offset to CMS lock data section.
48	30	SMF72CML	2	binary	Length of CMS lock data section.
50	32	SMF72CMN	2	binary	Number of CMS lock data sections.
52	34	SMF72EDS	4	binary	Offset to CMS EnqueueDequeue lock data section.
56	38	SMF72EDL	2	binary	Length of CMS EnqueueDequeue lock data section.
58	3A	SMF72EDN	2	binary	Number of CMS EnqueueDequeue lock data sections.
60	3C	SMF72LAS	4	binary	Offset to CMS latch lock data section.
64	40	SMF72LAL	2	binary	Length of CMS latch lock data section.
66	42	SMF72LAN	2	binary	Number of CMS latch lock data sections.
68	44	SMF72SMS	4	binary	Offset to CMS SMF lock data section.
72	48	SMF72SML	2	binary	Length of CMS SMF lock data section.
74	4A	SMF72SMN	2	binary	Number of CMS SMF lock data sections.
76	4C	SMF72LOS	4	binary	Offset to local lock data section.
80	50	SMF72LOL	2	binary	Length of local lock data section.
82	52	SMF72LON	2	binary	Number of local lock data sections.
84	54	SMF72COS	4	binary	Offset to CML lock owner data section.
88	58	SMF72COL	2	binary	Length of CML lock owner data section.
90	5A	SMF72CON	2	binary	Number of CML lock owner data sections.
92	5C	SMF72CRS	4	binary	Offset to CML lock requestor data section.
96	60	SMF72CRL	2	binary	Length of CML lock requestor data section.
98	62	SMF72CRN	2	binary	Number of CML lock requestor data sections.
GRS data sections:					

Offsets		Name	Length	Format	Description
100	64	SMF72LCS	4	binary	Offset to GRS latch set creator data section.
104	68	SMF72LCL	2	binary	Length of GRS latch set creator data section.
106	6A	SMF72LCN	2	binary	Number of GRS latch set creator data sections.
108	6C	SMF72LRS	4	binary	Offset to GRS latch set requestor data section.
112	70	SMF72LRL	2	binary	Length of GRS latch set requestor data section.
114	72	SMF72LRN	2	binary	Number of GRS latch set requestor data sections.
116	74	SMF72TDS	4	binary	Offset to GRS ENQ SCOPE=STEP data section.
120	78	SMF72TDL	2	binary	Length of GRS ENQ SCOPE=STEP data section.
122	7A	SMF72TDN	2	binary	Number of GRS ENQ SCOPE=STEP data sections.
124	7C	SMF72YDS	4	binary	Offset to GRS ENQ SCOPE=SYSTEM data section.
128	80	SMF72YDL	2	binary	Length of GRS ENQ SCOPE=SYSTEM data section.
130	82	SMF72YDN	2	binary	Number of GRS ENQ SCOPE=SYSTEM data sections.
132	82	SMF72SDS	4	binary	Offset to GRS ENQ SCOPE=SYSTEMS data section.
136	88	SMF72SDL	2	binary	Length of GRS ENQ SCOPE=SYSTEMS data section.
138	8A	SMF72SDN	2	binary	Number of GRS ENQ SCOPE=SYSTEMS data sections.
140	8C	SMF72QSS	4	binary	Offset to GRS QScan statistics data section.
144	90	SMF72QSL	2	binary	Length of GRS QScan statistics data section.
146	92	SMF72QSN	2	binary	Number of GRS QScan statistics data sections.

RMF Product Section

Offsets		Name	Length	Format	Description
0	0	SMF72MFV	2	EBCDIC/ packed	RMF version number.
2	2	SMF72PRD	8	EBCDIC	Product name (‘RMF’).
10	A	SMF72IST	4	packed	Time that the RMF measurement interval started, in the form 0*hhmmssF*, where *hh* is the hours, *mm* is the minutes, *ss* is the seconds, and *F* is the sign.
14	E	SMF72DAT	4	packed	Date when the RMF measurement interval started, in the form 0*cyydddF*. See “Standard and Extended SMF record headers” on page 162 for a detailed description.
18	12	SMF72INT	4	packed	Duration of the RMF measurement interval, in the form *mmsstttF* where *mm* is the minutes, *ss* is the seconds, *ttt* is the milliseconds, and *F* is the sign. The end of the measurement interval is the sum of the recorded start time (and this field.)
22	16		2		Reserved.
24	18	SMF72SAM	4	binary	Number of RMF samples.
28	1C		2		Reserved.

Offsets		Name	Length	Format	Description
30	1E	SMF72FLA	2	binary	Flags **Bit** **Meaning when set** **0** Reserved. **1** Samples have been skipped. **2** Record was written by RMF Monitor III. **3** Interval was synchronized with SMF. **4 - 8** Reserved. **9** zIIP boost was active during entire interval. **10** Speed boost was active during entire interval. **11 - 12** Reserved. **13 - 15** Boost class: `001`: IPL `010`: Shutdown `011`: Recovery process **Note:** The boost class value is valid only when one or more boosts is active; that is, a boost active bit is also on.
32	20		4		Reserved.
36	24	SMF72CYC	4	packed	Sampling cycle length, in the form 000*ttttF*, where *tttt* is the milliseconds and *F* is the sign (taken from CYCLE option). The range of values is 0.050 to 9.999 seconds.
40	28	SMF72MVS	8	EBCDIC	z/OS software level (consists of an acronym and the version, release, and modification level - ZV*vvrrmm*).
48	30	SMF72IML	1	binary	Indicates the type of processor complex on which data measurements were taken. **Value** **Meaning** **3** 9672, zSeries

Offsets		Name	Length	Format	Description
49	31	SMF72PRF	1	binary	Processor flags. **Bit** **Meaning when set** **0** The system has expanded storage **1** The processor is enabled for ES connection architecture (ESCA) **2** There is an ES connection director in the configuration **3** System is running in z/Architecture mode **4** At least one zAAP is currently installed **5** At least one zIIP is currently installed **6** Enhanced DAT facility 1 available **7** Enhanced DAT facility 2 available
50	32	SMF72PTN	1	binary	PR/SM partition number of the partition that wrote this record.
51	33	SMF72SRL	1	binary	SMF record level change number (X'8E' for z/OS V2R4 RMF with RMF Data Gatherer APAR OA59330). This field enables processing of SMF record level changes in an existing release.
52	34	SMF72IET	8	char	Interval expiration time token. This token can be used to identify other than RMF records that belong to the same interval (if interval was synchronized with SMF).
60	3C	SMF72LGO	8	binary	Offset GMT to local time (STCK format).
68	44	SMF72RAO	4	binary	Offset to reassembly area relative to start of RMF Product section.
72	48	SMF72RAL	2	binary	Length of reassembly area. Area consists of a fixed header and a variable number of information blocks. Length depends on the record type/subtype, but is fixed for a specific type/subtype.
74	4A	SMF72RAN	2	binary	Reassembly area indicator. **Value** **Meaning** **0** Record is not broken. **1** Record is broken. **Note:** This field is used to indicate whether an SMF record is a broken record. Therefore, offset (SMF72RAO) and length (SMF72RAL) are only valid if SMF72RAN = 1. A reassembly area is only present in broken records.
76	4C	SMF72OIL	2	binary	Original interval length as defined in the session or by SMF (in seconds).
78	4E	SMF72SYN	2	binary	SYNC value in seconds.
80	50	SMF72GIE	8	binary	Projected gathering interval end (STCK format) GMT time.
88	58	SMF72XNM	8	EBCDIC	Sysplex name as defined in parmlib member COUPLExx.
96	60	SMF72SNM	8	EBCDIC	System name for current system as defined in parmlib member IEASYSxx SYSNAME parameter.
Reassembly Area:					
0	0	SMF72RBR	2	binary	Total number of broken records built from the original large record.

Offsets		Name	Length	Format	Description
2	2	SMF72RSQ	2	binary	Sequence number of this broken record. Every broken record built from the same large record must have a unique sequence number, it is in the range from 1 to SMF72RBR.
4	4	SMF72RIO	4	binary	Offset to first reassembly information block relative to start of reassembly area header.
8	8	SMF72RIL	2	binary	Length of reassembly information block.
10	A	SMF72RIN	2	binary	Number of reassembly information blocks (same value as SMF72TRN in header section).
12	C		4		Reserved.
Reassembly Area Information Block:					
0	0	SMF72RNN	2	binary	Total number of sections in the original large record. This field contains information of how many sections of a specific type were contained in the original SMF record. This field is a copy of the number field of the triplet in the original (non broken) record.
2	2	SMF72RPP	2	binary	Position of the first of one or more consecutive sections described by this block as in the original record. Values in the range of 1 to SMF72RNN are valid for correct processing. A value of 0 will skip processing of this information block. This field provides information where the sections that are part of this broken record were placed in the original record before the split took place. The actual number of consecutive sections contained in this record is available from the actual triplet in the header extension.

Subtype 3: Workload Activity

Workload Manager Control Section

Offsets		Name	Length	Format	Description
0	0	R723MSCF	1	binary	Service/Report class flags. **Bit** **Meaning when set** **0** Indicator for a report class **1** Workload activity data not available **2** Policy data not available **3** Execution velocity includes I/O delays **4** Indicator for CPU protection **5** Indicator for storage protection **6** Indicator for dynamic alias tuning **7** Indicator for I/O priority group HIGH

Offsets		Name	Length	Format	Description
1	1	R723MFLG	1	binary	Flags. **Bit** **Meaning when set** **0** Indicator for zAAP crossover **1** Indicator for zAAP honor priority **2** Indicator for zIIP honor priority **3** Failure returned by HISMT service. Multithreading maximum capacity numerator values are invalid. **4** Indicator that service class is not eligible for honor priority processing. When on, specialty engine eligible work in this service class will not be offloaded to CPs for help processing. **5** Indicator for a tenant report class **6** Service class and tenant report class periods that are associated with a resource group and have assigned a discretionary goal are excluded from workload management. **7** Reserved
2	2	*	2		Reserved.
4	4	R723MNSP	8	EBCDIC	Policy name.
12	C	R723MDSP	32	EBCDIC	Policy description.
44	2C	R723MTPA	8	binary	Local time/date of policy activation (STCK format).
52	34	R723MCPU	4	binary	CPU service coefficient * 10,000.
56	38	R723MIOC	4	binary	I/O service coefficient * 10,000.
60	3C	R723MMSO	4	binary	Storage service coefficient * 10,000. When being used in calculations, apply the following scaling: `R723MMSO / 10000 * 4096 / 50 + 1` For details see "Defining service coefficients and options" in *z/OS MVS Planning: Workload Management*.
64	40	R723MSRB	4	binary	SRB service coefficient * 10,000
68	44	R723MTVL	4	binary	WLM sample interval (in milliseconds).
72	48	R723MTV#	4	binary	Number of times when WLM sampling code ran.
76	4C	R723MOPT	2	EBCDIC	Suffix of the IEAOPTxx parmlib member.
78	4E		2		Reserved.
80	50	R723MWNM	8	EBCDIC	Workload name.
88	58	R723MWDE	32	EBCDIC	Workload description.
120	78	R723MCNM	8	EBCDIC	Service/Report class name.
128	80	R723MCDE	32	EBCDIC	Service/Report class description.
160	A0	R723MCPG	2	binary	Number of periods belonging to this service or report class.
162	A2	R723MSUB	1	binary	Number of entries in the work/resource manager state section belonging to a subsystem.

Offsets		Name	Length	Format	Description
163	A3	*	3		Reserved.
166	A6	R723MERF	6	EBCDIC	Enqueue residency CPU service factor.
172	AC	R723MADJ	4	binary	Adjustment factor for CPU rate.
176	B0	R723MIDN	8	EBCDIC	Service definition name.
184	B8	R723MIDD	32	EBCDIC	Service definition description.
216	D8	R723MTDI	8	binary	Local time/date the service definition was installed (STCK format).
224	E0	R723MIDU	8	EBCDIC	Userid that installed the service definition.
232	E8	R723CLSC	8	EBCDIC	Service class that last contributed to this report class. Blank if this is a service class.
240	F0	R723NFFI	4	binary	Normalization factor for zAAP. Multiply zAAP service times or service units with this value and divide by 256 to calculate the CP equivalent value.
244	F4	R723NFFS	4	binary	Normalization factor for zIIP. Multiply zIIP service units with this value and divide by 256 to calculate the CP equivalent value.
248	F8	R723NADJ	4	binary	Nominal adjustment factor for CPU rate.
252	FC	R723CECA	4	binary	CEC adjustment factor.
256	100	R723MCF	4	binary	Multithreading maximum capacity numerator for general purpose processors. Divide this value by 1024 to get the MT maximum capacity factor for all general purpose processors that were configured ONLINE for the complete interval.
260	104	R723MCFS	4	binary	Multithreading maximum capacity numerator for zIIP. Divide this value by 1024 to get the multithreading maximum capacity factor for all zIIPs that were configured ONLINE for the complete interval. A zero value is reported if no zIIP is currently installed.
264	108	R723MCFI	4	binary	Multithreading maximum capacity numerator for zAAP. Divide this value by 1024 to get the multithreading maximum capacity factor for all zAAPs that were configured ONLINE for the complete interval. A zero value is reported if no zAAP is currently installed.
268	10C	R723CPA_actual	4	binary	Physical CPU adjustment factor based on Model Capacity Rating.
272	110	R723CPA_scaling_factor	4	binary	Scaling factor for R723CPA_actual.
276	114	R723CPA_actual_zCBP	4	binary	Reserved for future use.

Service Class Served Data Section

Offsets		Name	Length	Format	Description
0	0	R723SCSN	8	EBCDIC	Name of service class being served (by one or more address spaces in service class R723MCNM).
8	8	R723SCS#	4	binary	Number of times an address space running in service class R723MCNM was observed serving the served service class R723SCSN.

Resource Group Data Section

Offsets		Name	Length	Format	Description
0	0	R723GGNM	8	EBCDIC	Resource group name.
8	8	R723GGDE	32	EBCDIC	Resource group description.

Offsets		Name	Length	Format	Description
40	28	R723GGLT	1	binary	Resource group flags. **Bit** **Meaning when set** **0** Maximum capacity was specified **1** Minimum capacity was specified **2** Specification of R723GGMN and R723GGMX is in percentage of the LPAR share rather than in service units. In addition, the scope of the resource group is system-wide rather than sysplex-wide. **3** Specification of R723GGMN and R723GGMX is in percentage of a single processor capacity rather than in service units. In addition, the scope of the resource group is system-wide rather than sysplex-wide. **4** Memory limit was specified. **5** Specification of R723GGMN and R723GGMX is in MSU/h rather than in service units. **6** Specialty processor consumption is included into the WLM capping algorithms, i.e. R723GGMN and R723GGMX limit the combined general purpose and specialty processor consumption. **7** Reserved.
41	29	R723GGTF	1	binary	Tenant Resource Group Flags. **Bit** **Meaning when set** **0** Indicator for a tenant resource group **1-7** Reserved
42	2A		2		Reserved.
44	2C	R723GGMN	4	binary	If bit 1 of R723GGLT is ON, minimum capacity of the resource group. If bit 2, bit 3, and bit 5 of R723GGLT are OFF, this value is in unweighted CPU service units per second. In addition, the scope of the resource group is sysplex-wide. If bit 2, bit 3, or bit 5 of R723GGLT is ON, see the description of R723GGLT.
48	30	R723GGMX	4	binary	If bit 0 of R723GGLT is ON, maximum capacity of the resource group. If bit 2, bit 3, and bit 5 of R723GGLT are OFF, this value is in unweighted CPU service units per second. In addition, the scope of the resource group is sysplex-wide. If bit 2, bit 3, or bit 5 of R723GGLT is ON, see the description of R723GGLT.
52	34	R723GGML	4	binary	If bit 4 of R723GGLT is ON, memory limit (in GB) of the resource group. The scope of the resource group is system-wide.
56	38	R723GGTI	8	EBCDIC	Tenant identifier. Only valid if bit 0 of R723GGTF is ON.
64	40	R723GGTN	32	EBCDIC	Tenant name. Only valid if bit 0 of R723GGTF is ON.
96	60	R723GGKY	64	EBCDIC	Solution ID. Only valid if bit 0 of R723GGTF is ON.

Service/Report Class Period Data Section

There is one section per service or report class period.

Offsets		Name	Length	Format	Description
0	0	R723CRTX	2	binary	Index into the response time distribution count table in the Response Time Distribution data section. These buckets exist only for periods with a response time goal. Example: If the service class has six service class periods, and the periods 1, 3, and 5 have a response time goal, then this index has the following values: **Period** **Index into Response Time Distribution Count Table** **1** 1 **2** 0 **3** 2 **4** 0 **5** 3 **6** 0
2	2	R723CWMX	2	binary	Index into the work/resource manager states area.
4	4	R723CWMN	2	binary	Number of entries in the work/resource manager states area associated with this period (R723CWMX points to the first entry).
6	6	R723CRS1	1	binary	Report class period flags. **Bit** **Meaning when set** **0** This report class period is heterogeneous. **1-7** Reserved.
7	7	R723CADF	1	binary	Data flags - they indicate the availability of actual measured data in one of the subsections being a part of this section. **Bit** **Meaning when set** **0** Resource consumption data available **1** Response time data available **2** General execution delay data available **3-7** Reserved.
Goals: For a report class period, these are the goals of the service class period that last contributed to this report class period. For a homogeneous report class period, this goal must be used to format the response time distribution.					
8	8	R723CPER	1	binary	Service or report class period number.

Offsets		Name	Length	Format	Description
9	9	R723CRTF	1	binary	Response time flags (indicates units for R723CVAL). **Bit** **Meaning when set** **0** Response time specified in milliseconds. **1** Response time specified in seconds. **2** Response time specified in minutes. **3** Response time specified in hours. **4-7** Reserved.
10	A	R723CRGF	1	binary	Response time goal flags. **Bit** **Meaning when set** **0** Percentile response time goal. **1** Average response time goal. **2** Execution velocity goal. **3** Discretionary goal. **4** System specified goal. **5-7** Reserved.
11	B		1		Reserved.
12	C	R723CVAL	4	binary	Response time or execution velocity goal - or zero if discretionary or system goal. Units are defined in R723CRTF.
16	10	R723CPCT	2	binary	Goal percentile value (in percentage).
18	12	R723CIMP	2	binary	Importance of the goal to be achieved for this period (1=highest, 5=lowest). The value is zero for a discretionary or system goal.
20	14	R723CDUR	4	binary	Period duration in weighted service units, or zero for the last period.
Resource Consumption Data - Actual measured values: All service units are weighted by the coefficients in the active service policy.					
24	18	R723CSRV	8	floating	Total service units.
32	20	R723CCPU	8	floating	Total TCB service units. This value includes SUs on general purpose CPs and normalized SUs on zIIPs and zAAPs.
40	28	R723CIOC	8	floating	Total IOC service units.
48	30	R723CMSO	8	floating	Total central storage service units.
56	38	R723CSRB	8	floating	Total SRB service units. This value includes SUs on general purpose CPs and normalized SUs on zIIPs and zAAPs.
64	40	R723CPIR	8	floating	Total page-in count.
72	48	R723CHPI	8	floating	Total hiperspace page-in count. This value includes only those hiperspace pages that were moved by the Real Storage Manager and not by the MVPG instruction.
80	50	R723CBPI	8	floating	Total block page-in from auxiliary count.
88	58	R723CPIE	8	floating	Total page-in from expanded count.

Offsets		Name	Length	Format	Description
96	60	R723CBPE	8	floating	Total block page-in from expanded count.
104	68	R723CBKA	8	floating	Total auxiliary blocks paged in.
112	70	R723CBKE	8	floating	Total expanded blocks paged in.
120	78	R723CPRS	8	floating	Total page residency time (1024-microsecond units).
128	80	R723CERS	8	floating	Total expanded page residency time (1024-microsecond units).
136	88	R723CTRR	8	floating	Total in storage residency time (1024-microsecond units).
144	90	R723CTAT	8	floating	Total transaction active time (1024-microsecond units).
152	98	R723CRCT	8	floating	Total RCT time (microseconds).
160	A0	R723CIIT	8	floating	Total I/O interrupt time (microseconds).
168	A8	R723CHST	8	floating	Total hiperspace service time (microseconds).
176	B0	R723CSWC	4	binary	Total swap count.
180	B4	R723CCRM	4	binary	Total hiperspace ESO read miss count.
Response Time Data - Actual measured values:					
184	B8	R723CRCP	4	binary	Count of transaction completions for this period. This field includes transaction completions reported by subsystem work managers by way of the IWMRPT service.
188	BC	R723CARC	4	binary	Count of transactions that completed abnormally as reported by subsystem work manager. This value is not part of R723CRCP and should not be used for response time calculations.
192	C0	R723CNCP	4	binary	Count of transactions that completed their execution phase as reported by subsystem work managers by way of the IWMNTFY service.
196	C4	R723CANC	4	binary	Count of transactions that completed their execution phase abnormally as reported by subsystem work Manager. This value is not part of R723CNCP and should not be used for execution response time calculations.
200	C8	R723CTET	8	floating	Total transaction elapsed time (1024-microsecond units).
208	D0	R723CXET	8	floating	Total transaction execution time (1024-microsecond units).
216	D8	R723CETS	8	floating	Sum of transaction elapsed times squared (1024-microsecond units).
General Execution Delay Data - Actual measured values:					
224	E0	R723CCUS	4	binary	CPU using samples. These are included in R723CTOU.
228	E4	R723CTOT	4	binary	Total general execution delay samples used in WLM's execution velocity calculation. For the velocity formula, see *z/OS MVS Planning: Workload Management*.
The following categories of samples represent general execution delays that are included in R723CTOT. Each counter was incremented by one every time the WLM sampler found the appropriate condition.					
232	E8	R723CCDE	4	binary	CPU delay. A TCB or SRB is waiting to be dispatched or a TCB is waiting for local lock.
236	EC	R723CCCA	4	binary	CPU capping delay. A TCB or SRB is marked non-dispatchable because a resource group maximum is being enforced. Note that R723CCCA is NOT a subset of R723CCDE.
240	F0	R723CSWI	4	binary	Swap-in delay. Swap-in has started, but not completed.
244	F4	R723CMPL	4	binary	MPL delay. Ready but swap-in has not started.
248	F8	R723CAPR	4	binary	Auxiliary page from private.
252	FC	R723CACO	4	binary	Auxiliary page from common.

Offsets		Name	Length	Format	Description
256	100	R723CAXM	4	binary	Auxiliary page from cross memory.
260	104	R723CVIO	4	binary	Auxiliary page from VIO.
264	108	R723CHSP	4	binary	Auxiliary page from standard hiperspaces.
268	10C	R723CCHS	4	binary	Auxiliary page from ESO hiperspaces.
The following categories of samples are not included in R723CTOT:					
272	110	R723CUNK	4	binary	Unknown. Address space or enclave is waiting, but none of the general execution delays (listed earlier) apply.
276	114	R723CIDL	4	binary	Idle. Address space or enclave is in STIMER wait, TSO terminal wait, APPC wait, or an initiator waiting for work.
280	118	R723CPDE	4	binary	Resource group capping count. Group maximum is being enforced for work in this class.
284	11C	R723CPQU	4	binary	Quiesce count. Some work in this service class has been reset by way of the RESET xxx, QUIESCE command.
Additional General Execution Delay Data - Actuals:					
288	120	R723CSAC	4	binary	Sampled address space count. Number of address spaces that contributed delay and using samples to this class.
292	124	R723CSRS	8	floating	Total shared page residency time in 1024-microsecond units.
The following categories of samples represent general execution delays that are included in R723CTOT. Each counter was incremented by one every time the WLM sampler found the appropriate condition.					
300	12C	R723CSPA	8	floating	Total shared page-ins from auxiliary storage.
308	134	R723CSPE	8	floating	Total shared page-ins from expanded storage.
Additional Resource Consumption Data:					
316	13C	R723CICT	8	floating	Total non-paging DASD connect time in 128-microsecond units.
324	144	R723CIWT	8	floating	Total non-paging DASD wait time (queue time + pending time) in 128-microsecond units.
332	14C	R723CIDT	8	floating	Total non-paging DASD disconnect time in 128-microsecond units. This does not include IOS queue time.
340	154	R723CIRC	4	binary	Total non-paging DASD I/O start subchannel count. This can be used with fields R723CICT, R723CIWT, and R723CIDT to determine the average DASD response time for the period.
Additional General Execution Delay Data – Actuals:					
344	158	R723CTOU	4	binary	Total using samples. For the velocity formula, see *z/OS MVS Planning: Workload Management*.
348	15C	R723CIOU	4	binary	DASD using samples. Only non-paging DASD I/O can contribute to I/O using samples.
The following categories of samples represent general execution delays. Each counter was incremented by one every time the WLM sampler found the appropriate condition.					
352	160	R723CIOD	4	binary	DASD delay samples.
356	164	R723CQ	4	binary	Queue delay samples, work is waiting for a server.
360	168	R723CSPV	4	binary	Server private area paging delay samples.
364	16C	R723CSVI	4	binary	Server space VIO paging delay samples.
368	170	R723CSHS	4	binary	Server hiperspace paging delay samples.
372	174	R723CSMP	4	binary	Server MPL delay samples.
376	178	R723CSSW	4	binary	Server swap-in delay samples.
Non-DASD I/O Using or Delay Samples:					

Offsets		Name	Length	Format	Description
380	17C	R723CNDI	4	binary	Non-DASD I/O using or delay samples.
384	180	R723CTDQ	4	binary	Total delay samples always including batch queue delay. For service classes that contain batch jobs that were not run in WLM managed initiators the batch queue delay samples are derived from the measured batch queue delay time. For service classes that contain jobs that ran in WLM managed initiators this value is the same as RCAETOTD. RCAETOTDQ can be used as a migration aid to determine what a batch service class period's velocity will be if its jobs are run in WLM managed initiators.
388	184	R723CTSA	8	floating	Total execution samples. It is the sum of RCAETOTU, RCAETOTD, RCAEUNKN, RCAEIDLE.
396	18C	R723CIOT	8	floating	Total DASD IOS queue time in 128-microsecond units.
404	194	R723CQDT	8	floating	Total queue delay time in 1024-microsecond units. For batch jobs, this is the time jobs spent on the job queue while eligible to run on some system. It represents the time the jobs spent waiting for an initiator. For TSO users, this time can be a portion of the LOGON process. For APPC, this is the time an APPC request spent on an APPC queue.
The following three values only apply to batch jobs, they are zero for other work types:					
412	19C	R723CADT	8	floating	Total time (in 1024-microsecond units) batch jobs were ineligible to run because a resource that the job had affinity to was unavailable.
420	1A4	R723CCVT	8	floating	Total time (in 1024-microsecond units) batch jobs spent in JCL conversion.
428	1AC	R723CIQT	8	floating	Total time (in 1024-microsecond units) batch jobs spent on job queue (after JCL conversion) while ineligible to run on any system for reasons other than resource affinities.
436	1B4	R723CIEA	8	floating	Independent enclave total transaction active time (in 1024-microsecond units) for enclaves that originated on this system.
444	1BC	R723CXEA	8	floating	Exported enclave total transaction active time (in 1024-microsecond units).
452	1C4	R723CFEA	8	floating	Foreign enclave total transaction active time (in 1024-microsecond units).
Crypto Using and Delay Samples:					
460	1CC	R723CAMU	4	binary	No longer used.
464	1D0	R723CAMD	4	binary	No longer used.
468	1D4	R723APU	4	binary	AP crypto using samples: a TCB was found executing on a cryptographic assist processor.
472	1D8	R723APD	4	binary	AP crypto delay samples: a TCB was found waiting for a cryptographic assist processor.
476	1DC	R723FQD	4	binary	Feature queue delay samples: a TCB was found waiting on a processor feature queue associated with a CPU. This is a subset of R723CCDE. **Note:** R723CCUS includes feature queue using samples.
480	1E0	R723PLSC	8	EBCDIC	Service class that last contributed to this report class period during this interval. Blank if this is a service class period.
488	1E8	R723RCOD	4	binary	Contention delay sample count. One sample is accumulated for each held resource which is reported to WLM by the resource manager by way of IWMCNTN.

Offsets		Name	Length	Format	Description
492	1EC	R723RCOU	4	binary	Contention using sample count. One sample is accumulated for each resource in use which is reported to WLM by the resource manager by way of IWMCNTN.
496	1F0	R723ECTC	8	floating	CPU time consumed while dispatching priority was temporarily raised by enqueue management because the work unit held a resource that other work needed (in 1024 microsecond units).
504	1F8	R723IFAU	4	binary	zAAP using samples.
508	1FC	R723IFCU	4	binary	zAAP on CP using samples. These samples are included in R723CCUS.
512	200	R723IFAD	4	binary	zAAP delay samples.
516	204	R723IFAT	8	floating	Reserved. Use R723CIFA to calculate zAAP (IFA) service times.
524	20C	R723IFCT	8	floating	Reserved
532	214	R723SUPU	4	binary	zIIP using samples.
536	218	R723SUCU	4	binary	zIIP on CP using samples.
540	21C	R723SUPD	4	binary	zIIP delay samples.
544	220	R723CSUP	8	floating	Total service units on zIIPs. Multiply with R723NFFS and divide by 256 to calculate the CP equivalent value.
552	228	R723CSUC	8	floating	Total service units on CPs spent by zIIP eligible work.
560	230	R723CIFA	8	floating	Total service units on zAAPs. Multiply with R723NFFI and divide by 256 to calculate the CP equivalent value.
568	238	R723CIFC	8	floating	Total service units on CPs spent by zAAP eligible work.
576	240	R723TPDP	8	floating	CPU time consumed while dispatching priority of work with low importance was temporarily raised to help blocked workloads (in 1024 microsecond units).
584	248	R723CPDP	8	floating	CPU time consumed while dispatching priority was temporarily raised by chronic resource contention management because the work unit held a resource that other work needed (in 1024 microsecond units).
592	250	R723LPDP	8	floating	CPU time consumed while dispatching priority was temporarily raised to shorten the lock hold time of a local suspend lock held by the work unit (in 1024 microsecond units). Only valid if HiperDispatch is active.
600	258	R723SPDP	8	floating	CPU time consumed while dispatching priority for a work unit was temporarily raised by the z/OS supervisor to a higher dispatching priority than assigned by WLM (in 1024-microsecond units).
608	260	R723RTDM	4	binary	Midpoint of all response times that were collected in the response time distribution buckets in milliseconds. For response time goals, the midpoint is always the response time goal. For execution velocity goals, it is the average of all response times that were collected in the response time distribution buckets.
612	264	R723RTDC	4	binary	Number of midpoint changes that occurred during the interval. Number equals zero for response time goals.
616	268	R723RTDT	8	binary	Timestamp in STCK format, showing the latest point in time when a midpoint change occurred in R723RTDM.

Transaction Resource Consumption Data

When transaction processor usage is reported to WLM through IWM4RPT or IWM4MNTF services, the consumed service units are accounted to the transaction service or report classes, and deducted from the region's service and report classes. If the number of transactions is very small and a single transaction reports high processor times, it can occur that processor times become negative. The corresponding SMF fields will report a negative value to allow for correct aggregation across intervals.

Offsets		Name	Length	Format	Description
624	270	R723TSUCP	8	floating	Total service units consumed by transactions, executed on general purpose processors.
632	278	R723TSUSP	8	floating	Total normalized service units consumed by transactions, executed on specialty processors.
640	280	R723TSUOCP	8	floating	Total service units consumed by transactions, eligible to run on specialty processors, but executed on general purpose processors.
648	288	R723MSUCP	8	floating	Service units consumed by transactions, classified with reporting attribute MOBILE, executed on general purpose processors.
656	290	R723MSUSP	8	floating	Normalized service units consumed by transactions, classified with reporting attribute MOBILE, executed on specialty processors.
664	298	R723MSUOCP	8	floating	Service units consumed by transactions, classified with reporting attribute MOBILE, eligible to run on specialty processors, but executed on general purpose processors.
672	2A0	R723ASUCP	8	floating	Service units consumed by transactions, classified with reporting attribute CATEGORYA, executed on general purpose processors.
680	2A8	R723ASUSP	8	floating	Normalized service units consumed by transactions, classified with reporting attribute CATEGORYA, executed on specialty processors.
688	2B0	R723ASUOCP	8	floating	Service units consumed by transactions, classified with reporting attribute CATEGORYA, eligible to run on specialty processors, but executed on general purpose processors.
696	2B8	R723BSUCP	8	floating	Service units consumed by transactions, classified with reporting attribute CATEGORYB, executed on general purpose processors.
704	2C0	R723BSUSP	8	floating	Normalized service units consumed by transactions, classified with reporting attribute CATEGORYB, executed on specialty processors.
712	2C8	R723BSUOCP	8	floating	Service units consumed by transactions, classified with reporting attribute CATEGORYB, eligible to run on specialty processors, but executed on general purpose processors.
720	2D0	R723CTETX	8	floating	Total transaction elapsed time. Same as R723CTET, but in microseconds.
728	2D8	R723CXETX	8	floating	Total transaction execution time. Same as R723CXET, but in microseconds.
736	2E0	R723CETSX	8	floating	Sum of transaction elapsed times squared. Same as R723CETS, but in microseconds.
744	2E8	R723CQDTX	8	floating	Total queue delay time. Same as R723CQDT, but in microseconds.
752	2F0	R723CADTX	8	floating	Total time batch jobs were ineligible to run because a resource that the job had affinity to was unavailable. Same as R723CADT, but in microseconds.
760	2F8	R723CCVTX	8	floating	Total time batch jobs spent in JCL conversion. Same as R723CCVT, but in microseconds.
768	300	R723CIQTX	8	floating	Total time batch jobs spent on job queue (after JCL conversion) while ineligible to run on any system for reasons other than resource affinities. Same as R723CIQT, but in microseconds.
776	308	R723TSUCBP	8	floating	Reserved for future use.
784	310	R723TSUCBPCP	8	floating	Reserved for future use.

Response Time Distribution Data Section

This section is available for each service or report class period and defines up to 9 arrays. Each array represents 14 response time distribution buckets built around a midpoint that is calculated dependent on the goal of the associated service class period. For service and report class periods with response time goals, the midpoint is the response time goal as defined in the active WLM service definition. For periods with execution velocity, the midpoint is the average of all response times that were collected in the response time distribution buckets. The midpoint is stored in field R723RTDM of the Service/Report Class Period data section.

Note: The data in the Response Time Distribution data section is not valid for heterogeneous report class periods. A report class period is heterogeneous if bit 0 of R723CRS1 is ON.

Offsets		Name	Length	Format	Description
Response Time Distribution Map:					
0	0	R723TRDB	4	binary	50 - Each map entry defines a maximum percentage of the midpoint that was calculated for the response time distribution. When used in conjunction with an entry in the response time distribution count table, it shows the number of transactions that completed in a percentage of the midpoint.
4	4		4	binary	60 - this value means: 60% of the goal response time.
8	8		4	binary	70 - this value means: 70% of the goal response time.
12	C		4	binary	80 - this value means: 80% of the goal response time.
16	10		4	binary	90 - this value means: 90% of the goal response time.
20	14		4	binary	100 - this value means: 100% of the goal response time.
24	18		4	binary	110 - this value means: 110% of the goal response time.
28	1C		4	binary	120 - this value means: 120% of the goal response time.
32	20		4	binary	130 - this value means: 130% of the goal response time.
36	24		4	binary	140 - this value means: 140% of the goal response time.
40	28		4	binary	150 - this value means: 150% of the goal response time.
44	2C		4	binary	200 - this value means: 200% of the goal response time.
48	30		4	binary	400 - this value means: 400% of the goal response time.
52	34		4	binary	X'FFFFFFFF' - last entry : >400% of the goal response time.
Response Time Distribution Count Table: Arrays 1-8 (where 8 is the maximum number of periods) contain the counts for an associated period and are addressed by an index from the Service/Report Class Period data section (R723CRTX). Each entry contains the number of transactions that completed in the time period represented by that entry. For example, the count at offset 0 means: Count of completed transactions with a response time ≤ 50% of the midpoint.					
0	0		4	binary	Count of completed transactions with: Response time ≤ 50% of the goal.
4	4		4	binary	Count of completed transactions with: Response time > 50% of the goal. Response time ≤ 60% of the goal.
8	8		4	binary	Count of completed transactions with: Response time > 60% of the goal. Response time ≤ 70% of the goal.
12	C		4	binary	Count of completed transactions with: Response time > 70% of the goal. Response time ≤ 80% of the goal.

Offsets		Name	Length	Format	Description
16	10		4	binary	Count of completed transactions with: Response time > 80% of the goal. Response time ≤ 90% of the goal.
20	14		4	binary	Count of completed transactions with: Response time > 90% of the goal. Response time ≤ 100% of the goal.
24	18		4	binary	Count of completed transactions with: Response time > 100% of the goal. Response time ≤ 110% of the goal.
28	1C		4	binary	Count of completed transactions with: Response time > 110% of the goal. Response time ≤ 120% of the goal.
32	20		4	binary	Count of completed transactions with: Response time > 120% of the goal. Response time ≤ 130% of the goal.
36	24		4	binary	Count of completed transactions with: Response time > 130% of the goal. Response time ≤ 140% of the goal.
40	28		4	binary	Count of completed transactions with: Response time > 140% of the goal. Response time ≤ 150% of the goal.
44	2C		4	binary	Count of completed transactions with: Response time > 150% of the goal. Response time ≤ 200% of the goal.
48	0		4	binary	Count of completed transactions with: Response time > 200% of the goal. Response time ≤ 400% of the goal.
52	34		4	binary	Count of completed transactions with: Response time > 400% of the goal.

Work Manager/Resource Manager State Section

This section defines subsystem work manager delay arrays per service class period. Value R723CWMN in the Service Class Period data section gives the number of entries in this section per service class period.

Entry in the subsystem work manager delay array.

There are always two entries for a subsystem:

- One for the begin_to_end phase; the begin_to_end entry is always the first one.
- One for the execution phase

Offsets		Name	Length	Format	Description
0	0	R723RTYP	4	EBCDIC	Subsystem type, as used in the classification rules specified in the WLM administrative application. The subsystem's documentation should explain the meaning that the product attributes to the various states.

Offsets		Name	Length	Format	Description
4	4	R723RFLG	1	binary	Work/Resource manager flags. **Bit** **Meaning when set** **0** States sampled in the begin_to_end phase of a transaction. **1** States sampled in the execution phase of a transaction. **2-7** Reserved.
5	5		3		Reserved.
8	8	R723RESS	4	binary	Total number of transaction states sampled in the phase specified by R723RFLG.
12	C	R723RACT	4	binary	Total number of active state samples. Active indicates that there is a program executing on behalf of the work request, from the perspective of the work manager. This does not mean that the program is active from the base control program's perspective.
16	10	R723RRDY	4	binary	Total number of ready state samples. Ready indicates that there is a program ready to execute on behalf of the work request described by the monitoring environment, but the work manager has given priority to another work request.
20	14	R723RIDL	4	binary	Total number of idle state samples. Idle indicates that no work request is available to the work manager that is allowed to run.
24	18	R723RWLO	4	binary	Total number of waiting for lock state samples.
28	1C	R723RWIO	4	binary	Total number of waiting for I/O state samples. Waiting for I/O indicates that the work manager is waiting for an activity related to an I/O request. This may be an actual I/O operation or some other function associated with the I/O request.
32	20	R723RWCO	4	binary	Total number of waiting for conversation state samples. Waiting for conversation may have been used in conjunction with the WLM service IWMMSWCH to identify where the recipient of the conversation is located. In this case, only the switched state will be recorded.
36	24	R723RWDS	4	binary	Total number of waiting for distributed request state samples. Waiting for distributed request indicates a high level that some function or data must be routed prior to resumption of the work request. This is to be contrasted with waiting for conversation, which is a low level view of the precise resource that is needed. A distributed request could involve waiting on a conversation as part of its processing.
40	28	R723RWSL	4	binary	Total number of waiting for a session to be established locally samples. Waiting for a session to be established locally, i.e. on the current MVS image.
44	2C	R723RWSN	4	binary	Total number of waiting for a session to be established somewhere in the network samples.
48	30	R723RWSS	4	binary	Total number of waiting for a session to be established somewhere in the sysplex samples.
52	34	R723RWTM	4	binary	Total number of waiting for a timer samples.
56	38	R723RWO	4	binary	Total number of waiting for another product samples.
60	3C	R723RWMS	4	binary	Total number of waiting for unidentified resource samples. Waiting for unidentified resource, possibly among another more specific category, but which may not be readily determined.
64	40	R723RSSL	4	binary	Number of states representing transactions for which there are logical continuations on this MVS image. Subsystem work managers might set this state when they function ship a transaction to another component within the same MVS image.

Offsets		Name	Length	Format	Description
68	44	R723RSSS	4	binary	Number of states representing transactions for which there are logical continuations on another MVS image in the sysplex. Subsystem work managers might set this state when they function ship a transaction to another component on another MVS image within the sysplex.
72	48	R723RSSN	4	binary	Number of states representing transactions for which there are logical continuations somewhere within the network. Subsystem work managers might set this state when they function ship a transaction to another component within the network.
76	4C	R723RWST	4	binary	Total number of waiting for SSL thread samples.
80	50	R723RWRT	4	binary	Total number of waiting for regular thread samples.
84	54	R723RWWR	4	binary	Total number of waiting for work table registration samples.
88	58	R723RAPP	4	binary	Total number of active application state samples.
92	5C	R723RWNL	4	binary	Total number of state samples reflecting waiting for new latch.
96	60	R723RW01	4	binary	Total number of samples waiting for resource type 1.
100	64	R723RW02	4	binary	Total number of samples waiting for resource type 2.
104	68	R723RW03	4	binary	Total number of samples waiting for resource type 3.
108	6C	R723RW04	4	binary	Total number of samples waiting for resource type 4.
112	70	R723RW05	4	binary	Total number of samples waiting for resource type 5.
116	74	R723RW06	4	binary	Total number of samples waiting for resource type 6.
120	78	R723RW07	4	binary	Total number of samples waiting for resource type 7.
124	7C	R723RW08	4	binary	Total number of samples waiting for resource type 8.
128	80	R723RW09	4	binary	Total number of samples waiting for resource type 9.
132	84	R723RW10	4	binary	Total number of samples waiting for resource type 10.
136	88	R723RW11	4	binary	Total number of samples waiting for resource type 11.
140	8C	R723RW12	4	binary	Total number of samples waiting for resource type 12.
144	90	R723RW13	4	binary	Total number of samples waiting for resource type 13.
148	94	R723RW14	4	binary	Total number of samples waiting for resource type 14.
152	98	R723RW15	4	binary	Total number of samples waiting for resource type 15.
156	9C	R723RBPM	4	binary	Number of state samples representing buffer pool misses that resulted in I/O.
160	A0	R723RDNX	2	binary	Index into resource delay type names table.
162	A2	R723RDNN	2	binary	Number of entries in resource delay type names table.
164	A4		8		Reserved.

Resource Delay Type Names Section

This section defines descriptions for generic resource types. Field R723RDNX in the "Work Manager/ Resource Manager State Section" on page 603 is the index into this section and R723RDNN is the number of entries for the subsystem.

Offsets		Name	Length	Format	Description
0	0	R723DNST	4	EBCDIC	Subsystem type as used in the classification rules specified in the WLM administrative application.
4	4	R723DNNU	2	binary	Number of the resource delay type. Values 1 ... 15 are related to R723RW01 ... R723RW15 respectively.
6	6	R723DNDE	16	EBCDIC	Resource delay description.

Offsets		Name	Length	Format	Description
22	16		2		Reserved.

Subtype 4: Storage Data

Service Class Period Data Section

Offsets		Name	Length	Format	Description
0	0	R724PNAM	8	EBCDIC	Name of active service policy.
8	8	R724PTM	8	binary	Local time/date of policy activation (STCK format).
16	10	R724LCNM	8	EBCDIC	Service class name.
24	18	R724PER#	1	binary	Service class period number.
25	19		3		Reserved.
28	1C	R724USER	4	binary	Number of users found.
32	20	R724ACTV	4	binary	Number of active users found.
36	24	R724ACTS	4	binary	Number of active samples (except OUTR).
40	28	R724IDLS	4	binary	Number of idle samples.
44	2C	R724PAGE	4	binary	Number of users delayed for paging at all samples.
48	30	R724SWAP	4	binary	Number of users delayed for swapping at all samples.
52	34	R724OUTR	4	binary	Number of out and ready users at all samples.
56	38	R724PGIN	4	binary	Number of page-ins.
60	3C	R724DIVS	4	binary	Number of DIV samples.
64	40	R724LSSA	4	binary	Total logically swapped samples for the group.
68	44	R724PSSA	4	binary	Total swapped samples for the group (except logical).
72	48	R724UPRO	4	binary	Total processor using samples for the group.
76	4C	R724UDEV	4	binary	Total device using samples for the group.
80	50	R724DPRO	4	binary	Total processor delay samples for the group.
84	54	R724DDEV	4	binary	Total device delay samples for the group.
88	58	R724DSTO	4	binary	Total storage delay samples for the group.
92	5C	R724DJES	4	binary	Total JES delay samples for the group.
96	60	R724DHSM	4	binary	Total HSM delay samples for the group.
100	64	R724DXCF	4	binary	Total XCF delay samples for the group.
104	68	R724DENQ	4	binary	Total ENQ delay samples for the group.
108	6C	R724DMNT	4	binary	Total mount delay samples for the group.
112	70	R724DMSG	4	binary	Total message delay samples for the group.
116	74	R724UNKN	4	binary	Total unknown state samples for the group.
120	78	R724VALD	4	binary	Total valid samples for the group (single state sum of all using, delay, idle, and unknown).
124	7C	R724LSCT	4	binary	Count of “long” logical swaps for the group.
128	80	R724ESCT	4	binary	Count of “long” swaps to expanded storage for the group.
132	84	R724PSCT	4	binary	Count of “long” physical swaps for the group.
136	88	R724ACTF	8	floating	Number of active frames.
144	90	R724IDLE	8	floating	Number of idle frames.

Offsets		Name	Length	Format	Description
152	98	R724SLOT	8	floating	Number of slots used.
160	A0	R724DIV	8	floating	Number of DIV frames.
168	A8	R724FIX	8	floating	Number of fixed frames.
176	B0	R724LSCF	8	floating	Number of central frames for all logically swapped users at all samples.
184	B8	R724LSEF	8	floating	Number of expanded frames for all logically swapped users at all samples.
192	C0	R724PSEF	8	floating	Number of expanded frames for all swapped users (except logical) at all samples.
200	C8	R724VECT	8	floating	Total vector utilization time for the group (microseconds).
208	D0	R724ET	8	floating	Total executiuon time for all transactions that ended in the group (1024-microsecond units). Does not include queued time.
216	D8	R724QT	8	floating	Total time spent on JES or APPC queues by all transactions that ended in the group (1024-microsecond units).
224	E0	R724END	8	floating	Number of transactions that ended in the group .
232	E8	R724TSV	8	floating	Sum of shared page views.
240	F0	R724VIN	8	floating	Sum of shared pages in central storage that are valid.
248	F8	R724VLC	8	floating	Sum of shared page validations.
256	100	R724GPI	8	floating	Sum of shared page-ins from auxiliary storage.
264	108	R724ETX	8	floating	Total execution time for all transactions that ended in the group. Same as R724ET, but in microseconds.
272	110	R724QTX	8	floating	Total time spent on JES or APPC queues by all transactions that ended in the group. Same as R724QT, but in microseconds.

Swap Reason Data Section

Offsets		Name	Length	Format	Description
0	0	R724OR1	4	binary	STOR/OUTR delay samples for swap reason 1: Terminal output wait.
4	4	R724OR2	4	binary	STOR/OUTR delay samples for swap reason 2: Terminal input wait.
8	8	R724OR3	4	binary	STOR/OUTR delay samples for swap reason 3: Long wait.
12	C	R724OR4	4	binary	STOR/OUTR delay samples for swap reason 4: Auxiliary storage shortage.
16	10	R724OR5	4	binary	STOR/OUTR delay samples for swap reason 5: Real storage shortage.
20	14	R724OR6	4	binary	STOR/OUTR delay samples for swap reason 6: Detected long wait.
24	18	R724OR7	4	binary	STOR/OUTR delay samples for swap reason 7: Requested swap. No longer used - refer to R724OR7A.
28	1C	R724OR8	4	binary	STOR/OUTR delay samples for swap reason 8: Enqueue exchange swap.
32	20	R724OR9	4	binary	STOR/OUTR delay samples for swap reason 9: Exchange swap.
36	24	R724OR10	4	binary	STOR/OUTR delay samples for swap reason 10: Unilateral swap.
40	28	R724OR11	4	binary	STOR/OUTR delay samples for swap reason 11: Transition swap.
44	2C	R724OR12	4	binary	STOR/OUTR delay samples for swap reason 12: Improve central storage usage.
48	30	R724OR13	4	binary	STOR/OUTR delay samples for swap reason 13: Improve system paging rate.

Offsets		Name	Length	Format	Description
52	34	R724OR14	4	binary	STOR/OUTR delay samples for swap reason 14: Make room for an out too long user.
56	38	R724OR15	4	binary	STOR/OUTR delay samples for swap reason 15: APPC wait.
60	3C	R724OR16	4	binary	STOR/OUTR delay samples for swap reason 16: OMVS input wait.
64	40	R724OR17	4	binary	STOR/OUTR delay samples for swap reason 17: OMVS output wait.
68	44	R724OR18	4	binary	STOR/OUTR delay samples for swap reason 18: In-real swap.
72	48	R724OR7A	4	binary	STOR/OUTR delay samples for swap reason 7: Memory pool shortage

Subtype 5: Serialization Delay

Serialization Control Section

This section contains system-wide serialization delay data for all address spaces. There is one section per record.

Offsets		Name	Length	Format	Description
0	0	R725SGMO	1	binary	GRS mode. **Value** **Meaning** **0** None **1** Ring **2** Star
1	1		15		Reserved.
CMS Lock Summary - system wide data for all address spaces.					
16	10	R725SCMS	8	binary	Total number of times that a unit of work was suspended on a CMS lock.
24	18	R725SCMA	8	binary	Total number of times that a unit of work was suspended on a CMS lock when there was already at least one other unit of work suspended for the lock.
32	20	R725SCMT	8	binary	Total amount of time in milliseconds that a unit of work was suspended on a CMS lock.
40	28		8		Reserved.
CMS Enqueue/Dequeue Lock Summary - system wide data for all address spaces.					
48	30	R725SEDS	8	binary	Total number of times that a unit of work was suspended on a CMS Enqueue/Dequeue lock.
56	38	R725SEDA	8	binary	Total number of times that a unit of work was suspended on a CMS Enqueue/Dequeue lock when there was already at least one other unit of work suspended for the lock.
64	40	R725SEDT	8	binary	Total amount of time in milliseconds that a unit of work was suspended on a CMS Enqueue/Dequeue lock.
72	48		8		Reserved.
CMS Latch Lock Summary - system wide data for all address spaces.					
80	50	R725SLAS	8	binary	Total number of times that a unit of work was suspended on a CMS Latch lock.
88	58	R725SLAA	8	binary	Total number of times that a unit of work was suspended on a CMS Latch lock when there was already at least one other unit of work suspended for the lock.

Offsets		Name	Length	Format	Description
96	60	R725SLAT	8	binary	Total amount of time in milliseconds that a unit of work was suspended on a CMS Latch lock.
104	68		8		Reserved.
CMS SMF Lock Summary - system wide data for all address spaces.					
112	70	R725SSMS	8	binary	Total number of times that a unit of work was suspended on a CMS SMF lock.
120	78	R725SSMA	8	binary	Total number of times that a unit of work was suspended on a CMS SMF lock when there was already at least one other unit of work suspended for the lock.
128	80	R725SSMT	8	binary	Total amount of time in milliseconds that a unit of work was suspended on a CMS SMF lock.
136	88		8		Reserved.
Local Lock Summary - system wide data for all address spaces.					
144	90	R725SLOS	8	binary	Total number of times that a unit of work was suspended on a local lock.
152	98	R725SLOA	8	binary	Total number of times that a unit of work was suspended on a local lock when there was already at least one other unit of work suspended for the lock.
160	A0	R725SLOT	8	binary	Total amount of time in milliseconds that a unit of work was suspended on a local lock.
168	A8		8		Reserved.
CML Lock Owner Summary - system wide data for all address spaces.					
176	B0	R725SCLS	8	binary	Total number of times that a unit of work from another address space was suspended when requesting the local lock of an address space.
184	B8	R725SCLA	8	binary	Total number of times that a unit of work from another address space was suspended when requesting the local lock of an address space and there was already at least one other unit of work suspended for the lock.
192	C0	R725SCLT	8	binary	Total amount of time in milliseconds that a unit of work from another address space was suspended when requesting the local lock of an address space.
200	C8		8		Reserved.
GRS Latch Obtain Request Summary - system wide data for all address spaces.					
208	D0	R725SLRS	8	binary	Total number of suspended latch obtain requests.
216	D8	R725SLRT	8	binary	Total amount of time in milliseconds that latch obtain requests were suspended.
224	E0	R725SLRQ	16	binary	Total sum of squares of time in milliseconds that latch obtain requests were suspended.
GRS ENQ SCOPE=STEP Summary - system wide data for all address spaces.					
240	F0	R725SSTR	8	binary	Total number of ENQ SCOPE=STEP requests.
248	F8	R725SSTS	8	binary	Total number of ENQ SCOPE=STEP requests that were suspended.
256	100	R725SSTT	8	binary	Total amount of contention time in milliseconds caused by ENQ SCOPE=STEP requests.
264	108		8		Reserved.
272	110	R725SSTQ	16	binary	Total sum of squares of contention time in milliseconds caused by ENQ SCOPE=STEP requests.
GRS ENQ SCOPE=SYSTEM Summary - system wide data for all address spaces.					
288	120	R725SSYR	8	binary	Total number of ENQ SCOPE=SYSTEM requests.

Offsets		Name	Length	Format	Description
296	128	R725SSYS	8	binary	Total number of ENQ SCOPE=SYSTEM requests that were suspended.
304	130	R725SSYT	8	binary	Total amount of contention time in milliseconds caused by ENQ SCOPE=SYSTEM requests.
312	138		8		Reserved.
320	140	R725SSYQ	16	binary	Total sum of squares of contention time in milliseconds caused by ENQ SCOPE=SYSTEM requests.
GRS ENQ SCOPE=SYSTEMS Summary - system wide data for all address spaces.					
336	150	R725SSSR	8	binary	Total number of ENQ SCOPE= SYSTEMS requests.
344	158	R725SSSS	8	binary	Total number of ENQ SCOPE= SYSTEMS requests that were suspended.
352	160	R725SSST	8	binary	Total amount of contention time in milliseconds caused by ENQ SCOPE= SYSTEMS requests.
360	168		8		Reserved.
368	170	R725SSSQ	16	binary	Total sum of squares of contention time in milliseconds caused by ENQ SCOPE=SYSTEMS requests.

CMS lock type data

This structure is mapping the following lock data sections of subtype 5:

- CMS Lock data section
- CMS Enqueue/Dequeue Lock data section
- CMS Latch Lock data section
- CMS SMF Lock data section

There is one section per address space, but only data for up to twenty address spaces is provided. The data sections are sorted by total contention time.

Offsets		Name	Length	Format	Description
R725CMSD - CMS lock type data					
0	0	R725CMJN	8	EBCDIC	Name of the job.
8	8		3		Reserved.
11	B	R725CMSP	1	binary	Service class period.
12	C	R725CMAS	2	binary	Address space ID.
14	E		2		Reserved.
16	10	R725CMST	8	EBCDIC	Address space SToken.
24	18	R725CMSN	8	EBCDIC	Service class name.
32	20	R725CMTY	1	binary	Lock type: **Value** **Meaning** **1** CMS lock **2** CMS Enqueue/Dequeue lock **3** CMS Latch lock **4** CMS SMF lock
33	21		7		Reserved.

Offsets		Name	Length	Format	Description
40	28	R725CMSU	8	binary	Number of times that a unit of work of this address space was suspended on the CMS lock type as specified in R725CMTY.
48	30	R725CMAL	8	binary	Number of times that a unit of work of this address space was suspended on the CMS lock type as specified in R725CMTY when there was already at least one other unit of work suspended for this lock.
56	38	R725CMTI	8	binary	Total amount of time in milliseconds that a unit of work of this address space was suspended on the CMS lock type as specified in R725CMTY.

Local Lock Data Section

There is one section per address space, but only data for up to twenty address spaces is provided. The data sections are sorted by total contention time.

Offsets		Name	Length	Format	Description
0	0	R725LOJN	8	EBCDIC	Name of the job.
8	8		3		Reserved.
11	B	R725LOSP	1	binary	Service class period.
12	C	R725LOAS	2	binary	Address space ID.
14	E		2		Reserved.
16	10	R725LOST	8	EBCDIC	Address space SToken.
24	18	R725LOSN	8	EBCDIC	Service class name.
32	20		8		Reserved.
Local lock data					
40	28	R725LOSU	8	binary	Number of times that a unit of work of this address space was suspended on a local lock.
48	30	R725LOAL	8	binary	Number of times that a unit of work of this address space was suspended on a local lock when there was already at least one other unit of work suspended.
56	38	R725LOTI	8	binary	Total amount of time in milliseconds that a unit of work of this address space was suspended on a local lock.
CML lock owner data					
64	40	R725LCSU	8	binary	Number of times that a unit of work from another address space was suspended when requesting the local lock of this address space.
72	48	R725LCAL	8	binary	Number of times that a unit of work from another address space was suspended when requesting the local lock of this address space and there was already at least one other unit of work waiting for that lock.
80	50	R725LCTI	8	binary	Total amount of time in milliseconds that a unit of work was suspended when requesting the local lock of this address space.

CML lock owner data section

There is one section per address space, but only data for up to twenty address spaces is provided. The data sections are sorted by total contention time.

Offsets		Name	Length	Format	Description
0	0	R725COJN	8	EBCDIC	Name of the job.
8	8		3		Reserved.
11	B	R725COSP	1	binary	Service class period.

Offsets		Name	Length	Format	Description
12	C	R725COAS	2	binary	Address space ID.
14	E		2		Reserved.
16	10	R725COST	8	EBCDIC	Address space SToken.
24	18	R725COSN	8	EBCDIC	Service class name.
32	20		8		Reserved.
CML lock owner data					
40	28	R725COSU	8	binary	Number of times that a unit of work from another address space was suspended when requesting the local lock of this address space.
48	30	R725COAL	8	binary	Number of times that a unit of work from another address space was suspended when requesting the local lock of this address space and there was already at least one other unit of work waiting for that lock.
56	38	R725COTI	8	binary	Total amount of time in milliseconds that a unit of work was suspended when requesting the local lock of this address space.
Local lock data					
64	40	R725CLSU	8	binary	Number of times that a unit of work of this address space was suspended on a local lock.
72	48	R725CLAL	8	binary	Number of times that a unit of work of this address space was suspended on a local lock when there was already at least one other unit of work suspended.
80	50	R725CLTI	8	binary	Total amount of time in milliseconds that a unit of work of this address space was suspended on a local lock.

CML Lock Requestor Data Section

There is one section per address space, but only data for up to twenty address spaces is provided. The data sections are sorted by total contention time.

Offsets		Name	Length	Format	Description
0	0	R725CRJN	8	EBCDIC	Name of the job.
8	8		3		Reserved.
11	B	R725CRSP	1	binary	Service class period.
12	C	R725CRAS	2	binary	Address space ID.
14	E		2		Reserved.
16	10	R725CRST	8	EBCDIC	Address space SToken.
24	18	R725CRSN	8	EBCDIC	Service class name.
32	20		8		Reserved.
40	28	R725CRSU	8	binary	Number of times that a unit of work from this address space was suspended when requesting the local lock of another address space.
48	30	R725CRAL	8	binary	Number of times that a unit of work from this address space was suspended when requesting the local lock of another address space and there was already at least one other unit of work waiting for that lock.
56	38	R725CRTI	8	binary	Total amount of time in milliseconds that a unit of work was suspended when requesting the local lock of another address space.

GRS latch type data

This structure is mapping the following lock data sections of subtype 5:

- GRS Latch Set Creator data section
- GRS Latch Requestor data section

There is one section per address space, but only data for up to twenty address spaces is provided. The data sections are sorted by total contention time.

Offsets		Name	Length	Format	Description
R725LATD - GRS latch type data					
0	0	R725LAJN	8	EBCDIC	Name of the job.
8	8		3		Reserved.
11	B	R725LASP	1	binary	Service class period.
12	C	R725LAAS	2	binary	Address space ID.
14	E		2		Reserved.
16	10	R725LAST	8	EBCDIC	Address space SToken.
24	18	R725LASN	8	EBCDIC	Service class name.
32	20	R725LATY	1	binary	Request type: **Value** **Meaning** **1** Latch obtain requests against a latch set created by this address space **2** Latch obtain requests from this address space
33	21		7		Reserved.
40	28	R725LASU	8	binary	Number of times a latch obtain request was suspended for the request type as specified in R725LATY.
48	30	R725LATI	8	binary	Total amount of suspend time in milliseconds that was caused by latch obtain requests for the request type as specified in R725LATY.
56	38	R725LASQ	16	binary	Sum of squares of the individual suspend times in milliseconds that was caused by latch obtain requests for the request type as specified in R725LATY.

GRS enqueue data

This structure is mapping the following lock data sections of subtype 5:

- GRS Enqueue Step data section
- GRS Enqueue System data section
- GRS Enqueue Systems data section

There is one section per address space, but only data for up to twenty address spaces is provided. The data sections are sorted by total contention time.

Offsets		Name	Length	Format	Description
R725ENTD - GRS enqueue data					
0	0	R725ENJN	8	EBCDIC	Name of the job.
8	8		3		Reserved.
11	B	R725ENSP	1	binary	Service class period.
12	C	R725ENAS	2	binary	Address space ID.

Offsets		Name	Length	Format	Description
14	E		2		Reserved.
16	10	R725ENST	8	EBCDIC	Address space SToken.
24	18	R725ENSN	8	EBCDIC	Service class name.
32	20	R725ENSC	1	binary	Enqueue scope type: **Value** **Meaning** **1** Scope = Step **2** Scope = System **3** Scope = Systems
33	21		7		Reserved.
40	28	R725ENRC	8	binary	Number of GRS ENQ requests with the scope as specified in R725ENSC for this address space.
48	30	R725ENSU	8	binary	Number of GRS ENQ requests with the scope as specified in R725ENSC that were suspended for this address space.
56	38	R725ENTI	8	binary	Total amount of suspend time in milliseconds that was caused by GRS ENQ requests with the scope as specified in R725ENSC for this address space.
64	40	R725ENSQ	16	binary	Sum of squares of the individual suspend times in milliseconds.

GRS QScan statistics data section

There is one section per address space, but only data for up to twenty address spaces is provided. The data sections are sorted by total request execution time.

Offsets		Name	Length	Format	Description
0	0	R725QSJN	8	EBCDIC	Name of the job.
8	8		3		Reserved.
11	B	R725QSSP	1	binary	Service class period.
12	C	R725QSAS	2	binary	Address space ID.
14	E		2		Reserved.
16	10	R725QSST	8	EBCDIC	Address space SToken.
24	18	R725QSSN	8	EBCDIC	Service class name.
32	20		8		Reserved.
Statistics for GQSCAN and ISGQUERY REQINFO = QSCAN requests issued from this address space					
40	28	R725QSRC	8	binary	Number of requests including START and RESUME requests, but not QUIT requests.
48	30	R725QSSC	8	binary	Number of specific requests that are either GQSCAN requests specified by QNAME and RNAME, or ISGQUERY requests specifying a search by ENQTOKEN.
56	38	R725QSRR	8	binary	Total number of resources returned for these requests.
64	40	R725QSRQ	16	binary	Sum of squares of number of resources returned for these requests.
80	50	R725QSTI	8	binary	Total amount of execution times within GRS for these requests in microseconds.
88	58	R725QSTQ	16	binary	Sum of squares of individual request execution times in microseconds.

Record type 73 (X'49') — RMF Channel Path Activity

For information on using RMF, see *z/OS RMF Reporter User's Guide*.

For information on Monitor I and II, see *z/OS RMF Report Analysis*.

Record type 73 is written when channel path activity measurement is requested. Entries are created for all 256 theoretical possible channel paths in the system.

As with all records produced by RMF, this record contains a header section followed by the RMF Product section. These are followed by:

Channel Path control section
Identifies number of times any channel path was busy. The SMF73CFL flag byte indicates (X'08') whether the record might include data sections that are not valid.

Channel Path data section
Identifies and gives information on each channel path. The SMF73FG3 flag byte indicates (X'02') whether the channel path is a real entry. This is of relevance only if the channel path control section indicates that invalid entries might occur.

Macro to Symbolically Address Record Type 73: The SMF record mapping macro for all records produced by RMF is ERBSMFR. Its format is ERBSMFR (*n1*,*n2*,...) where *n1*, *n2*, ... are the SMF record types you want to map. Note that the parentheses are required only when two or more record types are specified. The mapping macro resides in SYS1.MACLIB.

Record environment

The following conditions exist for the generation of this record:

Macro
SMFWTM (record exit: IEFU83)

Mode
Task

Storage Residency
31-bit

Record mapping

Header/Self-defining Section

This section contains the common SMF record headers fields and the triplet fields (offset/length/number), if applicable, that locate the other sections on the record.

Offsets		Name	Length	Format	Description
0	0	SMF73LEN	2	binary	Record length. This field and the next field (total of four bytes) form the RDW (record descriptor word). See “Standard and Extended SMF record headers” on page 162 for a detailed description.
2	2	SMF73SEG	2	binary	Segment descriptor (see record length field).

Offsets		Name	Length	Format	Description
4	4	SMF73FLG	1	binary	System indicator **Bit** **Meaning when set** **0** New record format **1** Subtypes used **2** Reserved **3-6** Version indicators* **7** System is running in PR/SM mode. *See “Standard and Extended SMF record headers” on page 162 for a detailed description.
5	5	SMF73RTY	1	binary	Record type 73 (X'49').
6	6	SMF73TME	4	binary	Time since midnight, in hundredths of a second, when the record was moved into the SMF buffer.
10	A	SMF73DTE	4	packed	Date when the record was moved into the SMF buffer, in the form 0*cyydddF*. See “Standard and Extended SMF record headers” on page 162 for a detailed description.
14	E	SMF73SID	4	EBCDIC	System identification (from the SMFPRMxx SID parameter).
18	12	SMF73SSI	4	EBCDIC	Subsystem identification (‘RMF’).
22	16	SMF73STY	2	binary	Record subtype=1.
24	18	SMF73TRN	2	binary	Number of triplets in this record. A triplet is a set of three SMF fields (offset/length/number values) that defines a section of the record. The offset is the offset from the RDW.
26	1A		2		Reserved.
28	1C	SMF73PRS	4	binary	Offset to RMF product section from RDW.
32	20	SMF73PRL	2	binary	Length of RMF product section.
34	22	SMF73PRN	2	binary	Number of RMF product sections.
36	24	SMF73HIS	4	binary	Offset to channel path control section from RDW.
40	28	SMF73HIL	2	binary	Length of channel path control section.
42	2A	SMF73HIN	2	binary	Number of channel path control sections.
44	2C	SMF73HPS	4	binary	Offset to Channel Path data section from RDW.
48	30	SMF73HPL	2	binary	Length of Channel Path data section.
50	32	SMF73HPN	2	binary	Number of Channel Path data sections.
52	34	SMF73HES	4	binary	Offset to Extended Channel Path data section from RDW.
56	38	SMF73HEL	2	binary	Length of Extended Channel Path data section.
58	3A	SMF73HEN	2	binary	Number of Extended Channel Path data sections.

RMF Product Section

Offsets		Name	Length	Format	Description
0	0	SMF73MFV	2	packed	RMF version number.
2	2	SMF73PRD	8	EBCDIC	Product name ('RMF').

Offsets		Name	Length	Format	Description
10	A	SMF73IST	4	packed	Time that the RMF measurement interval started, in the form 0*hhmmssF*, where *hh* is the hours, *mm* is the minutes, *ss* is the seconds, and *F* is the sign.
14	E	SMF73DAT	4	packed	Date when the RMF measurement interval started, in the form 0*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for a detailed description.
18	12	SMF73INT	4	packed	Duration of the RMF measurement interval, in the form *mmsstttF* where *mm* is the minutes, *ss* is the seconds, *ttt* is the milliseconds, and *F* is the sign. The end of the measurement interval is the sum of the recorded start time (and this field.)
22	16		2		Reserved.
24	18	SMF73SAM	4	binary	Number of RMF samples.
28	1C		2		Reserved.
30	1E	SMF73FLA	2	binary	Flags **Bit** **Meaning when set** **0** Reserved **1** Samples have been skipped **2** Record was written by RMF Monitor III **3** Interval was synchronized with SMF **4 - 15** Reserved.
32	20		4		Reserved.
36	24	SMF73CYC	4	packed	Sampling cycle length, in the form 000*ttttF*, where *tttt* is the milliseconds and *F* is the sign (taken from CYCLE option). The range of values is 0.050 to 9.999 seconds.
40	28	SMF73MVS	8	EBCDIC	z/OS software level (consists of an acronym and the version, release, and modification level - ZV*vvrrmm*).
48	30	SMF73IML	1	binary	Indicates the type of processor complex on which data measurements were taken. **Value** **Meaning** **3** 9672, zSeries

Offsets		Name	Length	Format	Description
49	31	SMF73PRF	1	binary	Processor flags. **Bit** **Meaning when set** **0** The system has expanded storage **1** The processor is enabled for ES connection architecture (ESCA) **2** There is an ES connection director in the configuration **3** System is running in z/Architecture mode **4** At least one zAAP is currently installed **5** At least one zIIP is currently installed **6** Enhanced DAT facility 1 available **7** Enhanced DAT facility 2 available
50	32	SMF73PTN	1	binary	PR/SM partition number of the partition that wrote this record.
51	33	SMF73SRL	1	binary	SMF record level change number (X'8E' for z/OS V2R4 RMF with RMF Data Gatherer APAR OA59330). This field enables processing of SMF record level changes in an existing release.
52	34	SMF73IET	8	char	Interval expiration time token. This token can be used to identify other than RMF records that belong to the same interval (if interval was synchronized with SMF).
60	3C	SMF73LGO	8	binary	Offset GMT to local time (STCK format).
68	44	SMF73RAO	4	binary	Offset to reassembly area relative to start of RMF product section.
72	48	SMF73RAL	2	binary	Length of reassembly area. Area consists of a fixed header and a variable number of information blocks. Length depends on the record type/subtype, but is fixed for a specific type/subtype.
74	4A	SMF73RAN	2	binary	Reassembly area indicator. **Value** **Meaning** **0** Record is not broken. **1** Record is broken. **Note:** This field is used to indicate whether an SMF record is a broken record. Therefore, offset (SMF73RAO) and length (SMF73RAL) are only valid if SMF73RAN = 1. A reassembly area is only present in broken records.
76	4C	SMF73OIL	2	binary	Original interval length as defined in the session or by SMF (in seconds).
78	4E	SMF73SYN	2	binary	SYNC value in seconds.
80	50	SMF73GIE	8	binary	Projected gathering interval end (STCK format) GMT time.
88	58	SMF73XNM	8	EBCDIC	Sysplex name as defined in parmlib member COUPLExx.
96	60	SMF73SNM	8	EBCDIC	System name for current system as defined in parmlib member IEASYSxx SYSNAME parameter.
Reassembly Area:					
0	0	SMF73RBR	2	binary	Total number of broken records built from the original large record.

Offsets		Name	Length	Format	Description
2	2	SMF73RSQ	2	binary	Sequence number of this broken record. Every broken record built from the same large record must have a unique sequence number, it is in the range from 1 to SMF73RBR.
4	4	SMF73RIO	4	binary	Offset to first reassembly information block relative to start of reassembly area header.
8	8	SMF73RIL	2	binary	Length of reassembly information block.
10	A	SMF73RIN	2	binary	Number of reassembly information blocks (same value as SMF73TRN in header section).
12	C		4		Reserved.
Reassembly Area Information Block:					
0	0	SMF73RNN	2	binary	Total number of sections in the original large record. This field contains information of how many sections of a specific type were contained in the original SMF record. This field is a copy of the number field of the triplet in the original (non broken) record.
2	2	SMF73RPP	2	binary	Position of the first of one or more consecutive sections described by this block as in the original record. Values in the range of 1 to SMF73RNN are valid for correct processing. A value of 0 will skip processing of this information block. This field provides information where the sections that are part of this broken record were placed in the original record before the split took place. The actual number of consecutive sections contained in this record is available from the actual triplet in the header extension.

Channel path control section

There is one section per record.

Offsets		Name	Length	Format	Description
0	0	SMF73SMP	4	binary	This field contains the number of samples while the busy count is stored in field SMF73BSY. Only valid if bit 2 of SMF73SFL is not set.
4	4	SMF73CFL	1	binary	Configuration change flags **Bit** **Meaning when set** **0** Configuration changed. Used to decide whether to provide the text “POR” or “ACTIVATE” on reports. Also used to check whether data can be combined in a duration report. **1** Configuration change since power-on-reset (POR). **2** POR using IODF data set that supports dynamic configuration change (contains I/O token). **3** I/O token is valid. **4** Record may include data sections that are not valid. **5** CPMF (channel path measurement facility) available. **6** Reserved. **7** CPMF mode has changed.

Offsets		Name	Length	Format	Description
5	5	SMF73SFL	1	binary	Status flags. **Bit** **Meaning when set** **0** DCM supported by hardware. **1** Configuration contains DCM managed channels. **2** Hardware allows multiple logical channel subsystems. **3** Enhanced channel measurement facility available. **4-7** Reserved.
6	6		2		Reserved.
8	8	SMF73TNM	44	EBCDIC	IODF name.
52	34	SMF73TSF	2	EBCDIC	IODF name suffix.
54	36		2		Reserved.
56	38	SMF73TOK	16	EBCDIC	Partial token information.
56	38	SMF73TDT	8	EBCDIC	IODF creation date, in the form *mm/dd/yy*.
64	40	SMF73TTM	8	EBCDIC	IODF creation time, in the form *hh.mm.ss*.
72	48	SMF73CRC	4	binary	CPMF (channel path measurement facility) restart count
76	4C	SMF73CSC	4	binary	Last CPMF (channel path measurement facility) sample count
80	50	SMF73TDY	10	EBCDIC	IODF creation date, in the form *mm/dd/yyyy*.
90	5A	SMF73CMI	1	binary	CPMF mode. **Value** **Meaning** **0** CPMF is not active **1** Compatibility mode **2** Extended mode
91	5B	SMF73CSS	1	EBCDIC	Channel subsystem ID. Only valid if bit 2 of SMF73SFL is set.

Channel path data section

There is one section per channel path.

Offsets		Name	Length	Format	Description
0	0	SMF73PID	1	binary	Channel path identification. The range of values is X'0' to X'FF'. Support for dynamic I/0. There are always X'FF' path data sections in record type 73, even though there might not be X'FF' CHPIDs defined in the system. These dummy data sections in the SMF records only contain the channel path ID. The rest is filled with hexadecimal zeroes.

Offsets		Name	Length	Format	Description
1	1	SMF73FG2	1	binary	Channel flags **Bit** **Meaning when set** **0-1** Reserved **2** Block multiplexor **3** Byte multiplexor **4** Reserved **5** Only partial statistics available **6** Data recorded is incorrect because channel path was reconfigured during interval **7** Channel path is currently online.
2	2	SMF73FG3	1	binary	Channel flags extension **Bit** **Meaning when set** **0** ES connection channel **1** ES connection director attached to channel path **2** ES connection converter attached to this channel **3** Channel path modified **4** Channel path deleted **5** Channel path added **6** Valid path **7** Channel path is shared between logical partitions

Offsets		Name	Length	Format	Description
3	3	SMF73FG4	1	binary	Channel path flags **Bit** **Meaning when set** **0** CPMB (channel path measurement block) entry not valid **1** Channel path is CTC defined **2** Channel conversion 3090 **3** Reserved **4** Channel path is DCM managed **5** Channel characteristics changed during interval **6** Extended channel path measurements are supported **7** Physical-network identifiers SMF73NT1 and SMF73NT2 are valid.
4	4	SMF73BSY	4	binary	Count of store channel path status (STCPS) samples taken by SRM in which the channel path related to this entry was found busy. This count is normalized (broken down into the simplest expression).
8	8	SMF73PBY	4	binary	Partition's channel-path-busy-time since last RMF interval, in units of 1024 microseconds.
12	C	SMF73PTI	4	binary	Partition's channel-path measurement interval, in units of 1024 microseconds.
16	10	SMF73CPD	1	binary	Channel path description. For an explanation, you can issue the command `D M=CHP`.
17	11	SMF73ACR	5	EBCDIC	Channel path acronym.
22	16	SMF73CMG	1	binary	CPMF Channel measurement group.
23	17	SMF73FG5	1	binary	CPMF validation flags - each bit (if on) indicates that the corresponding measurement data is available and valid. This refers to the first five words of the channel measurement data in field SMF73CCM. **Bit** **Measurement Data** **0** Channel measurement data — word 1 **1** Channel measurement data — word 2 **2** Channel measurement data — word 3 **3** Channel measurement data — word 4 **4** Channel measurement data — word 5 **5-7** Reserved.
24	18	SMF73CCM	48	*	CPMF Channel measurement data (extended mode). The contents of this field is different for each measurement group, as described in the following tables.
72	48	SMF73CPP	1	binary	Channel path parameter.

Offsets		Name	Length	Format	Description
73	49	SMF73GEN	1	binary	Channel type generation.
74	4A	SMF73EIX	2	binary	Index to Extended Channel Path data section. Only valid if bit 6 of SMF73FG4 is set.
76	4C	SMF73SPD	2	binary	Channel path speed at the end of interval. If channel path power (bits 4-7 of SMF73MSC) is zero, the channel path speed is in units of 100 megabits per second. Otherwise, this value must be multiplied by 10**Power to get the speed in units of bits per second.
78	4E	SMF73MSC	1	binary	Miscellaneous **0 - 3** Reserved. **4 - 7** Channel path power at the end of interval. If non-zero, this value can be used to calculate the channel path speed (SMF73SPD * 10**Power).
79	4F	*	1	binary	Reserved.
80	50	SMF73NT1	16	EBCDIC	Physical-network identifier (PNET ID) of an Ethernet network that is accessible from the first port of the channel path. Only valid for OSD and IQD channel path types.
96	60	SMF73NT2	16	EBCDIC	Physical-network identifier (PNET ID) of an Ethernet network that is accessible from the second port of the channel path. Only valid for OSD channel path type.

SMF73CCM — CPMF Channel Measurement Data (Measurement Group 1)

Offsets		Name	Length	Format	Description
0	0	SMF73TUT	4	float	Total channel path busy time (in units of 128 microseconds).
4	4	SMF73PUT	4	float	LPAR channel path busy time (in units of 128 microseconds).
8	8		40		Reserved.

SMF73CCM — CPMF Channel Measurement Data (Measurement Group 2)

Offsets		Name	Length	Format	Description
0	0	SMF73MBC	4	float	Maximum bus cycles per second - word 1.
4	4	SMF73MCU	4	float	Maximum channel work units per second - word 2.
8	8	SMF73MWU	4	float	Maximum WRITE data units per second - word 3.
12	C	SMF73MRU	4	float	Maximum READ data units per second - word 4.
16	10	SMF73US	4	float	Data unit size (in bytes) - word 5.
20	14	SMF73TBC	4	float	Total bus cycles count.
24	18	SMF73TUC	4	float	Total channel work unit count.
28	1C	SMF73PUC	4	float	LPAR channel work units count.
32	20	SMF73TWU	4	float	Total WRITE data units count.
36	24	SMF73PWU	4	float	LPAR WRITE data units count.
40	28	SMF73TRU	4	float	Total READ data units count.
44	2C	SMF73PRU	4	float	LPAR READ data units count.

SMF73CCM — CPMF Channel Measurement Data (Measurement Group 3)

Offsets		Name	Length	Format	Description
0	0	SMF73PDU	4	float	LPAR data unit size (in bytes) - word 1.

Offsets		Name	Length	Format	Description
4	4	SMF73TDU	4	float	Total data unit size (in bytes) - word 2.
8	8	SMF73PUM	4	float	LPAR message sent unit size (in bytes) - word 3.
12	C	SMF73TUM	4	float	Total message sent unit size (in bytes) - word 4.
16	10		4		Reserved.
20	14	SMF73PMS	4	float	LPAR count of message sent units.
24	18	SMF73TMS	4	float	Total count of message sent units.
28	1C	SMF73PUS	4	float	LPAR count of unsuccessful attempts to send messages.
32	20	SMF73PUB	4	float	LPAR count of unsuccessful attempts to receive messages due to unavailable buffers.
36	24	SMF73TUB	4	float	Total count of unsuccessful attempts to receive messages due to unavailable buffers.
40	28	SMF73PDS	4	float	LPAR count of data units sent.
44	2C	SMF73TDS	4	float	Total count of data units sent.

Extended Channel Path Data Section

Offsets		Name	Length	Format	Description
0	0	SMF73ECP	1	binary	Channel path identification
1	1		3		Reserved.
4	4	SMF73EDT	32	*	CPMF extended channel path measurement data. This field is only available for measurement group 2. See "SMF73EDT — CPMF Extended Channel Measurement Data (Measurement Group 2)" on page 624 for the contents of the field.

SMF73EDT — CPMF Extended Channel Measurement Data (Measurement Group 2)

Offsets		Name	Length	Format	Description
0	0	SMF73EOC	4	float	Total number of FICON command-mode operations (CPC) that have been attempted by the channel.
4	4	SMF73EOD	4	float	Total number of FICON command-mode operations (CPC) that could not be initiated by the channel because of a lack of available resources.
8	8	SMF73EOS	8	float	Summation count of FICON command-mode operations (CPC). Each time the number of FICON command-mode operations is incremented, the number of FICON command-mode operations active at the channel, including the one being initiated, is added to this field.
16	10	SMF73ETC	4	float	Total number of FICON transport-mode operations (CPC) that have been attempted by the channel. Zero when zHPF is not available.
20	14	SMF73ETD	4	float	Total number of FICON transport-mode operations (CPC) that could not be initiated by the channel because of a lack of available resources. Zero when zHPF is not available.
24	18	SMF73ETS	8	float	Summation count of FICON transport-mode operations (CPC). Each time the number of FICON transport-mode operations is incremented, the number of transport-mode operations active at the channel, including the one being initiated, is added to this field. Zero when zHPF is not available.

Record type 74 (X'4A') — RMF Activity of several resources

For information about using RMF, see *z/OS Resource Measurement Facility User's Guide* and *z/OS Data Gatherer User's Guide*.

For information about Monitor I, II, and III, see *z/OS RMF Report Analysis*.

Record type 74 has the following subtypes:

- **Subtype 1 —** Device Activity

  The record is written for all devices specified in the DEVICE option for a Monitor I session. It contains entries for all devices that have been online at least once since RMF was started. The entry for any device that was offline at the end of the reporting interval, or for any device that was taken offline during the interval, does not contain data.

  Device Control data section
  Contains general information on the number of devices and types.

  Device data section
  Contains the volume serial number for tape and direct access devices, number of requests on the device, total active, pending and connect time to service those requests, the number of requests enqueued for the device and the device number, class and type and other data collected about the device. RMF produces one or more type 74 records for the classes requested by the installation, and one Device data section for each device.

- **Subtype 2 —** XCF Activity

  Monitor III Cross-System Coupling Facility (XCF) measurement writes this subtype, only if the Monitor III data gatherer is on.

  Control data section
  Contains control information for splitting and reassembling of the XCF records.

  System data section
  Describes the message traffic between the local system (where RMF is running) and the remote systems on a system level.

  Path data section
  Describes the message traffic broken down by signalling paths connecting the local system with the remote systems.

  Member data section
  Describes the message traffic on a member basis for members on the local system and members communicating with the local system.

- **Subtype 3 —** OMVS Kernel Activity

  Monitor III Data Gatherer collects z/OS UNIX System Services measurement data that are input for the RMF Postprocessor to create the OMVS Kernel Activity report.

  Control data section
  Contains various z/OS UNIX System Services measurement data.

- **Subtype 4 —** Coupling Facility Activity

  One record is written for each coupling facility by each member in the sysplex.

  Local Coupling Facility data section
  One per record; contains path and subchannel data collected from each local system.

  Connectivity data section
  One per sysplex member connected to the coupling facility. This member list is used by the Postprocessor to verify that it has a complete set of SMF records for creating sysplex-level reports for this coupling facility.

  This section is created on only one system in the sysplex (RMF's sysplex master gathering). It is available only if bit 1 of the R744FFLG status flags in the Local Coupling Facility data section indicates that the coupling facility was connected to the system at the end of the interval.

  Storage Coupling Facility data section
  One per record; contains global data that is only collected once for the sysplex.

  Structure data section
  One for each structure allocated in this facility.

This section is created on only one system in the sysplex (RMF's sysplex master gathering). It is available only if bit 1 of the R744FFLG status flags in the Local Coupling Facility data section indicates that the coupling facility was connected to the system at the end of the interval.

Request data section
One for each structure in this facility if the structure has had an active connection from the system at some time during the interval.

Processor Utilization data section
One for each processor (CP, not IOP) within the respective coupling facility.

Cache data section
Several sections for each Request data section are possible, depending on applications using the coupling facility.

Remote Facility data section
One section for each duplexing coupling facility with various signal counters.

Channel Path data section
One section for each channel path of type CIB, CFP, CS5 or CL5 associated with a local or remote coupling facility, containing channel path attributes. There can be up to eight Channel Path data sections per coupling facility. There can be up to eight sender and eight receiver Channel Path data sections per remote coupling facility.

Storage Class Memory data section
One section for each structure in this coupling facility that is allocated with storage class memory and has had an active connection at some time during the interval.

Asynchronous CF Duplexing data section
One section for each asynchronously duplexed structure in the coupling facility.

- **Subtype 5** — Cache Subsystem Device Activity

One or several records (depending on the number of devices attached to the control unit) are written for each cache subsystem. The header section of each record contains an individual header extension for subtype 5.

Cache control section
Contains control information and return codes from interfaces.

Cache Device data section
Contains cache statistics for each device.

Cache Device data extension section
This extension applies only to control unit types 3990-03 and 3990-06. It is collected by RMF to provide the same data as in the corresponding CRR record.

Cache Control Unit Status data section
Contains cache statistics for the control unit.

RAID Rank/Extent Pool data section
Contains RAID rank statistics for a 2105 device or extent pool statistics for a 2107 device.

- **Subtype 6** — HFS Statistics

HFS Global data section
Contains global statistics and return codes from interfaces.

HFS Global Buffer section
Contains buffer statistics, there is one section for each buffer in the buffer pool.

HFS File System section
Contains file system statistics, there is one section for each mounted file system for which data gathering was activated.

- **Subtype 7** — FICON Director Statistics

FCD Global data section
Contains IODF configuration data.

FCD Switch data section
Contains switch configuration data.

FCD Port data section
Contains port statistics.

FCD Connector data section
Contains configuration data for additional control units.

- **Subtype 8 —** Enterprise Disk System Statistics

Control data section
Contains control information and control unit information concerning the storage server.

Link Statistics section
Contains link performance statistics for each active adapter.

Extent Pool Statistics section
Contains capacity information of allocated disk space and performance statistics for an extent pool.

Rank Statistics section
Contains activity statistics about read and write operations in the ranks of an extent pool.

Rank Array data section
Contains information about array characteristics of a rank.

Synchronous I/O Link Statistics data section
Contains IBM zHyperLink performance statistics for each synchronous I/O link attached to a storage controller.

- **Subtype 9 —** PCI Express Based Function Activity

PCIE Function data section
Contains the PCIE Function ID upon which performance data is returned, the PCIE device name and type, counts of executed PCI operations, as well as other data collected about the function.

PCIE Function Type data section
Contains one PCIE Function Type data block per PCIE Function data section. A PCIE Function Type data block contains different type of measurements that depend on the PCIE function type and hardware.

Hardware Accelerator data section
Provides performance statistics that are common between all Hardware Accelerators and independent from the application type. There is one data section per Hardware Accelerator.

Hardware Accelerator Compression data section
The Hardware Accelerator compression data section consists of performance statistics related to compression acceleration. This data section exists only if the Hardware Accelerator is used for compression acceleration.

Synchronous I/O Link data section
Provides connectivity data of a synchronous I/O link using IBM zHyperLink technology. There is one data section per synchronous I/O link.

Synchronous I/O Response Time Distribution data section
Provides response time distribution data for a synchronous I/O link using IBM zHyperLink technology. There is at least one data section for read response time distribution and one section for write response time distribution per synchronous I/O link.

- **Subtype 10 —** Extended Asynchronous Data Mover (EADM) Statistics

Monitor III Data Gatherer collects measurement data that are input for the RMF Postprocessor to create the Extended Asynchronous Data Mover (EADM) report.

Storage class memory (SCM) configuration measurement section
Contains various measurement data. There is one section per SCM-resource part.

Extended Asynchronous Data Mover (EADM) device (subchannel) information section
There is one section per record. This section holds the response time information as well as request rates, throughput, and ratios of compression and decompression of all EADM devices at an aggregated level.

Note:

1. All fields with format *s_float* have the type *short format floating point*.
2. All fields with format *l_float* have the type *long format floating point*.

Each subtype contains a header section, the individual header extension (which contains offset/length/number triplets to address record parts following the RMF Product section) and the RMF Product section.

Macro to Symbolically Address Record Type 74: The SMF record mapping macro for all records produced by RMF is ERBSMFR. Its format is ERBSMFR (*n1*,*n2*,...) where *n1*,*n2*, ... are the SMF record types you want to map. Note that the parentheses are required only when two or more record types are specified. The mapping macro resides in SYS1.MACLIB.

Record environment

The following conditions exist for the generation of this record:

Macro
SMFWTM (record exit: IEFU83)

Mode
Task

Storage Residency
31-bit

Record mapping

Header/Self-defining Section

This section contains the common SMF record headers fields and the triplet fields (offset/length/number), if applicable, that locate the other sections on the record.

Offsets		Name	Length	Format	Description
0	0	SMF74LEN	2	binary	Record length. This field and the next field (total of four bytes) form the RDW (record descriptor word). See “Standard and Extended SMF record headers” on page 162 for a detailed description.
2	2	SMF74SEG	2	binary	Segment descriptor (see record length field).
4	4	SMF74FLG	1	binary	System indicator **Bit** **Meaning when set** **0** New record format **1** Subtypes used **2** Reserved. **3-6** Version indicators (See “Standard and Extended SMF record headers” on page 162 for details.) **7** System is running in PR/SM mode.
5	5	SMF74RTY	1	binary	Record type 74 (X'4A').
6	6	SMF74TME	4	binary	Time since midnight, in hundredths of a second, that the record was moved into the SMF buffer.

Offsets		Name	Length	Format	Description
10	A	SMF74DTE	4	packed	Date when the record was moved into the SMF buffer, in the form 0*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for a detailed description.
14	E	SMF74SID	4	EBCDIC	System identification (from the SMFPRMxx SID parameter).
18	12	SMF74SSI	4	EBCDIC	Subsystem identification ('RMF').
22	16	SMF74STY	2	binary	Record subtype.
24	18	SMF74TRN	2	binary	Number of triplets in this record. A triplet is a set of three SMF fields (offset/length/number values) that defines a section of the record. The offset is the offset from the RDW.
26	1A		2		Reserved.
28	1C	SMF74PRS	4	binary	Offset to RMF Product section from RDW.
32	20	SMF74PRL	2	binary	Length of RMF Product section.
34	22	SMF74PRN	2	binary	Number of RMF Product sections.
Individual header extension for subtype 1:					
36	24	SMF74DCS	4	binary	Offset to Device Control data section from RDW.
40	28	SMF74DCL	2	binary	Length of Device Control data section.
42	2A	SMF74DCN	2	binary	Number of Device Control data sections.
44	2C	SMF74DDS	4	binary	Offset to Device data section from RDW.
48	30	SMF74DDL	2	binary	Length of Device data section.
50	32	SMF74DDN	2	binary	Number of Device data sections.
Individual header extension for subtype 2:					
36	24	SMF742CO	4	binary	Offset to Control data section from RDW.
40	28	SMF742CL	2	binary	Length of Control data section.
42	2A	SMF742CN	2	binary	Number of Control data sections.
44	2C	SMF742SO	4	binary	Offset to System data section from RDW.
48	30	SMF742SL	2	binary	Length of System data section.
50	32	SMF742SN	2	binary	Number of System data sections.
52	34	SMF742PO	4	binary	Offset to Path data section.
56	38	SMF742PL	2	binary	Length of Path data section.
58	3A	SMF742PN	2	binary	Number of Path data sections.
60	3C	SMF742MO	4	binary	Offset to Member data section from RDW.
64	40	SMF742ML	2	binary	Length of Member data section.
66	42	SMF742MN	2	binary	Number of Member data sections.
Individual header extension for subtype 3:					
36	24	SMF743PO	4	binary	Offset to OMVS control data section.
40	28	SMF743PL	2	binary	Length of OMVS control data section.
42	2A	SMF743PN	2	binary	Number of OMVS control data sections.
Individual header extension for subtype 4:					
36	24	SMF744FO	4	binary	Offset to Local Coupling Facility data section.
40	28	SMF744FL	2	binary	Length of Local Coupling Facility data section.
42	2A	SMF744FN	2	binary	Number of Local Coupling Facility data sections.
44	2C	SMF744XO	4	binary	Offset to Connectivity data section.

Offsets		Name	Length	Format	Description
48	30	SMF744XL	2	binary	Length of Connectivity data section.
50	32	SMF744XN	2	binary	Number of Connectivity data sections.
52	34	SMF744GO	4	binary	Offset to Storage data section.
56	38	SMF744GL	2	binary	Length of Storage data section.
58	3A	SMF744GN	2	binary	Number of Storage data sections.
60	3C	SMF744QO	4	binary	Offset to Structure data section.
64	40	SMF744QL	2	binary	Length of Structure data section.
66	42	SMF744QN	2	binary	Number of Structure data sections.
68	44	SMF744SO	4	binary	Offset to Request data section.
72	48	SMF744SL	2	binary	Length of Request data section.
74	4A	SMF744SN	2	binary	Number of Request data sections.
76	4C	SMF744PO	4	binary	Offset to Processor data section.
80	50	SMF744PL	2	binary	Length of Processor data section.
82	52	SMF744PN	2	binary	Number of Processor data sections.
84	54	SMF744CO	4	binary	Offset to Cache data section.
88	58	SMF744CL	2	binary	Length of Cache data section.
90	5A	SMF744CN	2	binary	Number of Cache data sections.
92	5C	SMF744RO	4	binary	Offset to Remote Facility data section.
96	60	SMF744RL	2	binary	Length of Remote Facility data section.
98	62	SMF744RN	2	binary	Number of Remote Facility data sections.
100	64	SMF744HO	4	binary	Offset to Channel Path data section.
104	68	SMF744HL	2	binary	Length of Channel Path data section.
106	6A	SMF744HN	2	binary	Number of Channel Path data sections.
108	6C	SMF744MO	4	binary	Offset to SCM data section.
112	70	SMF744ML	2	binary	Length of SCM data section.
114	72	SMF744MN	2	binary	Number of SCM data sections.
116	74	SMF744AO	4	binary	Offset to Asynchronous CF Duplexing data section.
120	78	SMF744AL	2	binary	Length of Asynchronous CF Duplexing data section.
122	7A	SMF744AN	2	binary	Number of Asynchronous CF Duplexing data sections.
Individual header extension for subtype 5:					
36	24	SMF745CO	4	binary	Offset to Control section.
40	28	SMF745CL	2	binary	Length of Control section.
42	2A	SMF745CN	2	binary	Number of Control sections.
44	2C	SMF745DO	4	binary	Offset to Cache Device data section.
48	30	SMF745DL	2	binary	Length of Cache Device data section.
50	32	SMF745DN	2	binary	Number of Cache Device data sections.
52	34	SMF745XO	4	binary	Offset to Cache Device data section extension.
56	38	SMF745XL	2	binary	Length of Cache Device data section extension.
58	3A	SMF745XN	2	binary	Number of Cache Device data section extensions.
60	3C	SMF745SO	4	binary	Offset to Cache Status data section.

Offsets		Name	Length	Format	Description
64	40	SMF745SL	2	binary	Length of Cache Status data section.
66	42	SMF745SN	2	binary	Number of Cache Status data sections.
68	44	SMF7451O	4	binary	Offset to RAID Rank data sections.
72	48	SMF7451L	2	binary	Length of RAID Rank data section.
74	4A	SMF7451N	2	binary	Number of RAID Rank data sections.
Individual header extension for subtype 6:					
36	24	SMF746DO	4	binary	Offset to HFS Global data section.
40	28	SMF746DL	2	binary	Length of HFS Global data section.
42	2A	SMF746DN	2	binary	Number of HFS Global data sections.
44	2C	SMF746BO	4	binary	Offset to HFS Global Buffer section.
48	30	SMF746BL	2	binary	Length of HFS Global Buffer section.
50	32	SMF746BN	2	binary	Number of HFS Global Buffer sections.
52	34	SMF746FO	4	binary	Offset to HFS File System section.
56	38	SMF746FL	2	binary	Length of HFS File System section.
58	3A	SMF746FN	2	binary	Number of HFS File System sections.
Individual header extension for subtype 7:					
36	24	SMF747GO	4	binary	Offset to FCD Global data section.
40	28	SMF747GL	2	binary	Length of FCD Global data section.
42	2A	SMF747GN	2	binary	Number of FCD Global data sections.
44	2C	SMF747SO	4	binary	Offset to FCD Switch data section.
48	30	SMF747SL	2	binary	Length of FCD Switch data section.
50	32	SMF747SN	2	binary	Number of FCD Switch data sections.
52	34	SMF747PO	4	binary	Offset to FCD Port data section.
56	38	SMF747PL	2	binary	Length of FCD Port data section.
58	3A	SMF747PN	2	binary	Number of FCD Port data sections.
60	3C	SMF747CO	4	binary	Offset to FCD Connector data section.
64	40	SMF747CL	2	binary	Length of FCD Connector data section.
66	42	SMF747CN	2	binary	Number of FCD Connector data sections.
Individual header extension for subtype 8:					
36	24	SMF748CO	4	binary	Offset to Control data section.
40	28	SMF748CL	2	binary	Length of Control data section.
42	2A	SMF748CN	2	binary	Number of Control data sections.
44	2C	SMF748LO	4	binary	Offset to Link Statistics section.
48	30	SMF748LL	2	binary	Length of Link Statistics section.
50	32	SMF748LN	2	binary	Number of Link Statistics sections.
52	34	SMF748XO	4	binary	Offset to Extent Pool Statistics section.
56	38	SMF748XL	2	binary	Length of Extent Pool Statistics section.
58	3A	SMF748XN	2	binary	Number of Extent Pool Statistics sections.
60	3C	SMF748RO	4	binary	Offset to Rank Statistics section.
64	40	SMF748RL	2	binary	Length of Rank Statistics section.

Offsets		Name	Length	Format	Description
66	42	SMF748RN	2	binary	Number of Rank Statistics sections.
68	44	SMF748AO	4	binary	Offset to Rank Array data section.
72	48	SMF748AL	2	binary	Length of Rank Array data section.
74	4A	SMF748AN	2	binary	Number of Rank Array data sections.
76	4C	SMF748SO	4	binary	Offset to Synchronous I/O Link Statistics data section.
80	50	SMF748SL	2	binary	Length of Synchronous I/O Link Statistics data section.
82	52	SMF748SN	2	binary	Number of Synchronous I/O Link Statistics data sections.
Individual header extension for subtype 9:					
36	24	SMF749PO	4	binary	Offset to PCIE Function data section.
40	28	SMF749PL	2	binary	Length of PCIE Function data section.
42	2A	SMF749PN	2	binary	Number of PCIE Function data sections.
44	2C	SMF749DO	4	binary	Offset to PCIE Function Type data section.
48	30	SMF749DL	2	binary	Length of PCIE Function Type data section.
50	32	SMF749DN	2	binary	Number of PCIE Function Type data sections.
52	34	SMF749FO	4	binary	Offset to Hardware Accelerator data section.
56	38	SMF749FL	2	binary	Length of Hardware Accelerator data section.
58	3A	SMF749FN	2	binary	Number of Hardware Accelerator data sections.
60	3C	SMF7491O	4	binary	Offset to Hardware Accelerator Compression data section.
64	40	SMF7491L	2	binary	Length of Hardware Accelerator Compression data section.
66	42	SMF7491N	2	binary	Number of Hardware Accelerator Compression data sections.
68	44	SMF749SO	4	binary	Offset to Synchronous I/O Link data section.
72	48	SMF749SL	2	binary	Length of Synchronous I/O Link data section.
74	4A	SMF749SN	2	binary	Number of Synchronous I/O Link data sections.
76	4C	SMF749RO	4	binary	Offset to Synchronous I/O Response Time Distribution data section.
80	50	SMF749RL	2	binary	Length of Synchronous I/O Response Time Distribution data section.
82	52	SMF749RN	2	binary	Number of Synchronous I/O Response Time Distribution data sections.
Individual header extension for subtype 10:					
36	24	SMF7410DO	4	binary	Offset to SCM EADM device information section.
40	28	SMF7410DL	2	binary	Length of SCM EADM device information section.
42	2A	SMF7410DN	2	binary	Number of SCM EADM device information sections.
44	2C	SMF7410CO	4	binary	Offset to SCM configuration measurement sections.
48	30	SMF7410CL	2	binary	Length of SCM configuration measurement section.
50	32	SMF7410CN	2	binary	Number of SCM configuration measurement sections.

RMF Product Section

Offsets		Name	Length	Format	Description
0	0	SMF74MFV	2	EBCDIC/ packed	RMF version number.
2	2	SMF74PRD	8	EBCDIC	Product name (‘RMF’).

Offsets		Name	Length	Format	Description
10	A	SMF74IST	4	packed	Time that the RMF measurement interval started, in the form 0*hhmmssF*, where *hh* is the hours, *mm* is the minutes, *ss* is the seconds, and *F* is the sign.
14	E	SMF74DAT	4	packed	Date when the RMF measurement interval started, in the form 0*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for a detailed description.
18	12	SMF74INT	4	packed	Duration of RMF measurement interval, in the form *mmsstttF* where *mm* is the minutes, *ss* is the seconds, *ttt* is the milliseconds, and *F* is the sign. The end of the measurement interval is the sum of the recorded start time and this field.
22	16		2		Reserved.
24	18	SMF74SAM	4	binary	Number of RMF samples.
28	1C		2		Reserved.
30	1E	SMF74FLA	2	binary	Flags **Bit** **Meaning when set** **0** Reserved. **1** Samples have been skipped **2** Record was written by RMF Monitor III **3** Interval was synchronized with SMF **4 - 15** Reserved.
32	20		4		Reserved.
36	24	SMF74CYC	4	packed	Sampling cycle length, in the form 000*ttttF*, where *tttt* is the milliseconds and *F* is the sign (taken from CYCLE option). The range of values is 0.050 to 9.999 seconds.
40	28	SMF74MVS	8	EBCDIC	z/OS software level (consists of an acronym and the version, release, and modification level - ZV*vvrrmm*).
48	30	SMF74IML	1	binary	Indicates the type of processor complex on which data measurements were taken. **Value** **Meaning** **3** 9672, zSeries

Offsets		Name	Length	Format	Description
49	31	SMF74PRF	1	binary	Processor flags. **Bit** **Meaning when set** **0** The system has expanded storage **1** The processor is enabled for ES connection architecture (ESCA) **2** There is an ES connection director in the configuration **3** System is running in z/Architecture mode **4** At least one zAAP is currently installed **5** At least one zIIP is currently installed **6** Enhanced DAT facility 1 available **7** Enhanced DAT facility 2 available
50	32	SMF74PTN	1	binary	PR/SM partition number of the partition that wrote this record.
51	33	SMF74SRL	1	binary	SMF record level change number (X'8E' for z/OS V2R4 RMF with RMF Data Gatherer APAR OA59330). This field enables processing of SMF record level changes in an existing release.
52	34	SMF74IET	8	char	Interval expiration time token. This token can be used to identify other than RMF records that belong to the same interval (if interval was synchronized with SMF).
60	3C	SMF74LGO	8	binary	Offset GMT to local time (STCK format).
68	44	SMF74RAO	4	binary	Offset to reassembly area relative to start of RMF Product section.
72	48	SMF74RAL	2	binary	Length of reassembly area. Area consists of a fixed header and a variable number of information blocks. Length depends on the record type/subtype, but is fixed for a specific type/subtype.
74	4A	SMF74RAN	2	binary	Reassembly area indicator. **Value** **Meaning** **0** Record is not broken. **1** Record is broken. **Note:** This field is used to indicate whether an SMF record is a broken record. Therefore, offset (SMF74RAO) and length (SMF74RAL) are only valid if SMF74RAN = 1. A reassembly area is only present in broken records.
76	4C	SMF74OIL	2	binary	Original interval length as defined in the session or by SMF (in seconds).
78	4E	SMF74SYN	2	binary	SYNC value in seconds.
80	50	SMF74GIE	8	binary	Projected gathering interval end (STCK format) GMT time.
88	58	SMF74XNM	8	EBCDIC	Sysplex name as defined in parmlib member COUPLExx.
96	60	SMF74SNM	8	EBCDIC	System name for current system as defined in parmlib member IEASYSxx SYSNAME parameter.
Reassembly Area:					
0	0	SMF74RBR	2	binary	Total number of broken records built from the original large record.

Offsets		Name	Length	Format	Description
2	2	SMF74RSQ	2	binary	Sequence number of this broken record. Every broken record built from the same large record must have a unique sequence number, it is in the range from 1 to SMF74RBR.
4	4	SMF74RIO	4	binary	Offset to first reassembly information block relative to start of reassembly area header.
8	8	SMF74RIL	2	binary	Length of reassembly information block.
10	A	SMF74RIN	2	binary	Number of reassembly information blocks (same value as SMF74TRN in header section).
12	C		4		Reserved.
Reassembly Area Information Block:					
0	0	SMF74RNN	2	binary	Total number of sections in the original large record. This field contains information of how many sections of a specific type were contained in the original SMF record. This field is a copy of the number field of the triplet in the original (non broken) record.
2	2	SMF74RPP	2	binary	Position of the first of one or more consecutive sections described by this block as in the original record. Values in the range of 1 to SMF74RNN are valid for correct processing. A value of 0 will skip processing of this information block. This field provides information where the sections that are part of this broken record were placed in the original record before the split took place. The actual number of consecutive sections contained in this record is available from the actual triplet in the header extension.

Subtype 1 — Device Activity

Device Control Data Section

There is one section per record but the devices belonging to a particular device class can be spread over one or more SMF records.

Offsets		Name	Length	Format	Description
0	0	SMF74NXT	2	binary	Number of Device data sections in following broken records for this logical device class record.
2	2	SMF74TOT	2	binary	Total number of Device data sections in all records for this logical device class record.
4	4	SMF74GEN	2	binary	Total number of devices specified for all classes at system installation.
6	6	SMF74SUB	2	binary	Device class code: **Bit Configuration** **Meaning** **‘0080’X** Magnetic tape device **‘0040’X** Communication equipment **‘0020’X** Direct access devices **‘0010’X** Graphics devices **‘0008’X** Unit record devices **‘0004’X** Character reader devices.

Offsets		Name	Length	Format	Description
8	8	SMF74DCF	1	binary	Flags for DASD class **Bit** **Meaning when set** **0** Both sections of report requested **1** Sort by storage group **2-7** Reserved.
9	9	SMF74DMS	1	binary	Message flag **Bit** **Meaning when set** **0** Message issued that SMS not available **1** SMS interface error **2-7** Reserved.
10	A	SMF74ENF	1	binary	Flags for environment. **Bit** **Meaning when set** **0** Extended CMB **1** Model-dependent data not available by STSCH **2** Initial command response time valid (SMF74CMR) **3** Interrupt-Delay-Time facility is provided by channel subsystem **4 -7** Reserved
11	B	SMF74SMF	1	binary	Logical SMF record flag **Bit** **Meaning when set** **0** There are more logical SMF records for this device class **1-7** Reserved.
12	C	SMF74S15	4	binary	Contents of register 15 after SMS interface call, zero if normal return.
16	10	SMF74SRC	4	binary	Return code from SMS interface, zero if normal return.
20	14	SMF74SRS	4	binary	Reason code from SMS interface, zero if normal return.
24	18	SMF74TSR	2	binary	Total number of small SMF records.

Offsets		Name	Length	Format	Description
26	1A	SMF74CFL	1	binary	Configuration change flags **Bit** **Meaning when set** **0** Configuration changed. Used to decide whether to provide the text “POR” or “ACTIVATE” on reports. Also used to check whether data can be combined in a duration report. **1** Configuration change since power-on-reset (POR). **2** POR using IOC data set that contains a token. **3** Configuration token is valid. **4-7** Reserved.
27	1B	SMF74LSN	1	binary	Logical SMF record sequence number within a device class. This number can be used by SMF record assembly programs to recognize conditions where logical SMF records of a device class are not sorted in chronological order.
28	1C		2		Reserved.
30	1E	SMF74TNM	44	EBCDIC	IODF name suffix.
74	4A	SMF74TSF	2	EBCDIC	IODF name suffix.
76	4C		2		Reserved.
78	4E	SMF74TOK	16	EBCDIC	Partial token information.
78	4E	SMF74TDT	8	EBCDIC	IODF creation date, in the form *mm/dd/yy*.
86	56	SMF74TTM	8	EBCDIC	IODF creation time, in the form *hh.mm.ss*.
94	5E		2		Reserved.
96	60	SMF74MCT	4	binary	Maximum number of allocated tape devices. This field is zero for devices other than tape.
100	64	SMF74TDY	10	EBCDIC	IODF creation date, in the form *mm/dd/yyyy*.
110	6E		2		Reserved.

Device Data Section

There is one section per device.

Offsets		Name	Length	Format	Description
0	0	SMF74NUM	2	binary	Device number, in the range X'0000' to X'FFFF'.
2	2	SMF74LCU	2	binary	Logical control unit number, in the range X'0000' to X'FFFF'.
4	4	*	1		Reserved.

Offsets		Name	Length	Format	Description
5	5	SMF74CNF	1	binary	Device indicator **Bit** **Meaning when set** **0** IOS queue length is incorrect. **1** No logical control unit information. **2** Data contained in fields SMF74SSC through SMF74DIS is incorrect. **3** Device has been deleted. **4** Only partial statistics are available. **5** Reserved. **6** Data recorded is incorrect because device was configured during interval. **7** Device is currently online.
6	6	SMF74SER	6	EBCDIC	Volume serial of the volume mounted on this device (tape or direct access device only).
12	C	SMF74TYP	4	binary	Unit type.
16	10	SMF74NUX	4	binary	Number of unit control blocks (UCBs) for a parallel access volume. For HyperPAV base devices (bit 6 of SMF74CNX is set), this is the accumulated number of HyperPAV aliases.
20	14	SMF74SSC	4	binary	Start subchannel count. This is the number of physical requests to the device and includes SSCH and RSSCH instructions.
24	18	SMF74MEC	4	binary	Measurement event count (number of SSCH instructions for which connect, pending, and active times were stored).
28	1C	SMF74CNN	4	binary	Device connect time (in 128-microsecond units).
32	20	SMF74PEN	4	binary	Device pending time (in 128-microsecond units).
36	24	SMF74ATV	4	binary	Device active time (in 128-microsecond units).
40	28	SMF74DIS	4	binary	Device disconnect time (in 128-microsecond units).
44	2C	SMF74QUE	4	binary	Number of requests queued in IOS for this device.
48	30	SMF74UTL	4	binary	Number of samples when the device was reserved but an SSCH instruction had not been issued to the device.
52	34	SMF74RSV	4	binary	Number of samples taken when the device was reserved.
56	38	*	4		Reserved.
60	3C	SMF74ALC	4	binary	Number of samples taken that indicated that the device was allocated.
64	40	SMF74MTP	4	binary	Number of samples taken that indicated a mount pending condition.
68	44	SMF74NRD	4	binary	Number of samples taken that indicated that the device was not ready.
72	48	SMF74COF	2	binary	Number of requests that had hardware timer overflow for connect time measurement.
74	4A	SMF74ICT	2	binary	Number of incorrect samples.
76	4C	SMF74DVB	4	binary	Device busy delay time, from subchannel information block (SCHIB) (in 128-microsecond units).

Offsets		Name	Length	Format	Description
80	50	*	4		Reserved.
84	54	SMF74CLF	1	binary	DASD report control flag **Bit** **Meaning when set** **0** Number option active indicator **1** Storage group option active indicator **2** Storage group name changed during the interval **3** Mount pending condition exists at the start of the interval **4** Mount pending condition exists at end of the interval **5** Reserved **6** CTC with special protocol **7** Reserved.
85	55	*	3		Reserved.
88	58	SMF74SGN	8	EBCDIC	Storage group name as defined by DFSMS.
96	60	SMF74NDA	4	binary	Total number of allocations in effect for the device.
100	64	SMF74DEV	8	EBCDIC	Device model name. This field is blank if device name cannot be determined.
108	6C	SMF74CU	8	EBCDIC	Control unit name. Blank if control unit name cannot be determined.
116	74	*	4		Reserved.
120	78	SMF74CNX	1	binary	Device flag extensions: **Bit** **Meaning when set** **0** Device dynamically changed **1** Device disconnect time is not valid **2** Base exposure of a parallel access volume **3** Number of alias exposures has changed **4** Timing facility not active **5** Device connect time is invalid **6** HyperPAV base device **7** Device connected to FICON.

Offsets		Name	Length	Format	Description
121	79	SMF74CN2	1	binary	Device flag extension 2 **Bit** **Meaning when set** **0** HyperWrite requested **1** Device in SuperPAV mode **2** Device is capable of performing synchronous I/O read requests **3** Device is capable of performing synchronous I/O write requests **4-7** Reserved.
122	7A	SMF74MTC	2	binary	Number of tape mounts detected against the device during the interval.
124	7C	SMF74DTS	1	binary	Shared Device report control flag **Bit** **Meaning when set** **0** Valid node descriptor ID retrieved **1** No valid node descriptor ID retrieved **2** Reserved **3** SMF74SHR is valid **4** Device is shared/assigned to multiple systems **5–7** Reserved.
125	7D	SMF74DCT	28	EBCDIC	Node descriptor ID for selfdescribing devices (if bit 0 of SMF74SRD on). 4-byte device number in EBCDIC format left justified with trailing blanks (if bit 1 of SMF74DTS is on).
153	99	SMF74HPC	1	binary	Number of HyperPAV aliases configured for that LSS.
154	9A	SMF74NSS	2	binary	Number of skipped samples caused by too large delta values.
156	9C	SMF74PSM	4	binary	Number of successful PAV samples.
160	A0	SMF74PCT	4	binary	Number of unsuccessful PAV counts.
164	A4	SMF74CMR	4	binary	Command response time in units of 128 microseconds.
168	A8	SMF74CAP	4	binary	DASD volume capacity (specified by the number of available cylinders).
172	AC	SMF74IDT	4	binary	Interrupt delay time in units of 128 microseconds. This field is zero if not supported by the hardware.
176	B0	SMF74CUQ	4	binary	Control Unit Queuing Time.
180	B4	*	1		Reserved.
181	B5	SMF74SCS	1	binary	Subchannel set ID.
182	B6	SMF74NM2	2	binary	Device number (same as SMF74NUM).
184	B8	SMF74ATD	4	binary	Number of times I/Os were subjected to imposed delays due to PAV alias throttling.

Offsets		Name	Length	Format	Description
191	BF	SMF74AGC	1	binary	The alias management group number defined on the physical controller for this device. This number is valid if the device belongs to a DASD subsystem that supports alias management groups and bit 1 of SMF74CN2 is set.
192	C0	SMF74AGS	4	binary	The alias management group number assigned by z/OS for this device on this system. This number is valid if the device belongs to a DASD subsystem that supports alias management groups and bit 1 of SMF74CN2 is set.
196	C4	*	4		Reserved.
200	C8	SMF74SBR	8	l_float	Number of synchronous I/O read bytes transferred.
208	D0	SMF74SBW	8	l_float	Number of synchronous I/O write bytes transferred.
216	D8	SMF74SQR	8	l_float	Number of successfully completed synchronous I/O read requests.
224	E0	SMF74SQW	8	l_float	Number of successfully completed synchronous I/O write requests.
232	E8	SMF74SPR	8	l_float	Processing time (in 0.5 microsecond units) for synchronous I/O read requests.
240	F0	SMF74SPW	8	l_float	Processing time (in 0.5 microsecond units) for synchronous I/O write requests.
248	F8	SMF74SFTR	8	l_float	Elapsed time (in 0.5 microsecond units) for unsuccessful synchronous I/O read requests.
256	100	SMF74SFTW	8	l_float	Elapsed time (in 0.5 microsecond units) for unsuccessful synchronous I/O write requests.
264	108	SMF74SLBR	4	s_float	Number of synchronous I/O read link busy conditions.
268	10C	SMF74SLBW	4	s_float	Number of synchronous I/O write link busy conditions.
272	110	SMF74SCMR	4	s_float	Number of cache miss conditions for synchronous I/O read requests.
276	114	SMF74SNIS	4	s_float	Number of synchronous I/O write requests where the write data could not be immediately stored.
280	118	SMF74STOR	4	s_float	Number of synchronous I/O read timeout conditions.
284	11C	SMF74STOW	4	s_float	Number of synchronous I/O write timeout conditions.
288	120	SMF74SOR	4	s_float	Number of synchronous I/O read requests rejected for reasons other than link busy, read cache miss or timeout conditions.
292	124	SMF74SOW	4	s_float	Number of synchronous I/O write requests rejected for reasons other than link busy, timeout or deferred write conditions.
296	128	SMF74IOS	4	s_float	IOS Queue time in microseconds
300	12C	*	4		Reserved

Subtype 2 — XCF Activity

Control Data Section

Offsets		Name	Length	Format	Description
0	0	R742TSR	2	binary	Total number of type 74 subtype 2 records written during this interval.
2	2		2		Reserved.
4	4	R742STOT	4	binary	Total number of System data sections in all SMF records.

Offsets		Name	Length	Format	Description
8	8	R742SNXT	4	binary	Number of System data sections in records written after this record.
12	C	R742PTOT	4	binary	Total number of Path data sections in all SMF records.
16	10	R742PNXT	4	binary	Number of Path data sections in records written after this record.
20	14	R742MTOT	4	binary	Total number of Member data sections in all SMF records.
24	18	R742MNXT	4	binary	Number of Member data sections in records written after this record.

System Data Section

Offsets		Name	Length	Format	Description
0	0	R742SNME	8	EBCDIC	System name as defined in parmlib member IEASYSxx SYSNAME parameter.
8	8	R742SSTF	1	binary	Status flags **Bit** **Meaning when set** **0** System became active during this interval **1** System became inactive during this interval **2** Counts reset by XCF during this interval **3** Partially not active during RMF Postprocessor interval. **4-7** Reserved.
9	9	R742SDIR	1	binary	Direction of the message traffic **Bit** **Meaning when set** **0** Inbound. The R742SNME system sent messages to the local system. **1** Outbound. The R742SNME system receives messages from the local system. **2** Local. This means that the message traffic is within the local system. **3-7** Reserved.
10	A		2		Reserved.
12	C	R742SPTH	4	binary	Current number of signalling paths in service (zero for local entry). If outbound entry, count is for the indicated transport class.
16	10	R742SBSY	4	binary	Number of no buffer conditions. For local or outbound entry, count is for the indicated transport class.
20	14	R742SNOP	4	binary	Number of no path conditions (zero for local entry). For outbound entry, count is for the indicated transport class.
24	18	R742SMXB	4	binary	Maximum 1K blocks of message buffer space. For local or outbound entry, count is for the indicated transport class.
28	1C	R742SBIG	4	binary	Number of big message conditions (zero for inbound entry).
32	20	R742SFIT	4	binary	Number of message fit conditions (zero for inbound entry).

Offsets		Name	Length	Format	Description
36	24	R742SSML	4	binary	Number of small message conditions (zero for inbound entry).
40	28	R742SOVR	4	binary	Number of big messages that exceeded the message length for which XCF was optimized (zero for inbound entry).
44	2C	R742STCL	4	binary	Message length for transport class (zero for inbound entry).
48	30	R742STCN	8	EBCDIC	Transport class name (blanks for inbound entry).

Path Data Section

Offsets		Name	Length	Format	Description
0	0	R742PNME	8	EBCDIC	System name as defined in parmlib member IEASYSxx SYSNAME parameter.
8	8	R742PDEV	4	EBCDIC	Device number.
12	C	R742PSTF	1	binary	Status flags **Bit** **Meaning when set** **0** Path became active during this interval **1** Path became inactive during this interval. **2** Counts reset by XCF during this interval. **3-7** Reserved.
13	D	R742PDIR	1	binary	Direction path **Bit** **Meaning when set** **0** Inbound path **1** Outbound path **2-7** Reserved.
14	E	R742PTYP	1	binary	Path type indicator. **Value** **Meaning** **1** CTC **3** List structure.
15	F		1		Reserved.
16	10	R742PONA	8	EBCDIC	Name of system on other end if known, otherwise blanks.
24	18	R742PODV	4	EBCDIC	Device number on other end if known, otherwise blanks.

Offsets		Name	Length	Format	Description
28	1C	R742PSTA	1	binary	Path status **Bit** **Meaning when set** **0** Starting **1** Restarting **2** Working **3** Stopping **4** Waiting for completion of communication link **5** Not operational. Path defined to XCF, but not usable until hardware and/or definition problems are resolved. **6** Stop failed **7** Rebuilding.
29	1D	R742PSTM	1	binary	More path status flags: **Bit** **Meaning when set** **0** Quiescing **1** Quiesced **2-7** Reserved.
30	1E		2		Reserved.
32	20	R742PRET	4	binary	Path retry limit.
36	24	R742PRST	4	binary	Number of restarts.
40	28	R742PMXM	4	binary	Maximum number of 1K blocks of message buffer space.
44	2C	R742PSIG	4	binary	Number of outbound (inbound) signals sent (received) over path.
48	30	R742PQLN	4	binary	Number of outbound signals pending transfer on path.
52	34	R742PIBR	4	binary	Number of inbound signals refused due to maximum message limit.
56	38	R742PSUS	4	binary	Number of times this signalling path was **not** busy when it was selected to transfer a message.
60	3C	R742PAPP	4	binary	Number of times this signalling path was busy when it was selected to transfer a message.
64	40	R742PTCN	8	EBCDIC	Transport class name For an outbound path, the class to which the path is assigned. For an inbound path, the class to which the outbound side of the path is assigned, blanks if not known. .
72	48	R742PSTR	16	EBCDIC	Name of XES list structure being used as a path, blank for CTCs.
88	58	R742PIOT	4	binary	For inbound paths: Average I/O transfer time (microseconds) for the observed in the last minute of the RMF reporting interval, or X'FFFFFFFF' (if time > 35 minutes). For outbound paths, the field is zero.
92	5C	R742PRCT	4	binary	Path retry count.

Offsets		Name	Length	Format	Description
96	60	R742PPND	4	binary	The current number of signals pending for transfer on the path (outbound only).
100	64	R742PUSE	4	binary	The current number of 1KB blocks of message buffer space in use by this path.
104	68	R742PLIN	4	binary	List number within structure.
108	6C	*	4	*	Reserved.
Path Usage Statistics block This block exists four times. The metrics of one array entry are related to the path utilization percentage that is indicated in metric R742PUSG_Percent. The path usage statistics are available for inbound paths only.					
112	70	R742PUSG_TimeSum	8	binary	Time (in microseconds) this path was in use at the indicated percent utilization.
120	78	R742PUSG_TimeSsq	8	binary	Squared microseconds this path was in use at the indicated percent utilization.
128	80	R742PUSG_Time#	4	binary	Number of times this path was in use at the indicated percent utilization.
132	84	R742PUSG_SigCnt	4	binary	Number of signals sent for this usage entry.
136	88	R742PUSG_Percent	4	binary	Percent utilization that this entry represents.
140	8C	*	4	*	Reserved.
End of four instances of Path Usage Statistics block					
240	F0	R742PNIB_TimeSum	8	binary	Total time (in microseconds) this path had a no-inbound-buffer impact condition.
248	F8	R742PNIB_TimeSsq	8	binary	Squared microseconds for each no-inbound-buffer impact condition.
256	100	R742PNIB_Time#	4	binary	Number of times this path was impacted by a no-inbound-buffer condition.

For each path which has been added during the measurement interval, only fields R742PNME, R742PDIR, R742PONA, and R742PQLN contain data, all other fields are blank or contain X'00'.

Member Data Section

The information contained in this section provides information about the message traffic for the member. If the member is active on the system that provided this SMF data, this information describes all messages sent and received by that member. If the member is active on some other system than the one that provided the data, this information describes just those messages sent from the system providing the data to that member, and just those messages received from that member by the system providing the data.

If the member is active on the system that provided the SMF data, then the contents of R742MSYS and SMF74SNM (in the RMF Product section) are the same.

Offsets		Name	Length	Format	Description
0	0	R742MSYS	8	EBCDIC	System name (as defined in parmlib member IEASYSxx SYSNAME parameter) where the member resides.
8	8	R742MGRP	8	EBCDIC	Group name.
16	10	R742MMEM	16	EBCDIC	Member name.

Offsets		Name	Length	Format	Description
32	20	R742MSTF	1	binary	Status flags **Bit** **Meaning when set** **0** Member became active during this interval **1** Member became inactive during this interval **2** Counts reset by XCF during this interval **3** Partially not active during RMF Postprocessor interval. **4** No information returned from IXCQUERY. **5-7** Reserved.
33	21	R742MST1	1	binary	Extended member state (1): 2=CREATED 3=ACTIVE 4=QUIESCED 5=FAILED
34	22	R742MST2	1	binary	Extended member state (2): **Bit** **Meaning when set** **0** System status update missing **1** System termination started **2** Reserved **3** Status update missing (confirmed) **4** Status update missing (not confirmed) **5** Reserved **6** Monitoring has been removed **7** Reserved.
35	23		1		Reserved.
36	24	R742MSNT	4	binary	Number of signals sent by member.
40	28	R742MRCV	4	binary	Number of signals received by member.
44	2C	R742MINT	4	binary	Status checking interval.
48	30	R742MJOB	8	EBCDIC	Job name that joined the member.

Subtype 3 — OMVS Kernel Activity

Control Data Section

Offsets		Name	Length	Format	Description
0	0	R743CYCU	4	binary	The number of cycle units elapsed between first and last measured sample.

Offsets		Name	Length	Format	Description
4	4	R743CYCT	4	binary	The cycle time value obtained from Monitor III options (in milliseconds).
8	8	R743FLG	4	binary	Processing Flags **Bit** **Meaning when set** **0** Kernel address space is terminated or reinstated this interval. **1** Maximum number of processes changed during reporting interval. **2** Maximum number of users changed during reporting interval. **3** Maximum number of processes per user changed during reporting interval. **4** Maximum number of message queue ids changed during reporting interval when set. **5** Maximum number of semaphore ids changed during reporting interval when set. **6** Maximum number of shared memory ids changed during reporting interval when set. **7** Maximum number of shared memory pages changed during reporting interval when set. **8** Maximum number of memory map storage pages changed during reporting interval when set. **9** Maximum number of shared storage pages changed during reporting interval when set. **10** Maximum size of shared library region changed during reporting interval when set. **11** Maximum number of queued signals per process changed during reporting interval when set. **12-31** Reserved.
12	C	R743SYSC	4	s_float	The total number of kernel callable services invoked during the interval.
16	10	R743SCMN	4	binary	The minimum number of kernel callable services invoked during one cycle.
20	14	R743SCMX	4	binary	The maximum number of kernel callable services invoked during one cycle.
24	18	R743CPU	4	s_float	Total CPU time spent processing callable services in the kernel address space during the interval (in 10-millisecond units).
28	1C	R743CTMN	4	binary	Minimum CPU time spent processing callable services in the kernel address space during one cycle (in 10-millisecond units).
32	20	R743CTMX	4	binary	Maximum CPU time spent processing callable services in the kernel address space during one cycle (in 10-millisecond units).
36	24	R743OPR	4	s_float	Count of times fork() or dub failed because the maximum number of processes was exceeded during the interval.
40	28	R743OPMN	4	binary	Minimum number of times fork() or dub failed because the maximum number of processes was exceeded during one cycle.

Offsets		Name	Length	Format	Description
44	2C	R743OPMX	4	binary	Maximum number of times fork() or dub failed because the maximum number of processes was exceeded during one cycle.
48	30	R743OUS	4	s_float	Count of times fork() or dub failed because the maximum number of users was exceeded during the interval.
52	34	R743OUMN	4	binary	Minimum number of times fork() or dub failed because the maximum number of users was exceeded during one cycle.
56	38	R743OUMX	4	binary	Maximum number of times fork() or dub failed because the maximum number of users was exceeded during one cycle.
60	3C	R743OPRU	4	s_float	Count of times fork() or dub failed because the maximum number of processes per user was exceeded during the interval.
64	40	R743ORMN	4	binary	Minimum number of times fork() or dub failed because the maximum number of processes per user was exceeded during one cycle.
68	44	R743ORMX	4	binary	Maximum number of times fork() or dub failed because the maximum number of processes per user was exceeded during one cycle.
72	48	R743MAXP	2	binary	Maximum number of processes.
74	4A	R743MAXU	2	binary	Maximum number of users.
76	4C	R743MXPU	2	binary	Maximum number of processes per user.
78	4E	R743RSV1	2	binary	Reserved.
80	50	R743CURP	4	s_float	Accumulated number of processes during the interval.
84	54	R743CPMN	2	binary	Minimum number of processes during one cycle.
86	56	R743CPMX	2	binary	Maximum number of processes during one cycle.
88	58	R743CURU	4	s_float	Accumulated number of users during the interval.
92	5C	R743CUMN	2	binary	Minimum number of users during one cycle.
94	5E	R743CUMX	2	binary	Maximum number of users during one cycle.
96	60	R743MMSG	4	binary	Maximum number of message queue IDs (constant).
100	64	R743MSEM	4	binary	Maximum number of semaphore IDs (constant).
104	68	R743MSHM	4	binary	Maximum number of shared memory IDs (constant).
108	6C	R743MSPG	4	binary	Maximum number of shared memory pages (constant).
112	70	R743CMSG	4	s_float	Accumulated number of message queue IDs during one interval.
116	74	R743CMMN	4	binary	Minimum number of message queue IDs per cycle.
120	78	R743CMMX	4	binary	Maximum number of message queue IDs per cycle.
124	7C	R743CSEM	4	s_float	Accumulated number of semaphore IDs during one interval.
128	80	R743CSMN	4	binary	Minimum number of semaphore IDs per cycle.
132	84	R743CSMX	4	binary	Maximum number of semaphore IDs per cycle.
136	88	R743CSHM	4	s_float	Accumulated number of shared memory IDs during one interval.
140	8C	R743CHMN	4	binary	Minimum number of shared memory IDs per cycle.
144	90	R743CHMX	4	binary	Maximum number of shared memory IDs per cycle.
148	94	R743CSPG	4	s_float	Accumulated number of shared memory pages during one interval.
152	98	R743CGMN	4	binary	Minimum number of shared memory pages per cycle.
156	9C	R743CGMX	4	binary	Maximum number of shared memory pages per cycle.
160	A0	R743OMSG	4	s_float	Accumulated number of attempts to exceed maximum number of message queue IDs during one interval.

Offsets		Name	Length	Format	Description
164	A4	R743OMMN	4	binary	Minimum number of attempts to exceed maximum number of message queue IDs per cycle.
168	A8	R743OMMX	4	binary	Maximum number of attempts to exceed maximum number of message queue IDs per cycle.
172	AC	R743OSEM	4	s_float	Accumulated number of attempts to exceed maximum number of semaphore IDs during one interval.
176	B0	R743OSMN	4	binary	Minimum number of attempts to exceed maximum number of semaphore IDs per cycle.
180	B4	R743OSMX	4	binary	Maximum number of attempts to exceed maximum number of semaphore IDs per cycle.
184	B8	R743OSHM	4	s_float	Accumulated number of attempts to exceed maximum number of shared memory IDs during one interval.
188	BC	R743OHMN	4	binary	Minimum number of attempts to exceed maximum number of shared memory IDs per cycle.
192	C0	R743OHMX	4	binary	Maximum number of attempts to exceed maximum number of shared memory IDs per cycle.
196	C4	R743OSPG	4	s_float	Accumulated number of attempts to exceed maximum number of shared memory pages during one interval.
200	C8	R743OGMN	4	binary	Minimum number of attempts to exceed maximum number of shared memory pages per cycle.
204	CC	R743OGMX	4	binary	Maximum number of attempts to exceed maximum number of shared memory pages per cycle.
208	D0	R743MMAP	4	binary	Maximum number of memory map storage pages (constant).
212	D4	R743CMAP	4	s_float	Accumulated number of memory map storage pages during one interval.
216	D8	R743CAMN	4	binary	Minimum number of memory map storage pages per cycle.
220	DC	R743CAMX	4	binary	Maximum number of memory map storage pages per cycle.
224	E0	R743OMAP	4	s_float	Accumulated number of attempts to exceed maximum number of memory map storage pages during one interval.
228	E4	R743OAMN	4	binary	Minimum number of attempts to exceed maximum number of memory map storage pages per cycle.
232	E8	R743OAMX	4	binary	Maximum number of attempts to exceed maximum number of memory map storage pages per cycle.
236	EC	R743MPAG	4	binary	Maximum number of shared storage pages (constant).
240	F0	R743CPAG	4	s_float	Accumulated number of shared storage pages during one interval.
244	F4	R743CXMN	4	binary	Minimum number of shared storage pages per cycle.
248	F8	R743CXMX	4	binary	Maximum number of shared storage pages per cycle.
252	FC	R743OPAG	4	s_float	Accumulated number of attempts to exceed maximum number of shared storage pages during one interval.
256	100	R743OXMN	4	binary	Minimum number of attempts to exceed maximum number of shared storage pages per cycle.
260	104	R743OXMX	4	binary	Maximum number of attempts to exceed maximum number of shared storage pages per cycle.
264	108	R743MSLR	4	binary	Maximum amount of storage (MB) available for shared library region.
268	10C	R743CSLR	4	s_float	Accumulated amount of shared library storage (MB) allocated in one interval.
272	110	R743CLMN	4	binary	Minimum amount of shared library storage (MB) allocated per cycle.

Offsets		Name	Length	Format	Description
276	114	R743CLMX	4	binary	Maximum number of shared library storage (MB) allocated per cycle.
280	118	R743OSLR	4	s_float	Accumulated number of attempts to exceed maximum amount of shared library region size during one interval.
284	11C	R743OLMN	4	binary	Minimum number of attempts to exceed maximum amount of shared library region per cycle.
288	120	R743OLMX	4	binary	Maximum number of attempts to exceed maximum amount of shared library region per cycle.
292	124	R743MQDS	4	binary	Maximum amount of queued signals allowed per process.
296	128	R743OQDS	4	s_float	Accumulated number of attempts to exceed maximum amount of queued signals per interval.
300	12C	R743OQMN	4	binary	Minimum number of attempts to exceed maximum amount of queued signals per cycle.
304	130	R743OQMX	4	binary	Maximum number of attempts to exceed maximum amount of queued signals per cycle.

Subtype 4 — Coupling Facility Activity

Local coupling facility data section

One per record.

Offsets		Name	Length	Format	Description
0	0	R744FNAM	8	EBCDIC	Name of coupling facility as defined in parmlib member COUPLExx.
8	8	R744FSYS	8	EBCDIC	Name of this system (from IEASYSxx parmlib member, SYSNAME parameter).
16	10	R744FFLG	1	binary	Status Flags. **Bit** **Meaning when set** **0** Coupling facility was connected to the system at the end of the interval **1** Coupling facility became active during the interval **2** Permanent error in cycle gatherer during the complete interval **3** Dynamic dispatching is active. Valid if R744FLVL > 14. **4** Thin interrupts are enabled. Valid if R744FLVL > 18. **5 - 7** Reserved.
17	11	R744FFLC	1	binary	Informational Flags. **Bit** **Meaning when set** **0** CHPIDs set offline during the interval **1 - 7** Reserved.
18	12		1		Reserved.
19	13	R744FAMV	1	binary	IXLYAMDA Version.
20	14	R744FPAM	4	binary	Number of paths available to the coupling facility.

Offsets		Name	Length	Format	Description
24	18	R744FPBC	8	l_float	Number of times coupling facility requests fail due to path busy.
32	20	R744FSCG	4	binary	Number of subchannels defined.
36	24	R744FSCU	4	binary	Number of subchannels currently in use.
40	28	R744FSCL	4	binary	Number of subchannels that can be used (limit).
44	2C	R744FSCC	8	l_float	Subchannel contention count (all subchannel busy).
52	34	R744FTOR	8	l_float	Total number of requests from this system.
60	3C	R744FAIL	8	l_float	Number of unsuccessful requests from this system.
68	44	R744FTIM	8	binary	Total service time for unsuccessful requests in microseconds.
76	4C	R744FSQU	8	binary	Total squares of service time for unsuccessful requests (in square-microseconds).
84	54	R744FCTM	8	binary	Total contention time (microseconds) for waiting for subchannels to become free for synchronous immediate operations.
92	5C	R744FCSQ	8	binary	Total squares of contention time for waiting for subchannels to become free for synchronous immediate operations.
100	64	R744FMOD	6	EBCDIC	Coupling facility type. The type is right-aligned with leading blanks if necessary.
106	6A	R744FVER	3	EBCDIC	Coupling facility model.
109	6D	R744FMPC	2	EBCDIC	Manufacturer plant code of the coupling facility.
111	6F	R744FLPN	1	binary	Partition identifier of CF. Valid with SMF74SRL ≥ X'55' (85) and RMF version number SMF74MFV ≥ 718F
112	70	R744FLVL	4	binary	Coupling facility level.
116	74	R744FPAS	1	binary	Path-available mask for CF links.
117	75	R744FPIS	1	binary	Path-installed mask for CF links.
118	76	R744FPCM	1	binary	Composite-path mask: paths that have a physical or logical connection to the facility or that are connected to the facility in the active policy.
119	77		1		Reserved.
The following field is available eight times for eight possible channel paths.					
120	78	R744FTAP	5	EBCDIC	Channel path type acronym.
160	A0	R744FSEQ	12	EBCDIC	Sequence number of this coupling facility.
172	AC	R744FPSN	2	binary	Number of shared processors. Valid if R744FLVL > 14.
174	AE	R744FPDN	2	binary	Number of dedicated processors. Valid if R744FLVL > 14.
The following field is available eight times for eight possible channel paths.					
176	B0	R744FIDP	1	binary	Channel path identifier. The range of values is X'00' - X'FF'.
184	B8	R744FCPI	2	binary	Index to first channel path data section associated with this coupling facility.
186	BA	R744FCPN	2	binary	Number of channel path data sections for channel paths of type CIB, CFP, CL5, or CS5 connected to this coupling facility. This count matches the number of subsequent channel path data sections.

Connectivity Data Section

One per sysplex member

Offsets		Name	Length	Format	Description
0	0	R744XSYS	8	EBCDIC	Name of remote system also reporting on this coupling facility (from IEASYSxx parmlib member, SYSNAME parameter).

Storage Data Section

One per record; contains global data that is only collected once in the sysplex.

Offsets		Name	Length	Format	Description
0	0	R744GCSD	4	binary	Total amount of control storage defined (4K-block units).
4	4	R744GCSF	4	binary	Amount of free control storage (4K-block units).
8	8	R744GTSD	4	binary	Total amount of coupling facility storage defined (4K-block units).
12	C	R744GTSF	4	binary	Amount of free coupling facility storage (4K-block units).
16	10	R744GDSA	4	binary	Amount of dump space allocated (4K-block units).
20	14	R744GDSF	4	binary	Amount of free dump space (4K-block units).
24	18	R744GDSR	4	binary	Maximum amount of dump space requested (4K-block units).
28	1C	*	4		Reserved
32	20	R744GTSC	8	binary	Total amount of coupling facility storage class memory (4K-block units) which may be concurrently used as structure extensions.
40	28	R744GFSC	8	binary	Amount of free coupling facility storage class memory (4K-block units).
48	30	R744GISC	2	binary	Amount of storage class memory increment. This is the number of 4K blocks that are assigned to a single storage class memory segment.

Structure Data Section

One for each structure.

Offsets		Name	Length	Format	Description
0	0	R744QSTR	16	EBCDIC	Name of structure allocated in this coupling facility.
16	10	R744QSIZ	4	binary	Structure size requested to be allocated (4K-block units).
20	14	R744QVER	8	binary	Structure version number.
28	1C	R744QFLG	1	binary	Status Flags. **Bit** **Meaning when set** **0** Active instance of structure (normal case). **1** New instance during rebuild. **2** Old instance during rebuild. **3** Instance is just being added or deleted (in transition). **4** Instance in hold, deletion could not be finished. **5** Dump was initiated for this structure. **6** Structure rebuild in progress. **7** The in-progress rebuild is a duplexing rebuild.

Offsets		Name	Length	Format	Description
29	1D	R744QFL1	1	binary	Status Flags **0** Duplexing is active using system-managed asynchronous duplexing. **1-7** Reserved
30	1E		2		Reserved.

Request Data Section

There is one request data section for each structure.

Offsets		Name	Length	Format	Description
0	0	R744SNAM	16	EBCDIC	Name of connected structure in this coupling facility.
16	10	R744SVER	8	binary	Structure version number.
24	18	R744STYP	1	binary	Structure type identifier. **Value** **Meaning** **1** Unserialized List structure **2** Serialized List structure **3** Lock structure **4** Cache structure
25	19	R744SFLG	1	binary	Status Flags. **Bit** **Meaning when set** **0** Structure was connected to the system at the end of the interval. **1** Structure became active during the interval. **2** Structure is capable to participate in asynchronous duplexing. **3** Structure is in the duplexing active state. **4** Structure is primary instance of an asynchronously duplexed structure. **5** Structure is secondary instance of an asynchronously duplexed structure. **6** Structure is encrypted. **7** Reserved.
26	1A	*	1		Reserved.
27	1B	R744SLEC	1	binary	Lock structure only: lock table entry characteristic.
28	1C	R744SLEL	4	binary	List structure: limit on number of list entries. The estimated maximum number of list entries that may reside in storage class memory is not included. Lock structure: limit on number of data elements.

Offsets		Name	Length	Format	Description
32	20	R744SLEM	4	binary	List structure: current number of list entries in use. The number of list entries that currently reside in storage class memory is not included. Lock structure: current number of data elements in use.
36	24	R744SLTL	4	binary	Lock structure only: limit on number of lock table entries.
40	28	R744SLTM	4	binary	Lock structure only: Current number of lock table entries in use.
44	2C	R744SSTA	8	l_float	The number of list, lock, or cache requests that were to be executed synchronously at the coupling facility, but which were changed to an asynchronous operation due to lack of resources.
52	34	R744STRC	8	l_float	The total number of IXLLIST, IXLCACHE, or IXLLOCK requests made. This field will not necessarily equal the sum or R744SSRC, R744SARC, and R744SSTA due to internal processing. Use of the batch unlock function can produce large discrepancies because R744STRC is incremented for each lock being released, but only one coupling facility operation is executed.
60	3C	R744STAC	8	l_float	The total number of IXLLOCK requests that could not be satisfied immediately because of lock contention.
68	44	R744SARC	8	l_float	The total number of operations executed asynchronously at the coupling facility.
76	4C	R744SATM	8	binary	Summed service time for asynchronous requests in microseconds.
84	54	R744SASQ	8	binary	Summed squares of service time for asynchronous requests.
92	5C	R744SSRC	8	l_float	Count of number of times for synchronous requests.
100	64	R744SSTM	8	binary	Summed service time for synchronous requests in microseconds.
108	6C	R744SSSQ	8	binary	Summed squares of service time for synchronous requests.
116	74	R744SQRC	8	l_float	Count of number of times for queued requests.
124	7C	R744SQTM	8	binary	Summed queue delay time in microseconds.
132	84	R744SQSQ	8	binary	Summed squares of delay time for queued requests.
140	8C	R744SDRC	8	l_float	Number of times a request was found delayed in case of dump serialization.
148	94	R744SDTM	8	binary	Summed dump delay time in microseconds.
156	9C	R744SDSQ	8	binary	Summed squares of dump delay time.
164	A4	R744SDMP	8	l_float	Number of times dump serialization was found for this structure (list and cache structures only).
172	AC	R744SHTO	8	l_float	Total number of requests waiting on the high priority queue.
180	B4	R744SHMN	4	binary	Minimum number of requests waiting on the high priority queue during this interval.
184	B8	R744SHMX	4	binary	Maximum number of requests waiting on the high priority queue during this interval.
188	BC	R744SLTO	8	l_float	Total number of requests waiting on the low priority queue.
196	C4	R744SLMN	4	binary	Minimum number of requests waiting on the low priority queue during this interval.
200	C8	R744SLMX	4	binary	Maximum number of requests waiting on the low priority queue during this interval.
204	CC	R744SDTO	8	l_float	Total number of requests delayed because dump serialization is in progress.
212	D4	R744SDMN	4	binary	Minimum number of requests delayed because dump serialization is in progress during this interval.
216	D8	R744SDMX	4	binary	Maximum number of requests delayed because dump serialization is in progress during this interval.

Offsets		Name	Length	Format	Description
220	DC	R744SCN	8	l_float	Lock structure only: number of times any request encountered lock contention.
228	E4	R744SFCN	8	l_float	Lock structure only: number of times any request encountered false lock contention (storage contention within the structure).
236	EC	R744SSIZ	4	binary	Allocated size of structure (units = 4K byte blocks).
240	F0	R744SMAS	4	binary	Maximum structure size.
244	F4	R744SMIS	4	binary	Minimum structure size.
248	F8	R744SDEC	4	binary	Cache structure only: Total directory entry count.
252	FC	R744SDEL	4	binary	Cache structure only: Total data element count.
256	100	R744SNLH	4	binary	List structure only: Number of list headers.
260	104	R744SMAE	4	binary	List structure only: maximum number of elements. The estimated maximum number of list elements that may reside in storage class memory is not included.
264	108	R744SCUE	4	binary	List structure only: current number of elements in use. The number of list elements that currently reside in storage class memory is not included.
268	10C	R744CDSI	2	binary	Index to first Cache data section.
270	10E	R744CDNE	2	binary	Number of Cache data section entries.
272	110	R744SPLN	8	l_float	Count of peer-link-not-available conditions.
280	118	R744SPES	8	l_float	Count of execution-suppressed conditions.
288	120	R744SPTC	8	l_float	Count of waiting-for-peer-subchannel conditions.
296	128	R744SPST	8	binary	Total peer-subchannel-wait time (microseconds).
304	130	R744SPSS	8	binary	Square of total peer-subchannel-wait time (microseconds squared).
312	138	R744SRTC	8	l_float	Count of condition 'waiting for peer subchannel with reserve held'.
320	140	R744SRST	8	binary	Total peer-subchannel-wait-with-reserve time (microseconds).
328	148	R744SRSS	8	binary	Square of total peer-subchannel-wait-with-reserve time (microseconds squared).
336	150	R744SCTC	8	l_float	Count of condition 'waiting for peer completion'.
344	158	R744SCST	8	binary	Total waiting-for-peer-completion time (microseconds).
352	160	R744SCSS	8	binary	Square of total waiting-for-peer-completion time (microseconds squared).
360	168	R744SLSV	8	binary	Logical structure version number.
368	170	R744SETM	8	l_float	Structure execution time (microseconds). Valid if R744FLVL > 14.
376	178	R744SISC	2	binary	Index to Storage Class Memory data section. This field is zero if there is no SCM information available.
378	17A	R744SNSC	2	binary	Number of Storage Class Memory data sections.
380	17C	R744SSAC	4	binary	Count of Storage Class Memory Access Required conditions that require the request to be restarted.
384	180	R744SOSA	4	binary	Count of successful operations to the coupling facility that encountered an SCM Access Required condition.
388	184	R744SIAD	2	binary	Index to Asynchronous CF Duplexing data section. This field is zero if there is no Asynchronous CF Duplexing data available.
390	186	R744SADN	2	binary	Number of Asynchronous CF Duplexing data sections.
392	188	R744SIXC	4	binary	Number of asynchronous duplex requests that requested sync up with the primary. (Valid if bit 1 of R744SXFL is set.)

Offsets		Name	Length	Format	Description
396	18C	R744SXSC	4	binary	Number of asynchronous duplex requests that were suspended waiting for the operations to complete in the secondary structure of the current duplexing instance. (Valid if bit 1 of R744SXFL is set.)
400	190	R744SXST	8	binary	Summed suspend time, in microseconds, for suspended requests that were waiting for asynchronous duplex operations to complete in the secondary structure of the current duplexing instance. (Valid if bit 1 of R744SXFL is set.)
408	198	R744SXSQ	8	binary	Square of summed suspend times, in square of microseconds, for suspended requests that were waiting for the asynchronous duplex operations to complete in the secondary structure of the current duplexing instance. (Valid if bit 1 of R744SXFL is set.)
416	1A0	R744SADO	4	binary	Number of asynchronous duplex operations that were delayed because the primary structure was unable to accept new requests either because it could not forward requests to the secondary CF or because the secondary CF could not process incoming requests. (Valid if bit 0 of R744SXFL is set.)
420	1A4	R744SADR	4	binary	Number of asynchronous duplex requests that experienced a delayed operation because the primary CF was unable to accept new requests. (Valid if bit 0 of R744SXFL is set.)
424	1A8	R744SQCH	1	binary	Asynchronous duplex operation queue characteristic. The number of queue entries is the product of: 4096 × 2 ** R744SQCH
425	1A9	R744SXFL	1	binary	**Bit** **Meaning when set** **0** Data for primary instance of asynchronous duplexed structure is valid. **1** Data for secondary instance of asynchronous duplexed structure is valid. **2** Data for Write and Read Request Measurements is valid. **3** Data for CF monopolization delays is valid. **4 - 7** Reserved.
426	1AA	*	2		Reserved.
428	1AC	R744SWDR	4	binary	Number of requests to write data to the CF structure. (Valid if bit 2 of R744SXFL is set.)
432	1B0	R744SWAC	4	binary	Number of adjunct areas written to the CF structure. (Valid if bit 2 of R744SXFL is set.)
436	1B4	R744SRDR	4	binary	Number of requests to read data from the CF structure. (Valid if bit 2 of R744SXFL is set.)
440	1B8	R744SRAC	4	binary	Number of adjunct areas read from the CF structure. (Valid if bit 2 of R744SXFL is set.)

Offsets		Name	Length	Format	Description
444	1BC	R744SWEC	4	binary	Number of data entries with data elements that have been written to the CF structure. Includes both single and multi entry write requests. (Valid if bit 2 of R744SXFL is set.)
448	1C0	R744SREC	4	binary	Number of data entries with data elements that have been read from the CF structure. Includes both single and multi entry read requests. (Valid if bit 2 of R744SXFL is set.)
452	1C4	*	4		Reserved
456	1C8	R744SWED	8	binary	Sum of 256-byte increments accumulated for entry data with data elements written to the CF structure. (Valid if bit 2 of R744SXFL is set.)
464	1D0	R744SWES	8	binary	Square of summed number of 256-byte increments accumulated for entry data with data elements written to the CF structure. (Valid if bit 2 of R744SXFL is set.)
472	1D8	R744SRED	8	binary	Sum of 256-byte increments accumulated for entry data with data elements read from the CF structure. (Valid if bit 2 of R744SXFL is set.)
480	1E0	R744SRES	8	binary	Square of summed number of 256-byte increments accumulated for entry data with data elements read from the CF structure. (Valid if bit 2 of R744SXFL is set.)
488	1E8	R744SMRC	8	l_float	Number of times a request was found delayed due to coupling facility resource monopolization. (Valid if bit 3 of R744SXFL is set.)
496	1F0	R744SMTM	8	binary	Summed queue time (in microseconds) for operations queued due to coupling facility resource monopolization. (Valid if bit 3 of R744SXFL is set.)
504	1F8	R744SMSQ	8	binary	Summed queue time squared for operations queued due to coupling facility resource monopolization, in microseconds squared. (Valid if bit 3 of R744SXFL is set.)
512	200	R744SMTO	8	l_float	Total number of operations queued for CF monopolization avoidance. (Valid if bit 3 of R744SXFL is set.)
520	208	R744SMHT	8	l_float	Total number of high-priority operations queued for CF monopolization avoidance. (Valid if bit 3 of R744SXFL is set.)
528	210	R744SMMN	4	binary	Minimum number of operations queued for CF monopolization avoidance during this interval. (Valid if bit 3 of R744SXFL is set.)
532	214	R744SMMX	4	binary	Maximum number of operations queued for CF monopolization avoidance during this interval. (Valid if bit 3 of R744SXFL is set.)
536	218	R744SMHN	4	binary	Minimum number of high-priority operations queued for CF monopolization avoidance during this interval. (Valid if bit 3 of R744SXFL is set.)
540	21C	R744SMHX	4	binary	Maximum number of high-priority operations queued for CF monopolization avoidance during this interval. (Valid if bit 3 of R744SXFL is set.)
544	220	*	4		Reserved.

Processor Utilization Data Section

One for each processor

Offsets		Name	Length	Format	Description
0	0	R744PNUM	4	binary	CPU number.

Offsets		Name	Length	Format	Description
4	4	R744PBSY	4	binary	Busy time (in microseconds).
8	8	R744PWAI	4	binary	Wait time (in microseconds).
12	C	R744PTYP	1	binary	Processor flags **Bit** **Meaning when set** **0** Processor is dedicated. Valid if R744FLVL > 14. **1-7** Reserved.
13	D		1		Reserved.
14	E	R744PWGT	2	binary	Shared processor weight. Valid if R744FLVL > 14.

Cache Data Section

Several sections for each request section are possible, depending on applications using the coupling facility.

Offsets		Name	Length	Format	Description
0	0	R744CRHC	8	l_float	Read hit counter.
8	8	R744CRMD	8	l_float	Read miss, directory hit counter.
16	10	R744CRMA	8	l_float	Read miss, assignment suppressed counter.
24	18	R744CRMN	8	l_float	Read miss, name assigned counter.
32	20	R744CRMT	8	l_float	Read miss, target storage class full.
40	28	R744CWH0	8	l_float	Write hit change bit 0 - number of times unchanged data was written.
48	30	R744CWH1	8	l_float	Write hit change bit 1 - number of times changed data was written.
56	38	R744CWMN	8	l_float	Write miss not registered counter.
64	40	R744CWMI	8	l_float	Write miss invalid state counter.
72	48	R744CWMT	8	l_float	Write miss storage class full counter.
80	50	R744CDER	8	l_float	Directory entry reclaim counter.
88	58	R744CDTR	8	l_float	Data entry reclaim counter.
96	60	R744CXDR	8	l_float	XI directory reclaim counter.
104	68	R744CXFW	8	l_float	XI write counter.
112	70	R744CXNI	8	l_float	XI name invalidation counter.
120	78	R744CXCI	8	l_float	XI complement invalidation counter.
128	80	R744CCOC	8	l_float	Castout counter.
136	88	R744CRSM	8	l_float	Reference signal miss counter.
144	90	R744CTSF	8	l_float	Target storage class full counter.
152	98	R744CDEC	4	binary	Directory entry counter snapshot.
156	9C	R744CDAC	4	binary	Data element counter snapshot.
160	A0	R744CTCC	4	binary	Total changed counter.
164	A4	R744CDTA	4	binary	Data area counter.
168	A8	R744CRLC	8	l_float	Completed reference list counter.
176	B0	R744CPRL	8	l_float	Partially completed reference list counter.
184	B8	R744CXRL	8	l_float	XI for local cache vector index replacement.

Offsets		Name	Length	Format	Description
192	C0	R744CWUC	8	l_float	Write unchanged counter.

Remote Facility Data Section

One section for each duplexing coupling facility.

Offsets		Name	Length	Format	Description
0	0	R744RNDE	32	EBCDIC	Hardware node descriptor for the remotely connected CF.
32	20	R744RSYS	8	EBCDIC	System identification value for the remotely connected CF.
40	28	R744RNAM	8	EBCDIC	CF name (if applicable, else X'0').
48	30	R744RPGS	1	binary	Receiver path group size.
49	31		3		Reserved.
52	34	R744RRES	4	binary	Ready-to-execute signal counter.
56	38	R744RRCS	4	binary	Ready-to-complete signal counter.
60	3C	R744RHES	4	binary	Halt-execution signal counter.
64	40	R744RRSS	4	binary	Request-for-suppression signal counter.
68	44	R744RRSA	4	binary	Request-for-suppression-accepted signal counter.
72	48	R744RSST	4	binary	Unused. Value is now in R744RSSE.
76	4C	R744RSSS	8	binary	Total squares of signal service times.
84	54	R744RDSC	4	binary	Delayed signal counter.
88	58	R744RSDT	4	binary	Total signal delay times in microseconds.
92	5C	R744RSSD	8	binary	Total squares of signal times.
100	64	R744RSRS	4	binary	Signal-redrives signal counter.
The following field is available eight times for eight possible receiver/peer channel paths.					
104	68	R744RTAP	5	EBCDIC	Channel path type acronym. A CHPID type is provided for each active receiver/peer message path in the path group. The number of valid entries is equal to the receiver path group size.
144	90	R744RSSE	8	binary	Sum of signal service times in microseconds.
The following field is available eight times for eight possible receiver/peer channel paths.					
152	98	R744RIDP	1	binary	Channel path identifier for the receiver/peer channel path. The range of values is X'00' to X'FF'.
160	A0	R744RCPI	2	binary	Index to first channel path data section associated with this remote coupling facility.
162	A2	R744RCPN	2	binary	Number of channel path data sections for channel paths of type CIB, CFP, CL5, or CS5 connected to this remote coupling facility (CF). This includes the receiver/peer channel paths over which signals can be sent from the subject CF to this remote CF and the sender/peer channel paths returning signals from this remote CF to the subject CF. This count matches the number of subsequent channel path data sections associated with this remote CF.
164	A4	R744RSGS	1	binary	Sender path group size.
165	A5		3		Reserved
The following field is available eight times for eight possible sender/peer channel paths.					
168	A8	R744RSAP	5	EBCDIC	Channel path type acronym. A CHPID type is provided for each active sender/peer message path in the path group. The number of valid entries is equal to the sender path group size.
The following field is available eight times for eight possible sender/peer channel paths.					

Offsets		Name	Length	Format	Description
208	D0	R744RSID	1	binary	Channel path identifier for sender/peer channel path. The range of values is X'00' to X'FF'.
216	D8	R744RSC	4	binary	Number of subchannels associated with the remote CF.
220	DC	R744RAMC	4	binary	Number of asynchronous messages that are sent to this remote CF. The count includes the number of asynchronous commands that are sent and excludes path management commands and redrives of asynchronous commands.
224	E0	R744RAMST	8	binary	Total amount of service time for asynchronous messages sent to this remote CF, in microseconds.
232	E8	R744RAMSQ	8	binary	Total amount of squares of service time for asynchronous messages sent to this remote CF, in square of microseconds.
240	F0	R744RAMPB	4	binary	Asynchronous message path busy count.
244	F4	R744RAMNS	4	binary	Asynchronous message no subchannel count.

Channel path data section

One section for each channel path of type CIB, CFP, CL5, or CS5 associated with a coupling facility.

Offsets		Name	Length	Format	Description
0	0	R744HCPI	1	binary	Channel path identifier. The range of values is X'00' to X'FF'.
1	1	R744HTAP	5	EBCDIC	Channel path type acronym.
6	6	R744HFLA	4	binary	Validity bit mask. Each bit position represents the validity of a channel path attribute. **Bit** **Meaning when set** **0** Coupling adapter ID and port number are valid. **1** Channel path operation mode is valid. **2** Channel path latency time is valid. **3** Degraded status flag is valid. **4-7** The corresponding field in the array of I/O processors is valid. **8** Channel ID (CHID) is valid. **9-31** Reserved.

Offsets		Name	Length	Format	Description
10	A	R744HOPM	1	binary	Channel path operation mode. It describes the channel path type, data rate, protocol and adapter type. **Value** **Meaning** **X'01'** CFP path supporting a 1.0625 Gbit/s data rate **X'02'** CFP path supporting a 2.125 Gbit/s data rate **X'10'** CIB path operating at 1x bandwidth using the IFB protocol, adapter type HCA2-O LR **X'11'** CIB path operating at 12x bandwidth using the IFB protocol, adapter type HCA2-O **X'20'** CIB path operating at 1x bandwidth using the IFB protocol, adapter type HCA3-O LR **X'21'** CIB path operating at 12x bandwidth using the IFB protocol, adapter type HCA3-O **X'30'** CIB path operating at 12x bandwidth using the IFB3 protocol, adapter type HCA3-O **X'40'** CS5 path operating at 8x bandwidth using the PCIe third generation protocol, adapter type PCIe-O **X'50'** CL5 path supporting a 10 Gbit/s data rate using the Converged Enhanced Ethernet protocol, adapter type RoCE **Other** Unknown
11	B	R744HCHF	1	binary	Status flags. **Bit** **Meaning when set** **0** Channel path is operating at reduced capacity (degraded) or is not operating at the end of the interval. **1** Channel path is a sender channel. **2-7** Reserved.
12	C	R744HLAT	4	binary	Channel path latency time. This is the average round-trip path time in microseconds. A value of 0 means that the time was not measured. A value of 1 means a time less than or equal to one microsecond.
16	10	R744HPCP	2	binary	Physical channel ID (PCHID)
18	12	R744HAID	2	binary	Coupling adapter identifier associated with the CHPID.
20	14	R744HAPN	1	binary	Number of the port associated with the CHPID.
21	15		3		Reserved.
The following field is available four times for each I/O processor.					
24	18	R744HSAP	1	binary	I/O processor (System Assist Processor) to which this path is accessible. The range of values is X'00' to X'FF'.
28	1C		4		Reserved.

Storage Class Memory Data Section

One for each structure that is allocated with storage class memory.

Offsets		Name	Length	Format	Description
0	0	R744MSMA	8	binary	Maximum amount of storage class memory the structure can use (4K-block units).
8	8	R744MALG	1	binary	SCM algorithm type.
9	9	*	3	binary	Reserved.
12	C	R744MFAU	4	binary	Fixed augmented space (4K-block units).
16	10	*	4	binary	Reserved.
20	14	R744MIUA	4	binary	Amount of augmented space that is in use by this structure (4K-block units).
24	18	R744MIUS	8	binary	Amount of storage class memory that is in use by this structure (4K-block units).
32	20	*	4	binary	Reserved.
36	24	R744MEMA	4	binary	Estimated maximum amount of space that may be assigned as augmented space for this structure (4K-block units).
40	28	R744MEML	8	binary	Estimated maximum number of list entries that may reside in storage class memory for this structure.
48	30	R744MEME	8	binary	Estimated maximum number of list elements that may reside in storage class memory for this structure.
56	38	R744MENL	8	binary	Number of existing structure list entries that reside in storage class memory for this structure.
64	40	R744MENE	8	binary	Number of existing structure list elements that reside in storage class memory for this structure.
72	48	R744MSLT	1	binary	Percentage of the list entry and list element counts that determines the lower threshold for migration from storage class memory to CF storage.
73	49	R744MSUT	1	binary	Percentage of the list entry and list element counts that determines the upper threshold for migration from CF storage to storage class memory.
74	4A	R744MSLR	1	binary	Percentage of the list entry and list element counts that determines the lower threshold regulator for migration from CF storage class memory to CF real storage.The lower threshold regulators are used to stop migration from CF SCM into CF real storage after being triggered by the lower threshold.
75	4B	R744MSUR	1	binary	Percentage of the list entry and list element counts that determines the upper threshold regulator for migration from CF real storage to CF storage class memory. The upper threshold regulators are used to stop migration from CF real storage into CF SCM after being triggered by the upper threshold.
76	4C	R744MSWC	4	binary	SCM write count. The number of list write operations performed to storage class memory.
80	50	R744MRFC	4	binary	The number of read operations against storage class memory that were initiated by a reference to list structure objects residing in storage class memory.
84	54	R744MRPC	4	binary	The number of read operations against storage class memory that were initiated as a prefetch operation in order to retrieve list structure objects in storage class memory that are expected to be referenced.
88	58	R744MRST	8	binary	Total amount of service times for read operations from storage class memory in microseconds.
96	60	R744MRSQ	8	binary	Total amount of squares of service times for read operations from storage class memory in square-microseconds.

Offsets		Name	Length	Format	Description
104	68	R744MWST	8	binary	Total amount of service times for write operations to storage class memory in microseconds.
112	70	R744MWSQ	8	binary	Total amount of squares of service times for write operations to storage class memory in square-microseconds.
120	78	R744MRBT	8	binary	SCM read bytes transferred. This is the number of bytes in 4K units transferred from storage class memory to CF storage.
128	80	R744MWBT	8	binary	SCM write bytes transferred. This is the number of bytes in 4K units transferred from CF storage to storage class memory.
136	88	R744MAEC	4	binary	SCM auxiliary enabled command count. This is the number of commands that required the use of CF auxiliary frames.
140	8C	R744MSRL	4	binary	The number of references against storage class memory to locate list structure objects.
144	90	R744MSRR	4	binary	The number of references against storage class memory to resolve list entry key hashing.
148	94	R744MSRM	4	binary	The number of references against storage class memory for the purpose of migrating list structure objects from CF storage to storage class memory to allow the creation of new list structure objects in CF storage.
152	98	R744MMBL	4	binary	The maximum number of list entries that can be stored in a single storage class memory buffer.
156	9C	R744MMBE	4	binary	The maximum number of list elements that can be stored in a single storage class memory buffer.
160	A0	R744MNEL	4	binary	The minimum number of list elements that must be available for assignment after the specified allocation process completes.
164	A4	R744MNEC	4	binary	The minimum number of list entries that must be available for assignment after the specified allocation process completes.
168	A8	R744MSRK	4	binary	The number of references against storage class memory for the purpose of migrating list structure objects from storage class memory to CF storage to allow for key-range initialization to complete.

Asynchronous CF Duplexing Data Section

One section for each asynchronously duplexed structure in the coupling facility.

Offsets		Name	Length	Format	Description
0	0	R744AFO	8	binary	The most current failed operation sequence number.
8	8	R744AHEO	8	binary	Highest operation sequence number that can be executed and completed in the secondary CF.
16	10	R744ALAOH	8	binary	Highest sequence number of the operation that has been executed in the primary structure. (Valid if bit 4 of R744SFLG is set.)
24	18	R744ALAOSH	8	binary	Highest sequence number of the operation that has completed in the primary and has been recognized by the secondary structure.
32	20	R744ALCOH	8	binary	Highest sequence number of the operation that has completed in the secondary structure. (Valid if bit 5 of R744SFLG is set.)
40	28	R744ALCOPH	8	binary	Highest sequence number of the operation that has completed in the secondary structure and that has been recognized by the primary structure.
48	30	R744ALAO	8	binary	Number of asynchronous duplex operations that have been executed in the primary structure. (Valid if bit 4 of R744SFLG is set.)
56	38	R744ALAOS	8	binary	Number of asynchronous duplex operations that have executed in the primary and have been recognized in the secondary structure.

Offsets		Name	Length	Format	Description
64	40	R744ALCO	8	binary	Number of asynchronous duplex operations transmitted from the primary to the secondary structure that completed in the secondary structure. (Valid if bit 5 of R744SFLG is set.)
72	48	R744ALCOP	8	binary	Number of asynchronous duplex operations that have been completed both in the primary and in the secondary structure that has been recognized by the primary structure.
80	50	R744ATPOCT	8	binary	Total number of asynchronous duplex operations that have been transmitted from the primary to the secondary structure.
88	58	R744ATPOC	8	binary	Number of asynchronous duplex operations transmitted from the primary to the secondary structure in this interval.
96	60	R744ARCPOT	8	binary	Total number of asynchronous duplex operations that have completed in the secondary and have been recognized as complete to the primary structure.
104	68	R744ARCPO	8	binary	Number of asynchronous duplex operations transmitted from the primary to the secondary structure and recognized as complete to the primary structure in this interval.
112	70	R744ACQSC	8	binary	Number of stalls in the processing of the secondary operation queue.
120	78	R744APDT	8	binary	Total amount of primary delay time for asynchronous duplex operations, in microseconds. The primary delay time is the elapsed time in the primary CF between the assignment of the operation to the queue buffer and the first attempt to send the operation to the secondary CF.
128	80	R744APDQ	8	binary	Total amount of squares of primary delay time for asynchronous duplex operations, in square of microseconds.
136	88	R744AMDT	8	binary	Total amount of message delay time for asynchronous duplex operations, in microseconds. The message delay time is the elapsed time from the first attempt to send the asynchronous duplex operation in the primary CF to the time that the secondary CF assigns the asynchronous duplex operation to a secondary queue entry.
144	90	R744AMDQ	8	binary	Total amount of squares of message delay time for asynchronous duplex operations, in square of microseconds.
152	98	R744AQDT	8	binary	Total amount of secondary queue delay time for asynchronous duplex operations, in microseconds. The secondary queue delay time is the elapsed time from the time the asynchronous duplex operation is assigned to a secondary queue entry to the time of completion of the asynchronous duplex operation.
160	A0	R744AQDQ	8	binary	Total amount of squares of secondary queue delay time for asynchronous duplex operations, in square of microseconds.
168	A8	R744AQST	8	binary	Total amount of secondary queue stall time for asynchronous duplex operations, in microseconds.
176	B0	R744AQSQ	8	binary	Total amount of squares of secondary queue stall time for asynchronous duplex operations, in square of microseconds.
184	B8	R744ACDT	8	binary	Total amount of secondary reported completion delay time for asynchronous duplex operations, in microseconds. The secondary reported completion delay time is the elapsed time in the secondary CF, from the time the asynchronous duplex operation completes in the secondary to the time that the completion is reported to the primary.
192	C0	R744ACDQ	8	binary	Total amount of squares of secondary reported completion delay time for asynchronous duplex operations, in square of microseconds.
200	C8	R744ARDT	8	binary	Total amount of response delay time for asynchronous duplex operations, in microseconds. The response delay time is the elapsed time from the launch of the operation response in the secondary CF to the time that the primary CF recognizes the response.
208	D0	R744ARDQ	8	binary	Total amount of squares of response delay time for asynchronous duplex operations, in square of microseconds.
216	D8	R744AOTT	8	binary	Total amount of operation transmission time for operations sent from the primary to the secondary structure, in microseconds. (Valid if bit 5 of R744SFLG is set.)
224	E0	R744AOTQ	8	binary	Total amount of squares of operation transmission time, in square of microseconds. (Valid if bit 5 of R744SFLG is set.)

Offsets		Name	Length	Format	Description
232	E8	R744ASTT	8	binary	Total amount of service time to transfer the asynchronous duplex operations to the secondary structure and complete the operations in the secondary structure, in microseconds. (Valid if bit 5 of R744SFLG is set.)
240	F0	R744ASTQ	8	binary	Total amount of squares of service time to transfer the asynchronous duplex operations to the secondary structure and complete the operations in the secondary structure, in square of microseconds. (Valid if bit 5 of R744SFLG is set.)

Subtype 5 — Cache Subsystem Device Activity

Cache Control Section

There is one section per record.

Offsets		Name	Length	Format	Description
0	0	R745CLVL	1	binary	Gatherer level.
1	1	R745CMDL	1	binary	Caching subsystem model.
2	2	R745CCNT	1	binary	Record sequence number.
3	3	R745CUID	1	EBCDIC	Real control unit ID.
4	4	R745CSC	1	binary	Status code. **Value** **Meaning** **0** Successful processed. **4** IOS return code R745CIOC ¬= 0. **8** IDCSS01 return code R745CRTN ¬= 0. **98** SYSTEM or USER ABEND R745CEA ¬= 0.
5	5	R745CAE	3	binary	ABEND CODE (SDWACMPC): First 12 bits = System completion code. Second 12 bits = User completion code.
8	8	R745CRTN	2	binary	IDCSS01 return code. If not zero, record has no Device data sections (SMF745DN=0).
10	A	R745CIOC	1	binary	IOS return code. If not zero, record has no Device data sections (SMF745DN = 0).
11	B		1		Reserved.
12	C	R745CINT	4	binary	Number of seconds since subsystem statistics last collected.
16	10	R745CCMT	28	EBCDIC	Hardware type and model of the control unit.
44	2C		1		Reserved
45	2D	R745CFDV	3	binary	Failing device

Cache device data section

There is one section per device.

Offsets		Name	Length	Format	Description
0	0	R745DVOL	6	EBCDIC	Volume serial of device.

Offsets		Name	Length	Format	Description
6	6	R745DFL4	1	binary	Flags **Bit** **Meaning when set** **0** 4-digit device address. **1** Reserved. **2-3** Subchannel set ID: 00 = Subchannel set ID 0 01 = Subchannel set ID 1 10 = Subchannel set ID 2 11 = Subchannel set ID 3 **4-7** Reserved.
7	7	R745DCID	1	EBCDIC	Real control unit type code.
7	7	R745DCCU	1	EBCDIC	Configured control unit type code if R745CMDL = 1.
8	8	R745DUNT	3	binary	Unit address for sense command.
11	B		1		Reserved.
12	C	R745DEVN	2	binary	Device number.
14	E		2		Reserved.

16	10	R745DFLG	1	binary	Flags
					Bit
					Meaning when set
					0
					Cache storage is not available; set to 0 for DS8000.
					1-3
					Format of data returned:
					`B'000' = 3990 format`
					`B'001' = DS8000 disk controller format`
					4-7
					Format of data returned:
					`B'0000' = 3990 Models 1, 2, and 3, or Basic Operation Mode`
					`B'0001' = 3990-6 Enhanced Operation Mode 1, or host supports DS8000 disk controller format`

17	11	R745DVID	1	binary	Device address.

Offsets		Name	Length	Format	Description
18	12	R745DVS1	1	binary	Addressed device status flag # 1: **Bit** **Meaning** **0-1** Device caching status: B'00' = Caching activated. **2-3** DASD fast write device status: B'00' = DFW allowed. **4** PPRC copy pair suspended. **5** PPRC copy pair is duplex pending. **6-7** PPRC pair status: B'00' = PPRC pair available (full duplex). B'01' = PPRC pair pending. B'10' = Not used.. B'11' = Suspended.

Offsets		Name	Length	Format	Description
19	13	R745DVS2	1	binary	Addressed device status flag # 2. If R745SFT = 0: **Bit** **Meaning** **0 - 1** Pinned data: B'00' = No pinned data exists for the device. B'01' = Pinned data exists for the device. B'10' = Reserved. B'11' = Not used. **2 - 5** Not used. **6** Advanced FlashCopy enabled. **7** FlashCopy full volume enabled. If R745SFT = 1 or 2: **Bit** **Meaning** **0 - 2** Global Mirror state: B'000' = No Global Mirror configured. B'001' = Global Mirror running - optimal. B'010' = Global Mirror running - suboptimal. B'011' = Global Mirror running - consistency groups failing. B'100' = Global Mirror paused. B'101' = Global Mirror fatal. B'110' = More than one Global Mirror session is running. B'111' = Reserved. **3** Session member is pending. **4** Volume not allowed online. **5** Not used. **6** Advanced FlashCopy enabled. **7** FlashCopy full volume enabled.
20	14	R745DRCR	4	s_float	Search read caching requests.
24	18	R745DCRH	4	s_float	Search read caching hits.
28	1C	R745DWRC	4	s_float	Write caching requests.
32	20	R745DWCH	4	s_float	Write caching request hits.
36	24	R745DRSR	4	s_float	Read sequential requests.
40	28	R745DRSH	4	s_float	Read sequential request hits.
44	2C	R745DWSR	4	s_float	Write sequential requests.
48	30	R745DWSH	4	s_float	Write sequential request hits.
52	34	R745DRNR	4	s_float	Search read non-retentive requests.
56	38	R745DNRH	4	s_float	Search read non-retentive request hits.
60	3C	R745DWNR	4	s_float	Write non-retentive requests.
64	40	R745DWNH	4	s_float	Write non-retentive hits.
68	44	R745DICL	4	s_float	Inhibit cache load requests.

Offsets		Name	Length	Format	Description
72	48	R745DBCR	4	s_float	Bypass cache requests.
76	4C	R745DTC	4	s_float	Sequential DASD to cache XFRs.
80	50	R745DNTD	4	s_float	Normal cache requests DASD to cache XFRs.
84	54	R745DCTD	4	s_float	Cache to DASD XFRs.
88	58	R745DFWB	4	s_float	DASD Fast Write operations delayed due to non-volatile storage space constraints.
92	5C	R745DFWC	4	s_float	Fast write caching requests.
96	60	R745DFWS	4	s_float	Fast write sequential requests.
100	64	R745DCRM	4	s_float	Record cache read misses.
104	68	R745DSG2	1	binary	Device status group 2. **Bit** **Meaning** **0-1** Volume space management: B'00' = Standard volume B'01' = Track space efficient volume B'10' = Extent space efficient volume B'11' = Reserved. **2** Data exits in failed NVS. **3** Device in a soft fenced state. **4** Device in a SPID fenced state. **5** Volume is part of a RAID rank that is undergoing RAID rebuild. **6-7 (if R745SFT = 1 or 2)** Pinned data: B'00' = No pinned data exists for the device. B'01' = Pinned data exists for the device. B'10' = Reserved. B'11' = Not used.
105	69	R745INCR	1	binary	Status code. **0** Transfer statistics not valid. **1** Transfer statistics valid. Bytes in units of 128K. Times in units of 16 milliseconds.
106	6A	R745DSID	2	binary	Subsystem ID.
108	6C	R745DCWP	4	s_float	RCD cache write promotions.
112	70	R745DKDW	4	s_float	CKD writes, collected for 3990-03/06 and 2105.
116	74	R745DKDH	4	s_float	CKD write hits, collected for 3990-03/06 and 2105.
120	78	R745DFWR	4	s_float	Operations delayed due to cache space constraints.
124	7C	R745BYTR	4	s_float	Bytes read. See R745INCR.
128	80	R745BYTW	4	s_float	Bytes written. See R745INCR.
132	84	R745RTIR	4	s_float	Response time to read bytes. See R745INCR.
136	88	R745RTIW	4	s_float	Response time to write bytes. See R745INCR.

Cache device data section extension

There is one section per device.

This extension applies only to control unit types 3990-03/06. It is collected by RMF to provide the same data as in the corresponding CRR record.

Offsets		Name	Length	Format	Description
0	0	R745XDVN	2	binary	Device number.
2	2	R745XSCS	1	binary	Subchannel set ID.
3	3		1		Reserved.
4	4	R745XRSV	4	s_float	Lower interface I/O response time (in milliseconds).
8	8	R745XCTC	4	s_float	Not used by RMF.
12	C	R745XCTR	4	s_float	Not used by RMF.
16	10	R745XVRD	4	s_float	Not used by RMF.
20	14	R745XVRH	4	s_float	Not used by RMF.
24	18	R745XVWR	4	s_float	Not used by RMF.
28	1C	R745XVWH	4	s_float	Not used by RMF.
32	20	R745XSRR	4	s_float	Not used by RMF.
36	24	R745XFRD	4	s_float	Not used by RMF.
40	28	R745XWCC	4	s_float	Not used by RMF.
44	2C	R745XPRC	4	s_float	Not used by RMF.
48	30	R745XCT1	4	s_float	Not used by RMF.
52	34	R745XCT2	4	s_float	Not used by RMF.
56	38	R745XCT3	4	s_float	Not used by RMF.
60	3C	R745XCT4	4	s_float	Not used by RMF.
64	40	R745XCT5	4	s_float	Not used by RMF.
68	44	R745XCT6	4	s_float	Not used by RMF.
72	48	R745XCT7	4	s_float	Not used by RMF.
76	4C	R745XCT8	4	s_float	Not used by RMF.
80	50	R745XCT9	4	s_float	Not used by RMF.
84	54	R745XCTA	4	s_float	Not used by RMF.

Cache control unit status data section

There is one section per record.

Offsets		Name	Length	Format	Description
0	0	R745SVOL	6	EBCDIC	Volume serial of device.
6	6		2		Reserved.
8	8	R745SUNT	3	binary	Unit address for sense command.
11	B		1		Reserved.
12	C	R745SDEV	2	binary	Device number.
14	E	R745SLN	2	binary	Length of data section.

Offsets		Name	Length	Format	Description
16	10	R745SFT	1	binary	Status data format. **Bit** **Meaning** **0 - 3** Reserved. **4 - 7** Format of data returned: B'0000' = 40 bytes sense B'0001' = 44 bytes sense/unit KB B'0010' = 96 bytes sense/unit KB
17	11	R745SDID	1	binary	Device ID.
18	12	R745SNAD	1	binary	Number of attached devices.
19	13	R745SNSS	1	binary	Number of statistic sets.
20	14	R745SCS	1	binary	Caching status. **Bit** **Meaning** **0-2** Overall caching status: B'000' = Caching active. B'001' = Reserved. B'010' = Subsystem error. B'011' - B'111' = Reserved. **3** Reserved. **4** The storage facility is running as a single cluster. **5** Must be zero. **6** Reserved. **7** Non-retentive deactivated.
21	15	R745SVSS	1	binary	Non-volatile storage status. **Bit** **Meaning** **0** Host termination. **1** Problem termination. **2** DFW inhibited. **3** Disabled for maintenance. **4** Pending due to problem. **5-7** Reserved.
22	16	R745SCLN	2	binary	Length of subsystem count area.
24	18	R745SCSF	2	binary	State of Copy Services function.
26	1A	R745SCNF	4	binary	Configured subsystem storage: • In bytes, if R745SFT = 0 • In kilobytes (KB), if R745SFT = 1 or 2

Offsets		Name	Length	Format	Description
30	1E	R745SAVL	4	binary	Available subsystem storage: • In bytes, if R745SFT = 0 • In kilobytes (KB), if R745SFT = 1 or 2
34	22	R745SPIN	4	binary	Pinned subsystem storage: • In bytes, if R745SFT = 0 • In kilobytes (KB), if R745SFT = 1 or 2
38	26	R745SOFF	4	binary	Offline subsystem storage: • In bytes, if R745SFT = 0 • In kilobytes (KB), if R745SFT = 1 or 2
42	2A	R745SDS1	1	binary	Addressed device status 1. **Bit** **Meaning** **0-1** Device caching status: B'00' = Caching activated. **2-3** DASD fast write status: B'00' = DFW allowed. **4** PPRC copy pair is suspended. **5** PPRC copy pair is duplex pending. **6-7** Duplex pair status: B'00' = PPRC pair available (full duplex). B'01' = PPRC pair pending. B'10' = Not used. B'11' = Suspended.

Offsets		Name	Length	Format	Description
43	2B	R745SDS2	1	binary	Addressed device status 2. If R745SFT = 0: **Bit** **Meaning** **0 - 1** Pinned data: B'00' = No pinned data exists for the device. B'01' = Pinned data exists for the device. B'10' = Reserved. B'11' = Not used. **2 - 5** Not used. **6** Advanced FlashCopy enabled. **7** FlashCopy volume enabled. If R745SFT = 1 or 2: **Bit** **Meaning** **0 - 2** Global Mirror state: B'000' = No Global Mirror configured. B'001' = Global Mirror running - optimal. B'010' = Global Mirror running - suboptimal. B'011' = Global Mirror running - consistency groups failing. B'100' = Global Mirror paused. B'101' = Global Mirror fatal. B'110' = More than one Global Mirror session is running. B'111' = Reserved. **3** Session member is pending. **4** Volume not allowed online. **5** Reserved. **6** Advanced FlashCopy enabled. **7** FlashCopy volume enabled.
44	2C	R745SCNV	4	binary	Configured non-volatile cache: • In bytes, if R745SFT = 0 • In kilobytes (KB), if R745SFT = 1 or 2
48	30	R745SPND	4	binary	Pinned non-volatile cache: • In bytes, if R745SFT = 0 • In kilobytes (KB), if R745SFT = 1 or 2

Offsets		Name	Length	Format	Description
52	34	R745SG2	1	binary	Device status group 2. **Bit** **Meaning** **0-1** Volume space management: B'00' = Standard volume B'01' = Track space efficient volume B'10' = Extent space efficient volume B'11' = Reserved **2** Data exists on failed NVS. **3** Device is in a soft fenced state. **4** Device is in a SPID fenced state. **5** Volume is part of a RAID rank that is undergoing RAID rebuild. **6-7 (if R745SFT = 1 or 2)** Pinned data: B'00' = No pinned data exists for the device. B'01' = Pinned data exists for the device. B'10' = Reserved. B'11' = Not used.
53	35	R745SGL	1	binary	Global status. **Bit** **Meaning** **0** CFW and DFW suspended. **1-7** Reserved.
54	36	R745SSID	2	binary	Subsystem ID.
56	38		1		Reserved.
57	39		1		Reserved.
58	3A		1		Reserved.
59	3B		1		Reserved.
60	3C		12		Reserved.

RAID Rank/Extent Pool Data Section

There is one section per device.

Offsets		Name	Length	Format	Description
0	0	R7451DVN	2	binary	Device number (binary).

Offsets		Name	Length	Format	Description
2	2	R7451INC	1	binary	Flag **Bit** **Meaning when set** **0-2** Reserved. **3** Synchronous I/O cache data are valid. **4** zHPF read and write I/O requests R7451CT5 and R7451CT6 are available. **5-6** Measurement units: • B'00' = Bytes in units of 128K, and times in units of 16 milliseconds. • B'01', B'10', B'11' = Reserved. **7** Transfer statistics R7451XFR are valid.
3	3	R7451SCS	1	binary	Subchannel set ID.
4	4	R7451RSV	4	s_float	Lower interface I/O response time (in milliseconds).
8	8	R7451FLG	1	binary	Flag. **Value** **Meaning** **0** No additional information **1** RAID rank data. **2** Extent pool and physical storage data.
9	9	R7451AID	1	binary	Device adapter ID. Only valid with RAID rank data.
10	A	R7451RID(2)	2	binary	RAID rank ID.
10	A	R7451XID(3)	2	binary	Extent pool ID.
12	C	R7451HDD(1)(2)	1	binary	Number of HDDs in RAID rank.
12	C	R7452XTY(3)	1	binary	Extent type: **Value** **Meaning** **X'04'** FB 1Gb **X'84'** CKD 1Gb
13	D	R7451RTY(2)	1	binary	RAID rank type. **Value** **Type** **0** RAID-5 **1** JBOD **2** RAID-10

Offsets		Name	Length	Format	Description
13	D	R7452XFL(3)	1	binary	Extent pool flag: **Bit** **Meaning when set** **0** Dynamic extent allocation **1** Data sharing **2** Migrating/migration state **3-7** Reserved.
14	E	R7451HSS(1)	2	binary	HDD sector size.
16	10	R7451RRQ(1)(2)	4	s_float	RAID rank read requests.
16	10	R7452PRO(3)	4	s_float	Physical storage read operations.
20	14	R7451WRQ(1)(2)	4	s_float	RAID rank write requests.
20	14	R7452PWO(3)	4	s_float	Physical storage write operations.
24	18	R7451SR(1)(2)	4	s_float	RAID rank FB sectors read.
24	18	R7452PBR(3)	4	s_float	Physical storage bytes read. For units, see bits 5 and 6 of R7451INC.
28	1C	R7451SW(1)(2)	4	s_float	RAID rank FB sectors written.
28	1C	R7452PBW(3)	4	s_float	Physical storage bytes written. For units, see bits 5 and 6 of R7451INC.
32	20	R7451RMR	4	s_float	Record mode read request.
36	24	R7451XSF	4	s_float	Extended-Remote-Copy(XRC) or Concurrent-Copy(CC) sidefile read request.
40	28	R7451XCW	4	s_float	XRC or CC contaminated writes.
44	2C	R7451TSP	4	s_float	Number of tracks transferred to secondary Peer-to-Peer-Remote-Copy(PPRC) volume.
48	30	R7451NVS	4	s_float	NVS space allocation.
52	34	R7451RRT(1)(2)	4	s_float	RAID rank read response time (in milliseconds).
52	34	R7452PRT(3)	4	s_float	Physical storage read response time. For units, see bits 5 and 6 of R7451INC.
56	38	R7451WRT(1)(2)	4	s_float	RAID rank write response time (in milliseconds).
56	38	R7452PWT(3)	4	s_float	Physical storage write response time. For units, see bits 5 and 6 of R7451INC.
60	3C	R7451CT1	4	s_float	Bytes read. For units, see bits 5 and 6 of R7451INC.
64	40	R7451CT2	4	s_float	Bytes written. For units, see bits 5 and 6 of R7451INC.
68	44	R7451CT3	4	s_float	Read response time. For units, see bits 5 and 6 of R7451INC.
72	48	R7451CT4	4	s_float	Write response time. For units, see bits 5 and 6 of R7451INC.
76	4C	R7451CT5	4	s_float	Number of zHPF read I/O requests (valid if bit 4 in R7451INC is set).
80	50	R7451CT6	4	s_float	Number of zHPF write I/O requests (valid if bit 4 in R7451INC is set).
84	54	*	4	CHAR	Reserved.
88	58	R7451ZHL	4	s_float	zHPF List Pre-fetch I/O Requests. Number of command chains, where the Transport Mode operation specified a non-zero Imbedded Locate Record Count.

Offsets		Name	Length	Format	Description
92	5C	R7451ZHH	4	s_float	zHPF List Pre-fetch I/O Request Hits. Number of command chains, where • the Transport Mode operation specified a non-zero Imbedded Locate Record Count. • the chain was completed without requiring access to any DDM.
96	60	R7451GSF	4	s_float	Global Mirror Collisions sidefile count. A GMC occurs when, during the sending of data in the secondary to create a consistency group, a subsequent host update is attempted before the modified track has been transmitted to the secondary volume. The modified track will be moved to the sidefile before allowing a new host write. The counter will be incremented by one when a track is added to the sidefile.
100	64	R7451GSS	4	s_float	Global Mirror Collisions synchronous count. When a write collision occurs, the modified track data which belongs to the current consistency group may be sent to the remote control unit before allowing the write. The data may come from the sidefile if it is full or from cache if the collision sidefile is not being utilized.
104	68	R7451SRR	4	s_float	Number of synchronous I/O cache read requests. (Valid if bit 3 of R7451INC is set.)
108	6C	R7451SRH	4	s_float	Number of synchronous I/O cache read request hits. (Valid if bit 3 of R7451INC is set.)
112	70	R7451SWR	4	s_float	Number of synchronous I/O cache write requests. (Valid if bit 3 of R7451INC is set.)
116	74	R7451SWH	4	s_float	Number of synchronous I/O cache write request hits. (Valid if bit 3 of R7451INC is set.)
120	78		16		Reserved.

Note:

1. The information in this field is available only for one device belonging to the rank, as indicated by flag R7451FLG.
2. This field is valid if R7451FLG is set to 1.
3. This field is valid if R7451FLG is set to 2.

Subtype 6 — Hierarchical File System Statistics

HFS Global Data Section

Offsets		Name	Length	Format	Description
0	0	R746GMXV	4	binary	Value of VIRTUAL(MAX) (in MB).
4	4	R746GUSV	4	binary	Total amount (in pages) of virtual storage in use.
8	8	R746GMNF	4	binary	Value of FIXED(MIN) (in MB).
12	C	R746GUSF	4	binary	Total amount (in pages) of permanently fixed storage in use.
16	10	R746GMC	8	l_float	Number of times the metadata for a file was found in virtual storage (cache) during file lookup.
24	18	R746GMNC	8	l_float	Number of times the metadata for a file was not found in virtual storage (cache) during file lookup and an index call was necessary which may result in an I/O.
32	20	R746G1C	8	l_float	Number of times the first page of a data file was requested and found in virtual storage (cache).
40	28	R746G1NC	8	l_float	Number of times the first page of a data file was requested and not found in virtual storage (cache) and an I/O was necessary.
48	30	R746GLRC	4	binary	Return code from OMVS BPX1PCT for DisplayBufferLimits command.

Offsets		Name	Length	Format	Description
52	34	R746GLRS	4	binary	Reason code from OMVS BPX1PCT for DisplayBufferLimits command.
56	38	R746GSRC	4	binary	Return code from OMVS BPX1PCT for DisplayGlobalStats command.
60	3C	R746GSRS	4	binary	Reason code from OMVS BPX1PCT for DisplayGlobalStats command.
64	40	R746GSFL	1	binary	Status flags. **Bit** **Meaning when set** **0** OMVS kernel not ready **1** No buffer limit data **2** No global data **3** Partial global data **4-7** Reserved.
65	41		7		Reserved.

HFS Global Buffer Section

Offsets		Name	Length	Format	Description
0	0	R746GSB	2	binary	Size of buffers in buffer pool (in pages).
2	2	R746GNDS	2	binary	Number of data spaces for buffer pool.
4	4	R746GSBP	4	binary	Size of buffer pool (in pages).
8	8	R746GSBF	4	binary	Size of permanently fixed buffers in buffer pool (in pages).
12	C		4		Reserved.
16	10	R746GBF	8	l_float	Number of times a buffer was already fixed prior to an I/O request in buffer pool.
24	18	R746GBNF	8	l_float	Number of times a buffer was not already fixed prior to an I/O request in buffer pool.

HFS File System Section

Offsets		Name	Length	Format	Description
0	0	R746FSNM	44	EBCDIC	File system name (cataloged dataset name).
44	2C	R746FSNL	1	binary	Length of file system name.
45	2D	R746FSFL	1	binary	Status flags. **Bit** **Meaning when set** **0** No HFS file system statistics. **1** Mount time changed. **2** File system now mounted. **3-7** Reserved.
46	2E		2		Reserved.

Offsets		Name	Length	Format	Description
48	30	R746FCTM	8	EBCDIC	Current time stamp (when was data obtained).
56	38	R746FMTM	8	EBCDIC	Mount time stamp.
64	40	R746FSF	4	binary	Size of file system (in pages).
68	44	R746FPF	4	binary	Number of pages internally used by HFS.
72	48	R746FPD	4	binary	Number of pages used for the attribute directory.
76	4C	R746FPC	4	binary	Number of data buffer pages cached by this file system.
80	50	R746FSFI	8	l_float	Number of sequential file data I/O requests issued.
88	58	R746FRFI	8	l_float	Number of random file data I/O requests issued.
96	60	R746FMC	8	l_float	Number of times the metadata for a file was found in virtual storage (cache) during file lookup.
104	68	R746FMNC	8	l_float	Number of times the metadata for a file was not found in virtual storage (cache) during file lookup and an index call was necessary which may result in an I/O.
112	70	R746F1C	8	l_float	Number of times the first page of a data file was requested and found in virtual storage (cache).
120	78	R746F1NC	8	l_float	Number of times the first page of a data file was requested and not found in virtual storage (cache) and an I/O was necessary.
128	80	R746FINT	8	l_float	Number of index new tops.
136	88	R746FIS	8	l_float	Number of index splits.
144	90	R746FIJ	8	l_float	Number of index joins.
152	98	R746FIRH	8	l_float	Number of index page read hits.
160	A0	R746FIRM	8	l_float	Number of index page read misses.
168	A8	R746FIWH	8	l_float	Number of index page write hits.
176	B0	R746FIWM	8	l_float	Number of index page write misses.
184	B8	R746FSRC	4	binary	Return code from OMVS BPX1PCT for DisplayFSStats command.
188	BC	R746FSRS	4	binary	Reason code from OMVS BPX1PCT for DisplayFSStats command.

Subtype 7 — FICON Director Statistics

FCD Global Data Section

Offsets		Name	Length	Format	Description
0	0	R747GCFL	1	binary	Configuration change flags. **Bit** **Meaning when set** **0** Configuration changed during interval. **1** Configuration changed since IPL. **2** System IPLed by way of IODF. **3** I/O configuration token is valid. **4-7** Reserved.
1	1		1		Reserved.
2	2	R747GNFD	2	binary	Number of installed FCD switches.

Offsets		Name	Length	Format	Description
4	4	R747GINM	44	EBCDIC	IODF name.
48	30	R747GISF	2	EBCDIC	Suffix of IODF name.
50	32	R747GICI	18	EBCDIC	IODF creation information.
50	32	R747GICD	10	EBCDIC	IODF creation date (mm/dd/yyyy).
60	3C	R747GICT	8	EBCDIC	IODF creation time (hh.mm.ss).
68	44		12		Reserved.

FCD Switch Data Section

Offsets		Name	Length	Format	Description
0	0	R747SDEV	2	binary	Switch device number.
2	2	R747SLSN	1	binary	Logical switch number.
3	3	R747SPFL	1	binary	Switch processing flags. **Bit** **Meaning when set** **0** Status of switch has changed. **1** Number of ports has changed. **2** Switch is offline. **3** Switch is now online. **4** Cascaded switch. **5-7** Reserved.
4	4	R747SND	32	EBCDIC	ND associated with switch device.
36	24	R747SNSP	2	binary	Number of supported ports for this switch.
38	26	R747SNIP	2	binary	Number of installed ports for this switch.
40	28		8		Reserved.

FCD Port Data Section

Offsets		Name	Length	Format	Description
0	0	R747PNUM	1	EBCDIC	Port number.
1	1	R747PADR	1	EBCDIC	Port address.
2	2	R747PTFL	1	binary	Port type flags. **Bit** **Meaning when set** **0** Port type is single CU. **1** Port type is multiple CU. **2** Port type is CHPID. **3** Port type is switch. **4-7** Reserved.

Offsets		Name	Length	Format	Description
3	3	R747PSFL	1	binary	Status flags. **Bit** **Meaning when set** **0** Port type is not unique. **1** ID is not unique or not known. **2** Channel on caller's system. **3** Port installed. **4** Port status changed. **5** Port has been removed. **6** Port has been activated. **7** No measurement data available for this port.
4	4	R747PCU	2	binary	Connector id (CU) or channel path. **Note:** In case of a channel path, the CHPID can also be addressed as a one-byte field R747PCP at offset 5.
6	6	R747PCUN	1	binary	Number of connector CUs.
7	7	R747PNPC	1	binary	Number of Connector sections.
8	8	R747PXPC	2	binary	Index of first Connector section.
10	A	R747PPFL	1	binary	Port flags. **Bit** **Meaning when set** **0** Port information was returned at least once for this port. **1** Port information showed this port not installed. **2** Port information showed link failure condition. **3** Port information showed this port offline. **4** Statistics were returned at least once for this port. **5-7** Reserved.
11	B		5		Reserved.
16	10	R747PFPT	8	l_float	Frame pacing time (in units of 2.5 microseconds).
24	18	R747PNWR	8	l_float	Number of words received.
32	20	R747PNWT	8	l_float	Number of words transmitted.
40	28	R747PNFR	8	l_float	Number of frames received.
48	30	R747PNFT	8	l_float	Number of frames transmitted.
56	38	R747PNER	8	l_float	Number of errors.
64	40		8		Reserved.
72	48	R747PAND	32	EBCDIC	Node descriptor of attached unit.

FCD Connector Data Section

Offsets		Name	Length	Format	Description
0	0	R747CNUM	1	EBCDIC	Port number.
1	1	R747CADR	1	EBCDIC	Port address.
2	2	R747CTFL	1	binary	Port type flags. **Bit** **Meaning when set** **0** Port type is single CU. **1** Port type is multiple CU. **2** Port type is CHPID. **3** Port type is switch. **4-7** Reserved.
3	3	R747CSFL	1	binary	Status flags. **Bit** **Meaning when set** **0** Port type is not unique. **1** ID is not unique or not known. **2** Channel on caller's system. **3** Port installed. **4** Port status changed. **5** Port has been removed. **6** Port has been activated. **7** No measurement data available for this port.
4	4	R747CCU	2	binary	Connector id (CU).
6	6	R747CCUN	1	binary	Number of connector CUs.
7	7		1		Reserved.

Subtype 8 — Enterprise Disk System Statistics

Control Data Section

There is one section per record.

Offsets		Name	Length	Format	Description
0	0	R748CLVL	1	binary	Gatherer level.
1	1	R748CTYP	6	EBCDIC	Control unit type.
7	7	R748CMDL	3	EBCDIC	Control unit model.
10	A	R748CSER	10	EBCDIC	Primary control unit serial number.

Offsets		Name	Length	Format	Description
20	14	R748CVSN	1	binary	Version of link statistics definition: X'00' = Original version of link statistics X'01' = Link statistics extended
21	15	R748CAE	3	binary	Abend code (SDWACMPC) with: First 12 bits = System completion code. Second 12 bits = User completion code.
24	18	R748CRTN	2	binary	IDCSS01 return code.
26	1A	R748CSC	1	binary	Status code: **00** successfully processed. **04** IOS return code. R748CIOC ¬= 0. **08** IDCSS01 return code. R748CRTN ¬= 0. **98** SYSTEM or USER ABEND. R748CAE ¬= 0.
27	1B	R748CIOC	1	binary	IOS return code. If this field is not zero, no Link Statistic sections are available.
28	1C	R748CFDV	2	binary	Failing device.
30	1E	R748CVOL	6	EBCDIC	Volume serial of the device from which statistics are measured.
36	24	R748CDEV	2	binary	Device number of the device from which statistics are measured.
38	26	R748CFLG	1	binary	Flags **Bit** **Meaning when set** **0** Extent pool statistics valid **1-7** Reserved.
39	27	R748CSCS	1	binary	ID of the subchannel set which is physically configured to the device from which statistics are measured.
40	28	R748CINT	4	binary	Number of seconds that passed since the link statistics have been collected for the last time.
44	2C	R748CFTM	4	EBCDIC	Time when first record was written. Reserved for duration processing.
48	30	R748CFDT	4	EBCDIC	Date when first record was written. Reserved for duration processing.
52	34	R748CFCI	4	EBCDIC	Interval length of first record. Reserved for duration processing.
56	38	R748CFSC	1	binary	Subchannel set ID of failing device.
57	39		3		Reserved.

Link Statistics Section

There is one section per adapter.

Offsets		Name	Length	Format	Description
0	0	R748LAID	2	binary	Adapter ID.

Offsets		Name	Length	Format	Description
2	2	R748LTYP	1	binary	Link Type: **1** ESCON **2** Fibre Channel 1 Gbit/s **3** Fibre Channel 2 Gbit/s **4** Fibre Channel 4 Gbit/s **5** Fibre Channel 8 Gbit/s **6** Fibre Channel 16 Gbit/s **10** Ethernet Channel 10 Gbit/s
3	3	R748LFLG	1	binary	Flags. **Bit** **Meaning when set** **0** Units of bytes indeterminable. Byte values incorrect. **1** Units of time indeterminable. Time values incorrect.
4	4		4		Reserved.
8	8	R748LERB	8	l_float	ECKD read activity in units of 128KB.
16	10	R748LEWB	8	l_float	ECKD write activity in units of 128KB.
24	18	R748LERO	8	l_float	Number of ECKD read operations. For ESCON ports, one count is added per chain which transfers customer data (no administration data) to the host. For FICON ports, one count is added per command which transfers customer data to the host.
32	20	R748LEWO	8	l_float	Number of ECKD write operations. For ESCON ports, one count is added per chain which transfers customer data (no administration data) from the host. For FICON ports, one count is added per command which transfers customer data from the host.
40	28	R748LERT	8	l_float	Accumulated time for ECKD read activity on the channel in milliseconds. The active processing time for each command is accumulated.
48	30	R748LEWT	8	l_float	Accumulated time for ECKD write activity on the channel in milliseconds. The active processing time for each command is accumulated.
56	38	R748LPSB	8	l_float	PPRC send activity in units of 128KB.
64	40	R748LPRB	8	l_float	PPRC received activity in units of 128KB.
72	48	R748LPSO	8	l_float	PPRC send operations. Each PPRC write command sent by the PPRC primary is counted.
80	50	R748LPRO	8	l_float	PPRC received operations. Each PPRC write command received by the PPRC secondary is counted.
88	58	R748LPST	8	l_float	Accumulated time for PPRC send activity in milliseconds.
96	60	R748LPRT	8	l_float	Accumulated time for PPRC received activity in milliseconds.
104	68	R748LSRB	8	l_float	SCSI read activity in units of 128KB.
112	70	R748LSWB	8	l_float	SCSI write activity in units of 128KB.
120	78	R748LSRO	8	l_float	SCSI read operations. Each read operation is counted.
128	80	R748LSWO	8	l_float	SCSI write operations. Each write operation is counted.

Offsets		Name	Length	Format	Description
136	88	R748LSRT	8	l_float	Accumulated time for SCSI read operations on the channel in milliseconds.
144	90	R748LSWT	8	l_float	Accumulated time for SCSI write operations on the channel in milliseconds.
152	98	R748LFLF	4	s_float	Fibre channel link failures. Number of times the port lost meaningful communication on the link. This can cause I/O failures.
156	9C	R748LFLY	4	s_float	Fibre channel synchronization failures. Number of times the fibre channel signal lost synchronization.
160	A0	R748LFLS	4	s_float	Fibre channel signal failures. Number of times the fibre channel signal was lost.
164	A4	R748LFPQ	4	s_float	Number of fibre channel primitive sequence errors. Such errors can occur during loss of synchronization, loss of signal, or during a link failure.
168	A8	R748LFIT	4	s_float	Fibre channel invalid transmission word errors. Number of bit errors, which can lead to a loss of synchronization and/or to lost fibre channel traffic.
172	AC	R748LFCR	4	s_float	Fibre channel Cyclic Redundancy Check (CRC) errors. Number of fibre channel frames lost due to CRC errors. This causes an I/O abort or timeout.
176	B0	R748LFR1	4	s_float	Fibre channel link recovery (LR) sent. Number of times the ESS port reset the link due to a timeout on fibre channel buffer-to-buffer credit to send a frame. Such errors can cause timeouts or aborts or queued I/O frames to be lost.
180	B4	R748LFR2	4	s_float	Fibre channel link recovery (LR) received. Number of times the attached port reset the link due to a timeout on fibre channel buffer-to-buffer credit to send a frame. Such errors can cause timeouts or aborts or queued I/O frames to be lost.
184	B8	R748LFIF	4	s_float	Fibre channel illegal frame errors. Number of frames that violated the Fibre channel protocol. The most common cause is a missing frame. Another example is an invalid frame header. Illegal frames will cause I/O aborts or timeouts.
188	BC	R748LFOD	4	s_float	Fibre channel out of order data errors. Number of times that an out of order frame is detected. The most common cause is a missing frame. Such errors will cause I/O aborts or timeouts.
192	C0	R748LFOA	4	s_float	Fibre channel out of order ACK errors. Number of ACK frames identified as out of order. The most common cause is a missing frame. Such errors are not expected during I/O, since I/O does not use ACK.
196	C4	R748LFDF	4	s_float	Fibre channel duplicate frame errors. Number of times a duplicate frame was received. Such errors will cause I/O aborts or timeouts.
200	C8	R748LFIO	4	s_float	Fibre channel invalid relative offset failures. Number of frames that were received with an invalid relative offset field in the frame header. Such errors will cause I/O aborts or timeouts.
204	CC	R748LFTC	4	s_float	Fibre channel sequence timeout errors. Number of times the ESS port has detected a timeout on a receiving sequence initiative for a fibre channel exchange.
208	D0	R748LFBC	4	binary	Fibre channel bit error rate. A non-zero rate means that bit errors have occurred on the link within the last five minutes. This is not an accumulated error rate, but a snapshot of the last five minute interval.

Extent Pool Statistics Section

There is one section per extent pool.

Offsets		Name	Length	Format	Description
0	0	R748XPID	2	binary	Extent pool identifier.
2	2	R748XPLT	1	binary	Extent type: **Value** **Meaning** **0-3** Reserved **4** FIBER 1Gb **5-131** Reserved **132** CKD 1Gb **133-255** Reserved.
3	3	R748XPTQ	1	binary	Extent pool type qualifier: **Bit** **Meaning when set** **0** Data encrypted extent pool **1-7** Reserved.
4	4	R748XRCP	4	binary	Real extent pool capacity in GB.
8	8	R748XRNS	4	binary	Number of real extents in extent pool.
12	C	R748XRNA	4	binary	Number of allocated real extents in extent pool.
16	10	R748XRSC	4	binary	Real extent conversions. Valid if bit 0 of R748CFLG is set.
20	14	R748XVCP	4	binary	Virtual extent pool capacity in GB. Valid if bit 0 of R748CFLG is set.
24	18	R748XVNS	4	binary	Number of virtual extents in extent pool. Valid if bit 0 of R748CFLG is set.
28	1C	R748XVSC	4	binary	Virtual extent conversions. Valid if bit 0 of R748CFLG is set.
32	20	R748XSDY	4	binary	Number of extents that were sources of dynamic extent relocations. Valid if bit 0 of R748CFLG is set.
36	24	R748XTDY	4	binary	Number of extents that were targets of dynamic extent relocations. Valid if bit 0 of R748CFLG is set.

Rank Statistics Section

There is one section per rank in an extent pool.

Offsets		Name	Length	Format	Description
0	0	R748RRID	2	binary	Rank identifier.
2	2	R748RPNM	2	binary	Extent pool number.
4	4	R748RCNT	2	binary	Count of arrays in rank.
6	6	R748RAIX	2	binary	Index to first Array section of rank.
8	8	R748RBYR	8	l_float	Rank 128 KB read.
16	10	R748RBYW	8	l_float	Rank 128 KB write.
24	18	R748RROP	8	l_float	Rank read operations.
32	20	R748RWOP	8	l_float	Rank write operations.
40	28	R748RKRT	8	l_float	Rank read response time in units of 16 milliseconds.
48	30	R748RKWT	8	l_float	Rank write response time in units of 16 milliseconds.

Offsets		Name	Length	Format	Description
56	38	R748RTQ	1	binary	Rank type qualifier: **Bit** **Meaning when set** **0** Data encrypted rank **1-6** Reserved **7** Rank adapter pair ID valid
57	39		1		Reserved
58	3A	R748RAI	2	Character	Rank adapter pair ID
60	3C		4		Reserved

Rank Array Data Section

There is one section per rank in an extent pool.

Offsets		Name	Length	Format	Description
0	0	R748AAID	2	binary	Rank array identifier.
2	2	R748ARID	2	binary	Rank identifier.
4	4	R748AEBC	16	EBCDIC	Description of array type, for example: RAID-10.
20	14	R748ATYP	1	binary	Array type: **Value** **Meaning** **1** RAID-5 **2** RAID-10 **3** RAID-6
21	15	R748AASP	1	binary	Array speed in 1000 RPM.
22	16	R748AAWD	2	binary	Array width.
24	18	R748AACP	4	binary	Array capacity in GB.
28	1C	R748AAST	1	binary	Array device class and array status **Bit** **Meaning when set** **0-1** Device class B'00' = Enterprise drive B'01' = Near-line drive B'10' = SATA drive B'11' = Solid state drive **2** Raid degraded **3** DDM throttling **4** RPM exception **5-7** Reserved.

Synchronous I/O Link Statistics Section

There is one section per synchronous I/O link.

Offsets		Name	Length	Format	Description
0	0	R748SIID	2	binary	Synchronous I/O link (IBM zHyperLink) interface ID.
2	2	R748STYP	1	binary	Synchronous I/O link type. **Value** **Meaning** **00** Not used **01** Optical PCIe **02-FF** Not used
3	3	R748SSPD	1	binary	Synchronous I/O link speed. **Value** **Meaning** **00** Not used **01** PCIe Gen 1 **02** PCIe Gen 2 **03** PCIe Gen 3 **04** PCIe Gen 4 **05-FF** Not used
4	4	R748SWDH	1	binary	Synchronous I/O link width. This number is the number of PCIe lanes.
5	5	R748SSTE	1	binary	Synchronous I/O link state. **Value** **Meaning** **00** Not used **01** Link not Trained **02** Link handshake incomplete **03** Link handshake complete and link operational **04** Link in service mode (i.e. link quiesced) **05-FF** Not used
6	6	R748SFLG	1	binary	Flags. **Bit** **Meaning when set** **0** Unit of bytes indeterminable. Byte values incorrect. **1** Unit of time indeterminable. Time values incorrect.
7	7		1		Reserved.

Offsets		Name	Length	Format	Description
8	8	R748SCBR	8	l_float	Synchronous I/O cache bytes read in units of 128K bytes.
16	10	R748SCRO	8	l_float	Total number of synchronous I/O cache read operations.
24	18	R748SCRS	8	l_float	Number of successful synchronous I/O cache read operations.
32	20	R748SCRT	8	l_float	Synchronous I/O cache read accumulated time in milliseconds.
40	28	R748SCBW	8	l_float	Synchronous I/O cache bytes written in units of 128K bytes.
48	30	R748SCWO	8	l_float	Total number of synchronous I/O cache write operations.
56	38	R748SCWS	8	l_float	Number of successful synchronous I/O cache write operations.
64	40	R748SCWT	8	l_float	Synchronous I/O cache write accumulated time in milliseconds.
72	48	R748SNBW	8	l_float	NVS bytes written in units of 128K bytes.
80	50	R748SNWO	8	l_float	Total number of NVS write operations.
88	58	R748SNWS	8	l_float	Number of successful NVS write operations.
96	60	R748SNWT	8	l_float	NVS write accumulated time in milliseconds.

Subtype 9 — PCI Express Based Function Activity

This record subtype is written by the RMF Monitor III data gatherer for all PCI Express based functions that were allocated by an address space for a period of time within the RMF reporting interval.

PCIE function data section

RMF produces one PCIE Function data section for each PCIE function for which at least one of the following conditions are met:

- The PCIE function is allocated by a z/OS address space at the end of the reporting interval.
- The PCIE function is in the process of being deallocated from a z/OS address space at the end of the reporting interval.
- The PCIE function has been de-allocated from a z/OS address space during the reporting interval.
- The PCIE function has been in error during the reporting interval but there is performance data available.

There are one or more sections per PCIE function.

Offsets		Name	Length	Format	Description
0	0	R749PFID	4	binary	PCIE Function ID (PFID) for the PCIE function for which performance data is returned.
4	4	R749PFFL	2	binary	PFID function status merged over all MINTIME intervals for this reporting interval. **Bit** **Meaning when set** **0** PFID was allocated during this interval. **1** PFID was in status *De-Allocate-Pending* during this interval. **2** PFID was in error during this interval. **3-15** Reserved.

Offsets		Name	Length	Format	Description
6	6	R749PFF1	2	binary	Final PFID function status at the end of this reporting interval. **Bit** **Meaning when set** **0** PFID is de-allocated at the end of this interval. **1** PFID is re-allocated at the end of this interval. **2-15** Reserved.
8	8	R749ERRT	4	binary	Time in milliseconds for which no valid data was reported for the PCIE function within this reporting interval.
12	C	R749DEVT	4	binary	Device type for the PCIE function.
16	10	R749DEVN	24	EBCDIC	Device name for the PCIE function.
40	28	R749JOBN	8	EBCDIC	Job name of owner who allocated the PCIE function.
48	30	R749ASID	2	binary	Address space ID of owner who allocated the PCIE function.
50	32	R749PCID	2	binary	Physical or virtual channel identifier for the PCIE function.
52	34	R749ATST	8	binary	Timestamp in STCK format, showing the last point in time when a PCIE function was allocated.
60	3C	R749ALLT	4	binary	Time in milliseconds for which the PCIE function was allocated or was in status *De-Allocate-Pending*.
64	40		4		Reserved.
68	44	R749SCNT	4	binary	Sequence number for the last time the PCI operations counters or DMA read/write counters have been updated by the firmware.
72	48	R749LOOP	8	binary	Count of PCI Load operations for the PCIE function. Only valid, if bit 2 of R749FLAG is not set.
80	50	R749STOP	8	binary	Count of PCI Store operations for the PCIE function. Only valid, if bit 2 of R749FLAG is not set.
88	58	R749SBOP	8	binary	Count of PCI Store Block operations for the PCIE function. Only valid, if bit 2 of R749FLAG is not set.
96	60	R749RFOP	8	binary	Count of PCI Refresh Translation operations for the PCIE function. Only valid, if bit 2 of R749FLAG is not set.
104	68	R749DMAO	2	binary	The PCIE Function Type data blocks for all PCIE functions are grouped together in the record. To get to the PCIE Function Type data block associated with this PCIE Function data section, skip over the number of PCIE Function Type data blocks specified by this field, starting at the first PCIE Function Type data block in the record.
106	6A	R749DMAN	2	binary	Count of PCIE Function Type data blocks allocated for this PCIE function data section.

Offsets		Name	Length	Format	Description
108	6C	R749FPFO	2	binary	The data blocks for all hardware accelerators are grouped together in the record. To get to the hardware accelerator data block associated with this PCIE Function data section, skip over the number of hardware accelerator data blocks specified by this field, starting at the first hardware accelerator block in the record.
110	6E	R749FPFN	2	binary	Count of hardware accelerator data blocks allocated for this PCIE Function data section.
112	70	R749FP1O	2	binary	The data blocks for all hardware accelerators used for compression acceleration are grouped together in the record. To get to the hardware accelerator compression data block associated with this PCIE Function data section, skip over the number of hardware accelerator compression data blocks specified by this field, starting at the first hardware accelerator compression data block in the record.
114	72	R749FP1N	2	binary	Count of hardware accelerator compression data blocks allocated for this PCIE Function data section.
116	74	R749FLAG	1	binary	Validity flag. **Bit** **Meaning when set** **0** Physical-network identifiers R749NET1 and R749NET2 are valid. **1** PCIE function type R749PFT is valid. **2** PCI operation rates are invalid. **3** Global Performance Reporting is enabled. **4-7** Reserved.
117	75		1		Reserved.
118	76	R749PORT	1	binary	Physical port number for which this PCIE function is associated. If zero, then either the port field is not applicable, or there is more than one port associated with the PCIE function.
119	77	R749PFT	1	binary	PCIE function type.
120	78	R749NET1	16	EBCDIC	Physical-network identifier (PNET ID) that identifies the first port of the adapter. This field is only valid when the PCIE device type is defined as RoCE Express or ISM.
136	88	R749NET2	16	EBCDIC	Physical-network identifier (PNET ID) that identifies the second port of the adapter. Only valid when the PCIE device type is defined as RoCE Express.
152	98	R749WWNN	8	binary	Worldwide node name (WWNN) of the storage controller the synchronous I/O link is connected to.
160	A0	R749SIOO	2	binary	The data blocks for all Synchronous I/O links are grouped together in the record. To get the Synchronous I/O link data block associated with this PCIE Function data section, skip over the number of data blocks specified by this field, starting at the first Synchronous I/O link data block in the record.

Offsets		Name	Length	Format	Description
162	A2	R749SION	2	binary	Count of Synchronous I/O link data blocks allocated for this PCIE Function data section.
164	A4	R749RTDO	2	binary	The data blocks for all Synchronous I/O response time distribution buckets are grouped together in the record. To get the first Synchronous I/O response time distribution data block associated with this PCIE Function data section, skip over the number of data blocks specified by this field, starting at the first Synchronous I/O response time distribution data block in the record.
166	A6	R749RTDN	2	binary	Count of Synchronous I/O response time distribution data blocks allocated for this PCIE Function data section.
168	A8	R749LKID	2	binary	The identifier of the synchronous I/O link that is configured in the storage controller.
170	AA		18		Reserved.

PCIE Function Type data section

This section contains exactly one PCIE Function Type data block per PCIE Function data section.

Information provided for format x'00':

Offsets		Name	Length	Format	Description
0	0	R749DMAR	8	binary	DMA read counter that reports the number of bytes transferred from all defined DMA address spaces to the PCIE function.
8	8	R749DMAW	8	binary	DMA write counter that reports the number of bytes transferred from the PCIE function to all defined DMA address spaces.
16	10	R749DFMT	1	binary	Format x'00'
17	11		87		Reserved.

Information provided for format x'01':

Offsets		Name	Length	Format	Description
0	0	R749DBYR	8	binary	Number of bytes received on the external Ethernet interface.
8	8	R749DBYT	8	binary	Number of bytes transmitted on the external Ethernet interface.
16	10	R749DFMT	1	binary	Format x'01'
17	11		7		Reserved.
24	18	R749DPKR	8	binary	Number of packets received on the external Ethernet interface.
32	20	R749DPKT	8	binary	Number of packets transmitted on the external Ethernet interface.
40	28		64		Reserved.

Information provided for format x'02':

Offsets		Name	Length	Format	Description
0	0	R749DWUP	8	binary	Number of work units processed by the PCI function.
8	8	R749DWUM	8	binary	Maximum number of work units that the PCI function is capable of processing per second.
16	10	R749DFMT	1	binary	Format x'02'
17	11		87		Reserved.

Information provided for format x'03':

Offsets		Name	Length	Format	Description
0	0		8		Reserved.
8	8	R749DBYX	8	binary	Number of bytes transmitted by the PCI function.
16	10	R749DFMT	1	binary	Format x'03'
17	11		87		Reserved.

Information provided for format x'04':

Offsets		Name	Length	Format	Description
0	0	R749SRBF	8	binary	Number of bytes read by this synchronous I/O function.
8	8	R749SWBF	8	binary	Number of bytes written by this synchronous I/O function.
16	10	R749DFMT	1	binary	Format x'04'
17	11		7	binary	Reserved.
24	18	R749SSRF	8	binary	Number of successful requests for this synchronous I/O function.
32	20	R749SLRF	8	binary	Number of times the command was rejected by the processor (local rejects) for this synchronous I/O function.
40	28	R749SRRF	8	binary	Number of times the command was rejected by the storage controller (remote rejects) for this synchronous I/O function.
48	30	R749STPF	8	binary	Total processing time in microseconds for this synchronous I/O function.
56	38	R749SRBC	8	binary	Number of bytes read by all synchronous I/O functions that are using this synchronous I/O link on this CPC. Only valid, if bit 3 of R749FLAG is set.
64	40	R749SWBC	8	binary	Number of bytes written by all synchronous I/O functions that are using this synchronous I/O link on this CPC. Only valid, if bit 3 of R749FLAG is set.
72	48	R749SSRC	8	binary	Number of requests successfully processed by all synchronous I/O functions that are using this synchronous I/O link on this CPC. Only valid, if bit 3 of R749FLAG is set.
80	50	R749SLRC	8	binary	Number of local rejects of all synchronous I/O functions that are using this synchronous I/O link on this CPC. Only valid, if bit 3 of R749FLAG is set.
88	58	R749SRRC	8	binary	Number of remote rejects of all synchronous I/O functions that are using this synchronous I/O link on this CPC. Only valid, if bit 3 of R749FLAG is set.
96	60	R749STPC	8	binary	Total processing time in microseconds of all synchronous I/O functions that are using this synchronous I/O link on this CPC. Only valid, if bit 3 of R749FLAG is set.

Hardware accelerator data section

This section contains up to one hardware accelerator data block per PCIE Function data section. This section only exists if the device name of the PCIE function provided in R749DEVN is set to ***Hardware Accelerator***.

Offsets		Name	Length	Format	Description
0	0	R749FTYP	4	binary	Hardware accelerator application type.
4	4	R749FDSC	32	EBCDIC	Hardware accelerator application description.
36	24	R749FRQC	4	binary	Total number of hardware accelerator requests that completed successfully.

Offsets		Name	Length	Format	Description
40	28	R749FRQE	4	binary	Total number of hardware accelerator requests that completed with an error. Statistics for these requests are not included in the other fields of this data section.
44	2C	R749FQFL	4	binary	Number of times that the adapter queue was full when a new request was submitted.
48	30	R749FTET	8	binary	Total execution time of all requests in microseconds.
56	38	R749FSQE	16	binary	Sum of the squares of the individual execution times.
72	48	R749FTQT	8	binary	Total queue time of all requests in microseconds.
80	50	R749FSQQ	16	binary	Sum of the squares of the individual queue times.
96	60	R749FDRD	8	binary	Total DMA reads in units of 256 bytes.
104	68	R749FDWR	8	binary	Total DMA writes in units of 256 bytes.

Hardware accelerator compresssion data section

This section contains one hardware accelerator compression data block per hardware accelerator if the accelerator is used for compression acceleration. This data section only exists if the application name provided in R749FDSC is set to ***zEDC*** (zEnterprise Data Compression).

Offsets		Name	Length	Format	Description
0	0	R7491DIB	8	binary	Total number of deflate input bytes.
8	8	R7491DIS	16	binary	Sum of the squares of the individual deflate input bytes.
24	18	R7491DOB	8	binary	Total number of deflate output bytes.
32	20	R7491DOS	16	binary	Sum of the squares of the individual deflate output bytes.
48	30	R7491DCT	4	binary	Total number of deflate requests.
52	34		4		Reserved.
56	38	R7491IIB	8	binary	Total number of inflate input bytes.
64	40	R7491IIS	16	binary	Sum of the squares of the individual inflate input bytes.
80	50	R7491IOB	8	binary	Total number of inflate output bytes.
88	58	R7491IOS	16	binary	Sum of the squares of the individual inflate output bytes.
104	68	R7491ICT	4	binary	Total number of inflate requests.
108	6C		4		Reserved.
112	70	R7491BPS	4	binary	Total size of memory in megabytes allocated to the buffer pool.
116	74	R7491BPC	8	binary	Accumulated size of memory in megabytes for in-use buffers.

Synchronous I/O link data section

There is one data section per synchronous I/O link using IBM zHyperLink technology.

Offsets		Name	Length	Format	Description
0	0	R749SND	26	EBCDIC	Self-describing component of the node descriptor of the storage controller the synchronous I/O link is connected to.
26	1A		6		Reserved.

Synchronous I/O response time distribution data section

There is at least one read and one write data section per synchronous I/O link using IBM zHyperLink technology.

Offsets		Name	Length	Format	Description
0	0	R749RFLG	1	binary	Response time distribution bucket flag. **Bit** **Meaning** **0** If set, response time data measured for synchronous I/O read instructions. **1** If set, response time data measured for synchronous I/O write instructions. **2-7** Reserved.
1	1		3		Reserved.
4	4	R749RTRV	4	binary	Response time distribution bucket range value. The range value of the first read and the first write bucket of a Synchronous I/O link represents response times less than the range value. For example, if the read range value is 10, then this bucket represents read response times less than 10 microseconds. The range value of the remaining buckets represents response times less than this range value and greater than or equal to the prior range value. For example, if the range value is 30 and the prior range value was 20, this represents responses r in the range: 20 microseconds <= r < 30 microseconds
8	8	R749RTSC	4	binary	Response time distribution bucket sample count.

Subtype 10 — Extended asynchronous data mover (EADM) statistics

This record subtype is written by the RMF Monitor III data gatherer for all extended asynchronous data mover (EADM) resources.

Storage class memory (SCM) configuration measurement section

There is one section per SCM-resource part.

Offsets		Name	Length	Format	Description
0	0	R7410CM	56	Structure	
0	0	R7410CRID	2	binary	SCM resource identifier.
2	2	R7410CPID	2	binary	Part identifier.
4	4	R7410CDUS	4	binary	Data unit size in bytes.
8	8	R7410CRQC	4	binary	Internal requests processed at CPC level.
12	C	R7410CRQ	4	binary	Internal requests processed at LPAR level.
16	10	R7410CDWC	4	binary	Data units written at CPC level.
20	14	R7410CDW	4	binary	Data units written at LPAR level.
24	18	R7410CDRC	4	binary	Data units read at CPC level.
28	1C	R7410CDR	4	binary	Data units read at LPAR level.
32	20	R7410CRTC	4	binary	Aggregate time spent on execution of requests involving resource part in units of 128 microseconds at CPC level.
36	24	R7410CRT	4	binary	Aggregate time spent on execution of requests involving resource part in units of 128 microseconds at LPAR level.
40	28	R7410CIQC	4	binary	Accumulated IOP queue time in units of 128 microseconds at CPC level.

Offsets		Name	Length	Format	Description
44	2C	R7410CWUC	4	binary	Utilization at CPC level. This value designates the sum of the average CPC utilization per second in percent multiplied by the number of seconds of this interval.
48	30	R7410CWU	4	binary	Utilization at LPAR level. This value designates the sum of the average LPAR utilization per second in percent multiplied by the number of seconds of this interval.
52	34	R7410FLG	1	binary	Flag byte. **Bit** **Meaning when set** **0** SCM resource type is Virtual Flash Memory **1-7** Reserved
53	35		3		Reserved

Extended asynchronous data mover (EADM) device (subchannel) information section

There is one section per record. This section holds the response time information as well as request rates, throughput, and ratios of compression and decompression of all EADM devices at an aggregated level.

Offsets		Name	Length	Format	Description
0	0	R7410DI	32	Structure	
0	0	R7410DSCT	4	binary	SSCH count across all devices.
4	4	R7410DNUM	4	binary	Number of updates to the time accumulation fields.
8	8	R7410DFPT	8	binary	Sum of function pending times across all devices in units of 128 microseconds. The time lapse between the SSCH being issued and the acceptance of the first command of the channel program at the device.
16	10	R7410DIQT	8	binary	Sum of IOP queue times across all devices in units of 128 microseconds. The amount of time the request is not accepted at the SCM resource because it would exceed its maximum capacity.
24	18	R7410DCRT	8	binary	Sum of initial command response times across all devices in units of 128 microseconds. The time from when the first command does not immediately proceed to execute until the successful start of execution at the SCM resource part.
32	20	R7410DFLG	1	binary	Device information flags. **Bit** **Meaning when set** **0** EADM compression facility is available. **1 - 7** Reserved.
33	21	*	7	binary	Reserved.
40	28	R7410DOCC	4	binary	Number of compression operations.
44	2C	R7410DOCD	4	binary	Number of decompression operations.
48	30	R7410DISC	8	binary	Number of 1 MB input blocks consumed for compression.
56	38	R7410DOSC	8	binary	Number of 1 MB output blocks consumed for compression.
64	40	R7410DISD	8	binary	Number of 1 MB input blocks consumed for decompression.
72	48	R7410DOSD	8	binary	Number of 1 MB output blocks consumed for decompression.

Record type 75 (X'4B') — RMF Page Data Set Activity

For information on using RMF, see *z/OS RMF Reporter User's Guide*.

For information on Monitor I and II, see *z/OS RMF Report Analysis*.

Record type 75 is written at the end of each RMF measurement interval. One record is written for each page data set monitored during the interval.

As with all SMF records RMF produces, record type 75 contains a header section and RMF Product section. These are followed by:

Page Data Set data section
Provides information on the use of auxiliary storage page slots and the use of the page data set by the auxiliary storage manager (ASM).

Macro to Symbolically Address Record Type 75: The SMF record mapping macro for all records produced by RMF is ERBSMFR. Its format is ERBSMFR (*n1*,*n2*,...) where *n1*,*n2*, ... are the SMF record types you want to map. Note that the parentheses are required only when two or more record types are specified. The mapping macro resides in SYS1.MACLIB.

Record environment

The following conditions exist for the generation of this record:

Macro
SMFWTM (record exit: IEFU83)

Mode
Task

Storage Residency
31-bit

Record mapping

Header/Self-defining Section

This section contains the common SMF record headers fields and the triplet fields (offset/length/number), if applicable, that locate the other sections on the record.

Offsets		Name	Length	Format	Description
0	0	SMF75LEN	2	binary	Record length. This field and the next field (total of four bytes) form the RDW (record descriptor word). See "Standard and Extended SMF record headers" on page 162 for a detailed description.
2	2	SMF75SEG	2	binary	Segment descriptor (see record length field).
4	4	SMF75FLG	1	binary	System indicator **Bit** **Meaning when set** **0** New record format **1** Subtypes used **2** Reserved. **3-6** Version indicators (See "Standard and Extended SMF record headers" on page 162 for details.) **7** System is running in PR/SM mode.
5	5	SMF75RTY	1	binary	Record type 75 (X'4B').

Offsets		Name	Length	Format	Description
6	6	SMF75TME	4	binary	Time since midnight, in hundredths of a second, when the record was moved into the SMF buffer.
10	A	SMF75DTE	4	packed	Date when the record was moved into the SMF buffer, in the form 0*cyydddF*. See “Standard and Extended SMF record headers” on page 162 for details.
14	E	SMF75SID	4	EBCDIC	System identification (from the SMFPRMxx SID parameter).
18	12	SMF75SSI	4	EBCDIC	Subsystem identification (‘RMF’).
22	16	SMF75STY	2	binary	Record subtype=1.
24	18	SMF75TRN	2	binary	Number of triplets in this record. A triplet is a set of three SMF fields (offset/length/number values) that defines a section of the record. The offset is the offset from the RDW.
26	1A		2		Reserved.
28	1C	SMF75PRS	4	binary	Offset to RMF Product section from RDW.
32	20	SMF75PRL	2	binary	Length of RMF Product section.
34	22	SMF75PRN	2	binary	Number of RMF Product sections.
36	24	SMF75PSS	4	binary	Offset to Page Data Set data section from RDW.
40	28	SMF75PSL	2	binary	Length of Page Data Set data section.
42	2A	SMF75PSN	2	binary	Number of Page Data Set data sections.

RMF Product Section

Offsets		Name	Length	Format	Description
0	0	SMF75MFV	2	packed	RMF version number.
2	2	SMF75PRD	8	EBCDIC	Product name (‘RMF’).
10	A	SMF75IST	4	packed	Time that the RMF measurement interval started, in the form 0*hhmmssF*, where *hh* is the hours, *mm* is the minutes, *ss* is the seconds, and *F* is the sign.
14	E	SMF75DAT	4	packed	Date when the RMF measurement interval started, in the form 0*cyydddF*. See “Standard and Extended SMF record headers” on page 162 for details.
18	12	SMF75INT	4	packed	Duration of the RMF measurement interval, in the form *mmsstttF* where *mm* is the minutes, *ss* is the seconds, *ttt* is the milliseconds, and *F* is the sign. The end of the measurement interval is the sum of the recorded start time (and this field.)
22	16		2		Reserved.
24	18	SMF75SAM	4	binary	Number of RMF samples.
28	1C		2		Reserved.
30	1E	SMF75FLA	2	binary	Flags **Bit** **Meaning when set** **0** Reserved **1** Samples have been skipped **2** Record was written by RMF Monitor III **3** Interval was synchronized with SMF **4 - 15** Reserved.

Offsets		Name	Length	Format	Description
32	20		4		Reserved.
36	24	SMF75CYC	4	packed	Sampling cycle length, in the form 000*tttt*F, where *tttt* is the milliseconds and *F* is the sign (taken from CYCLE option). The range of values is 0.050 to 9.999 seconds.
40	28	SMF75MVS	8	EBCDIC	z/OS software level (consists of an acronym and the version, release, and modification level - ZV*vvrrmm*).
48	30	SMF75IML	1	binary	Indicates the type of processor complex on which data measurements were taken. **Value** **Meaning** **3** 9672, zSeries
49	31	SMF75PRF	1	binary	Processor flags. **Bit** **Meaning when set** **0** The system has expanded storage **1** The processor is enabled for ES connection architecture (ESCA) **2** There is an ES connection director in the configuration **3** System is running in z/Architecture mode **4** At least one zAAP is currently installed **5** At least one zIIP is currently installed **6** Enhanced DAT facility 1 available **7** Enhanced DAT facility 2 available
50	32	SMF75PTN	1	binary	PR/SM partition number of the partition that wrote this record.
51	33	SMF75SRL	1	binary	SMF record level change number (X'8E' for z/OS V2R4 RMF with RMF Data Gatherer APAR OA59330). This field enables processing of SMF record level changes in an existing release.
52	34	SMF75IET	8	char	Interval expiration time token. This token can be used to identify other than RMF records that belong to the same interval (if interval was synchronized with SMF).
60	3C	SMF75LGO	8	binary	Offset GMT to local time (STCK format).
68	44	SMF75RAO	4	binary	Offset to reassembly area relative to start of RMF Product section.
72	48	SMF75RAL	2	binary	Length of reassembly area. Area consists of a fixed header and a variable number of information blocks. Length depends on the record type/subtype, but is fixed for a specific type/subtype.

Offsets		Name	Length	Format	Description
74	4A	SMF75RAN	2	binary	Reassembly area indicator. **Value** **Meaning** **0** Record is not broken **1** Record is broken. **Note:** This field is used to indicate whether an SMF record is a broken record. Therefore, offset (SMF75RAO) and length (SMF75RAL) are only valid if SMF75RAN = 1. A reassembly area is only present in broken records.
76	4C	SMF75OIL	2	binary	Original interval length as defined in the session or by SMF (in seconds).
78	4E	SMF75SYN	2	binary	SYNC value in seconds.
80	50	SMF75GIE	8	binary	Projected gathering interval end (STCK format) GMT time.
88	58	SMF75XNM	8	EBCDIC	Sysplex name as defined in parmlib member COUPLExx.
96	60	SMF75SNM	8	EBCDIC	System name for current system as defined in parmlib member IEASYSxx SYSNAME parameter.
Reassembly Area:					
0	0	SMF75RBR	2	binary	Total number of broken records built from the original large record.
2	2	SMF75RSQ	2	binary	Sequence number of this broken record. Every broken record built from the same large record must have a unique sequence number, it is in the range from 1 to SMF75RBR.
4	4	SMF75RIO	4	binary	Offset to first reassembly information block relative to start of reassembly area header.
8	8	SMF75RIL	2	binary	Length of reassembly information block.
10	A	SMF75RIN	2	binary	Number of reassembly information blocks (same value as SMF75TRN in header section).
12	C		4		Reserved.
Reassembly Area Information Block:					
0	0	SMF75RNN	2	binary	Total number of sections in the original large record. This field contains information of how many sections of a specific type were contained in the original SMF record. This field is a copy of the number field of the triplet in the original (non broken) record.
2	2	SMF75RPP	2	binary	Position of the first of one or more consecutive sections described by this block as in the original record. Values in the range of 1 to SMF75RNN are valid for correct processing. A value of 0 will skip processing of this information block. This field provides information where the sections that are part of this broken record were placed in the original record before the split took place. The actual number of consecutive sections contained in this record is available from the actual triplet in the header extension.

Page Data Set Data Section

Offsets		Name	Length	Format	Description
0	0	SMF75DSN	44	EBCDIC	Page data set name. Valid only when bit 4 of SMF75FL2 is not set.

Offsets		Name	Length	Format	Description
44	2C	SMF75PST	1	binary	Page space type **Bit** **Meaning when set** **0** PLPA **1** COMMON **2** Reserved **3** LOCAL **4** Reserved **5** Data set unusable **6** Data set brought online during interval **7** Data set taken offline during interval.
45	2D	SMF75FL2	1	binary	Flags **Bit** **Meaning when set** **0** Data set accepts VIO pages **1** Data set is on a multiple exposure device **2** Data set is on a device with an alternate control unit **3** SMF75DEV contains a valid device name **4** Page space type is SCM **5-7** Reserved.
46	2E		1		Reserved.
47	2F	SMF75TYP	4	binary	Unit type. Valid only when bit 4 of SMF75FL2 is not set.
51	33	SMF75CHA	2	binary	Device number in the form *hhhh* (hex digits). Valid only when bit 4 of SMF75FL2 is not set.
53	35	SMF75VOL	6	EBCDIC	Volume serial number. Valid only when bit 4 of SMF75FL2 is not set.
59	3B	SMF75SCS	1	binary	Subchannel set ID. Valid only when bit 4 of SMF75FL2 is not set.
60	3C		4		Reserved.
64	40	SMF75SLA	4	binary	Total number of slots contained within the page data set.
68	44	SMF75MXU	4	binary	Maximum number of slots used.
72	48	SMF75MNU	4	binary	Minimum number of slots used.
76	4C	SMF75AVU	4	binary	Average number of slots used.
80	50	SMF75BDS	4	binary	Number of unusable slots.
84	54	SMF75USE	4	binary	Number of samples indicating data set was being used by ASM.
88	5A	SMF75REQ	4	binary	The value is the same as SMF75USE.
92	5C	SMF75SIO	4	binary	Number of I/O requests for the data set.
96	60	SMF75PGX	4	binary	Number of pages transferred to or from page data set.

Offsets		Name	Length	Format	Description
100	64	SMF75DEV	8	EBCDIC	Device name (blank if device name cannot be determined). Valid only when bit 4 of SMF75FL2 is not set.
108	6C	SMF75CU	8	EBCDIC	Control unit name (blank if control unit name cannot be determined). Valid only when bit 4 of SMF75FL2 is not set.

Record type 76 (X'4C') — RMF Trace Activity

Record type 76 is written at the end of each measurement interval. One record is written for each field name sampled during the interval. As with all SMF records produced by RMF, record type 76 contains a header section and RMF Product section. These are followed by:

Trace Control section
Contains the number of sample sets in the trace.

Trace data section
Contains information on the minimum value of the field, the maximum value of the field, the sum of the squared values of the field, and the final value sampled from the field.

Variable Trace data section
Contains the trace values collected for each set grouped at the end of the record.

Macro to Symbolically Address Record Type 76: The SMF record mapping macro for all records produced by RMF is ERBSMFR. Its format is ERBSMFR (*n1*,*n2*,...) where *n1*,*n2*, ... are the SMF record types you want to map. Note that the parentheses are required only when two or more record types are specified. The mapping macro resides in SYS1.MACLIB.

For information on using RMF, see *z/OS RMF Reporter User's Guide*. For information on Monitor I and II, see *z/OS RMF Report Analysis*.

Record environment

The following conditions exist for the generation of this record:

Macro
SMFWTM (record exit: IEFU83)

Mode
Task

Storage Residency
31-bit

Record mapping

Header/Self-defining Section

This section contains the common SMF record headers fields and the triplet fields (offset/length/number), if applicable, that locate the other sections on the record.

Offsets		Name	Length	Format	Description
0	0	SMF76LEN	2	binary	Record length. This field and the next field (total of four bytes) form the RDW (record descriptor word). See "Standard and Extended SMF record headers" on page 162 for a detailed description. This field and the next are collectively referred at as the RDW. (record descriptor word). See "Standard and Extended SMF record headers" on page 162 for a detailed description.
2	2	SMF76SEG	2	binary	Segment descriptor (see record length field).

Offsets		Name	Length	Format	Description
4	4	SMF76FLG	1	binary	System indicator **Bit** **Meaning when set** **0** New record format **1** Subtypes used **2** Reserved. **3-6** Version indicators (see “Standard and Extended SMF record headers” on page 162 for details) **7** System is running in PR/SM mode.
5	5	SMF76RTY	1	binary	Record type 76 (X'4C').
6	6	SMF76TME	4	binary	Time since midnight, in hundredths of a second, when the record was moved into the SMF buffer.
10	A	SMF76DTE	4	packed	Date when the record was moved into the SMF buffer, in the form 0*cyydddF*. See “Standard and Extended SMF record headers” on page 162 for a detailed description.
14	E	SMF76SID	4	EBCDIC	System identification (from the SMFPRMxx SID parameter).
18	12	SMF76SSI	4	EBCDIC	Subsystem identification (‘RMF’).
22	16	SMF76STY	2	binary	Record subtype=1.
24	18	SMF76TRN	2	binary	Number of triplets in this record. A triplet is a set of three SMF fields (offset/length/number values) that defines a section of the record. The offset is the offset from the RDW.
26	1A		2		Reserved.
28	1C	SMF76PRS	4	binary	Offset to RMF Product section from start of record, including record descriptor word (RDW).
32	20	SMF76PRL	2	binary	Length of RMF Product section.
34	22	SMF76PRN	2	binary	Number of RMF Product sections.
36	24	SMF76TCS	4	binary	Offset to Trace Control section from start of record, including record descriptor word (RDW).
40	28	SMF76TCL	2	binary	Length of Trace Control section.
42	2A	SMF76TCN	2	binary	Number of Trace Control sections.
44	2C	SMF76TDS	4	binary	Offset to Trace data section from start of record, including record descriptor word (RDW).
48	30	SMF76TDL	2	binary	Length of Trace data section.
50	32	SMF76TDN	2	binary	Number of Trace data sections.
52	34	SMF76VFS	4	binary	Offset to variable format set from start of record, including record descriptor word (RDW).
56	38	SMF76VFL	2	binary	Length of variable format set.
58	3A	SMF76VFN	2	binary	Number of variable format sets.

RMF Product Section

Offsets		Name	Length	Format	Description
0	0	SMF76MFV	2	packed	RMF version number.
2	2	SMF76PRD	8	EBCDIC	Product name (‘RMF’).

Offsets		Name	Length	Format	Description
10	A	SMF76IST	4	packed	Time that the RMF measurement interval started, in the form 0*hhmmssF*, where *hh* is the hours, *mm* is the minutes, *ss* is the seconds, and *F* is the sign.
14	E	SMF76DAT	4	packed	Date when the RMF measurement interval started, in the form 0*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for a detailed description.
18	12	SMF76INT	4	packed	Duration of the RMF measurement interval, in the form *mmsstttF* where *mm* is the minutes, *ss* is the seconds, *ttt* is the milliseconds, and *F* is the sign. (The end of the measurement interval is the sum of the recorded start time and this field.)
22	16		2		Reserved.
24	18	SMF76SAM	4	binary	Number of RMF samples.
28	1C		2		Reserved.
30	1E	SMF76FLA	2	binary	Flags **Bit** **Meaning when set** **0** Reserved **1** Samples have been skipped **2** Record was written by RMF Monitor III **3** Interval was synchronized with SMF **4 - 15** Reserved.
32	20		4		Reserved.
36	24	SMF76CYC	4	packed	Sampling cycle length, in the form 000*ttttF*, where *tttt* is the milliseconds and *F* is the sign (taken from CYCLE option). The range of values is 0.050 to 9.999 seconds.
40	28	SMF76MVS	8	EBCDIC	z/OS software level (consists of an acronym and the version, release, and modification level - ZV*vvrrmm*).
48	30	SMF76IML	1	binary	Indicates the type of processor complex on which data measurements were taken. **Value** **Meaning** **3** 9672, zSeries

Offsets		Name	Length	Format	Description
49	31	SMF76PRF	1	binary	Processor flags. **Bit** **Meaning when set** **0** The system has expanded storage **1** The processor is enabled for ES connection architecture (ESCA) **2** There is an ES connection director in the configuration **3** System is running in z/Architecture mode **4** At least one zAAP is currently installed **5** At least one zIIP is currently installed **6** Enhanced DAT facility 1 available **7** Enhanced DAT facility 2 available
50	32	SMF76PTN	1	binary	PR/SM partition number of the partition that wrote this record.
51	33	SMF76SRL	1	binary	SMF record level change number (X'8E' for z/OS V2R4 RMF with RMF Data Gatherer APAR OA59330). This field enables processing of SMF record level changes in an existing release.
52	34	SMF76IET	8	char	Interval expiration time token. This token can be used to identify other than RMF records that belong to the same interval (if interval was synchronized with SMF).
60	3C	SMF76LGO	8	binary	Offset GMT to local time (STCK format).
68	44	SMF76RAO	4	binary	Offset to reassembly area relative to start of RMF product section.
72	48	SMF76RAL	2	binary	Length of reassembly area. Area consists of a fixed header and a variable number of information blocks. Length depends on the record type/subtype, but is fixed for a specific type/subtype.
74	4A	SMF76RAN	2	binary	Reassembly area indicator. **Value** **Meaning** **0** Record is not broken **1** Record is broken. **Note:** This field is used to indicate whether an SMF record is a broken record. Therefore, offset (SMF76RAO) and length (SMF76RAL) are only valid if SMF76RAN = 1. A reassembly area is only present in broken records.
76	4C	SMF76OIL	2	binary	Original interval length as defined in the session or by SMF (in seconds).
78	4E	SMF76SYN	2	binary	SYNC value in seconds.
80	50	SMF76GIE	8	binary	Projected gathering interval end (STCK format) GMT time.
88	58	SMF76XNM	8	EBCDIC	Sysplex name as defined in parmlib member COUPLExx.
96	60	SMF76SNM	8	EBCDIC	System name for current system as defined in parmlib member IEASYSxx SYSNAME parameter.
Reassembly Area:					
0	0	SMF76RBR	2	binary	Total number of broken records built from the original large record.

Offsets		Name	Length	Format	Description
2	2	SMF76RSQ	2	binary	Sequence number of this broken record. Every broken record built from the same large record must have a unique sequence number, it is in the range from 1 to SMF76RBR.
4	4	SMF76RIO	4	binary	Offset to first reassembly information block relative to start of reassembly area header.
8	8	SMF76RIL	2	binary	Length of reassembly information block.
10	A	SMF76RIN	2	binary	Number of reassembly information blocks (same value as SMF76TRN in header section).
12	C		4		Reserved.
Reassembly Area Information Block:					
0	0	SMF76RNN	2	binary	Total number of sections in the original large record. This field contains information of how many sections of a specific type were contained in the original SMF record. This field is a copy of the number field of the triplet in the original (non broken) record.
2	2	SMF76RPP	2	binary	Position of the first of one or more consecutive sections described by this block as in the original record. Values in the range of 1 to SMF76RNN are valid for correct processing. A value of 0 will skip processing of this information block. This field provides information where the sections that are part of this broken record were placed in the original record before the split took place. The actual number of consecutive sections contained in this record is available from the actual triplet in the header extension.

Trace Control Section

Offsets		Name	Length	Format	Description
0	0	SMF76NUM	2	binary	Number of sample sets (lines of data) in the trace.
2	2		2		Reserved.

Trace Data Section

Offsets		Name	Length	Format	Description
0	0	SMF76NAM	8	EBCDIC	Field name.
8	8	SMF76OPT	1	binary	Trace options **Bit** **Meaning when set** **0** Minimum value of the field is contained in the SMF record **1** Maximum value of the field is contained in the SMF record **2** The sum of the values required to calculate the average of the field is contained in the SMF record **3** The sum of the squared values required to calculate the standard deviation of the field is contained in the SMF record **4** End value of the field is contained in the SMF record **5** All options selected **6** Domain tracing terminated **7** This entry is a domain field.

Offsets		Name	Length	Format	Description
9	9	SMF76OP1	1	binary	Trace options **Bit** **Meaning when set** **0** LPB trace requested **1** LPB trace request ended **2** Traced data in record is valid **3-7** Reserved.
10	A	SMF76SLN	1	binary	Length of a set.
11	B	SMF76DLN	1	binary	Length of a field sampled.
12	C	SMF76SSS	2	binary	Standard samples per set used.
14	E	SMF76SSL	2	binary	Samples per set.
16	10	SMF76MIN	4	binary	Minimum value during interval.
20	14	SMF76MAX	4	binary	Maximum value during interval.
24	18	SMF76AVG	8	binary	Accumulated value used to compute the average.
32	20	SMF76STD	12	binary	Sum of squares (used to compute standard deviation).
44	2C	SMF76ENV	4	binary	End value of field.

Variable Trace Data Section

Offsets		Name	Length	Format	Description
0	0	SMF76C or SMF76D	4	binary	Trace values collected for each set, stored in an array of either fullwords or halfwords, depending on the length of the field being sampled (SMF76C if fullwords; SMF76D if halfwords). There will be one group of values for each sample set (line of data) in the trace.

Record type 77 (X'4D') — RMF enqueue activity

Reference information:

- The SMF record mapping macro for all records produced by RMF is ERBSMFR. Its format is ERBSMFR (*n1*,*n2*,...) where *n1*,*n2*, ... are the SMF record types you want to map. Note that the parentheses are required only when two or more record types are specified. The mapping macro resides in SYS1.MACLIB.
- For information on Monitor I and II, see *z/OS RMF Report Analysis*.

Record type 77 is written at the end of each measurement interval and when the session is terminated. As with all SMF records RMF produces, it contains a header section followed by the RMF product section. These are followed by:

Enqueue Control section
Contains the status indicator.

Enqueue data section
Identifies the resources for which ENQ/DEQ contention occurred during the measurement interval and describes any contention that occurred.

Macro to Symbolically Address Record Type 77: The SMF record mapping macro for all records produced by RMF is ERBSMFR. Its format is ERBSMFR (*n1*,*n2*,...) where *n1*,*n2*, ... are the SMF record types you want to map. Note that the parentheses are required only when two or more record types are specified. The mapping macro resides in SYS1.MACLIB.

Record environment

The following conditions exist for the generation of this record:

Macro
SMFWTM (record exit: IEFU83)

Mode
Task

Storage Residency
31-bit

Record mapping

Header/Self-defining Section

This section contains the common SMF record headers fields and the triplet fields (offset/length/number), if applicable, that locate the other sections on the record.

Offsets		Name	Length	Format	Description
0	0	SMF77LEN	2	binary	Record length. This field and the next field (total of four bytes) form the RDW (record descriptor word). See “Standard and Extended SMF record headers” on page 162 for a detailed description.
2	2	SMF77SEG	2	binary	Segment descriptor (see record length field).
4	4	SMF77FLG	1	binary	System indicator **Bit** **Meaning when set** **0** New record format **1** Subtypes used **2** Reserved. **3-6** Version indicators* **7** System is running in PR/SM mode. *See “Standard and Extended SMF record headers” on page 162 for a detailed description.
5	5	SMF77RTY	1	binary	Record type 77 (X'4D').
6	6	SMF77TME	4	binary	Time since midnight, in hundredths of a second, when the record was moved into the SMF buffer.
10	A	SMF77DTE	4	packed	Date when the record was moved into the SMF buffer, in the form 0*cyydddF*. See “Standard and Extended SMF record headers” on page 162 for a detailed description.
14	E	SMF77SID	4	EBCDIC	System identification (from the SMFPRMxx SID parameter).
18	12	SMF77SSI	4	EBCDIC	Subsystem identification (‘RMF’).
22	16	SMF77STY	2	binary	Record subtype=1.
24	18	SMF77TRN	2	binary	Number of triplets in this record. A triplet is a set of three SMF fields (offset/length/number values) that defines a section of the record.
26	1A		2		Reserved.

Offsets		Name	Length	Format	Description
28	1C	SMF77PRS	4	binary	Offset to RMF Product section from start of record, including record descriptor word (RDW).
32	20	SMF77PRL	2	binary	Length of RMF Product section from start of record, including record descriptor word (RDW).
34	22	SMF77PRN	2	binary	Number of RMF Product sections.
36	24	SMF77EQS	4	binary	Offset to Enqueue Control section from start of record, including record descriptor word (RDW).
40	28	SMF77EQL	2	binary	Length of Enqueue Control section.
42	2A	SMF77EQN	2	binary	Number of Enqueue Control sections.
44	2C	SMF77EDS	4	binary	Offset to Enqueue data section from start of record, including record descriptor word (RDW).
48	30	SMF77EDL	2	binary	Length of Enqueue data section.
50	32	SMF77EDN	2	binary	Number of Enqueue data sections.

RMF Product Section

Offsets		Name	Length	Format	Description
0	0	SMF77MFV	2	packed	RMF version number.
2	2	SMF77PRD	8	EBCDIC	Product name (‘RMF’).
10	A	SMF77IST	4	packed	Time since midnight that the RMF measurement interval started, in the form 0*hhmmssF*, where *hh* is the hours, *mm* is the minutes, *ss* is the seconds, and *F* is the sign.
14	E	SMF77DAT	4	packed	Date when the RMF measurement interval started, in the form 0*cyydddF*. See “Standard and Extended SMF record headers” on page 162 for a detailed description.
18	12	SMF77INT	4	packed	Duration of RMF measurement interval, in the form *mmsstttF* where *mm* is the minutes, *ss* is the seconds, *ttt* is the milliseconds, and *F* is the sign. (The end of the measurement interval is the sum of the recorded start time and this field.)
22	16		2		Reserved.
24	18	SMF77SAM	4	binary	Number of RMF samples.
28	1C		2		Reserved.
30	1E	SMF77FLA	2	binary	Flags **Bit** **Meaning when set** **0** Reserved **1** Samples have been skipped **2** Record was written by RMF Monitor III **3** Interval was synchronized with SMF **4 - 15** Reserved.
32	20		4		Reserved.
36	24	SMF77CYC	4	packed	Sampling cycle length, in the form 000*ttttF*, where *tttt* is the milliseconds and *F* is the sign (taken from CYCLE option). The range of values is 0.050 to 9.999 seconds.
40	28	SMF77MVS	8	EBCDIC	z/OS software level (consists of an acronym and the version, release, and modification level - ZV*vvrrmm*).

Offsets		Name	Length	Format	Description
48	30	SMF77IML	1	binary	Indicates the type of processor complex on which data measurements were taken. **Value** **Meaning** **3** 9672, zSeries
49	31	SMF77PRF	1	binary	Processor flags. **Bit** **Meaning when set** **0** The system has expanded storage **1** The processor is enabled for ES connection architecture (ESCA) **2** There is an ES connection director in the configuration **3** System is running in z/Architecture mode **4** At least one zAAP is currently installed **5** At least one zIIP is currently installed **6** Enhanced DAT facility 1 available **7** Enhanced DAT facility 2 available
50	32	SMF77PTN	1	binary	PR/SM partition number of the partition that wrote this record.
51	33	SMF77SRL	1	binary	SMF record level change number (X'8E' for z/OS V2R4 RMF with RMF Data Gatherer APAR OA59330). This field enables processing of SMF record level changes in an existing release.
52	34	SMF77IET	8	char	Interval expiration time token. This token can be used to identify other than RMF records that belong to the same interval (if interval was synchronized with SMF).
60	3C	SMF77LGO	8	binary	Offset GMT to local time (STCK format).
68	44	SMF77RAO	4	binary	Offset to reassembly area relative to start of RMF Product section.
72	48	SMF77RAL	2	binary	Length of reassembly area. Area consists of a fixed header and a variable number of information blocks. Length depends on the record type/subtype, but is fixed for a specific type/subtype.
74	4A	SMF77RAN	2	binary	Reassembly area indicator. **Value** **Meaning** **0** Record is not broken **1** Record is broken. **Note:** This field is used to indicate whether an SMF record is a broken record. Therefore, offset (SMF77RAO) and length (SMF77RAL) are only valid if SMF77RAN = 1. A reassembly area is only present in broken records.
76	4C	SMF77OIL	2	binary	Original interval length as defined in the session or by SMF (in seconds).
78	4E	SMF77SYN	2	binary	SYNC value in seconds.
80	50	SMF77GIE	8	binary	Projected gathering interval end (STCK format) GMT time.

Offsets		Name	Length	Format	Description
88	58	SMF77XNM	8	EBCDIC	Sysplex name as defined in parmlib member COUPLExx.
96	60	SMF77SNM	8	EBCDIC	System name for current system as defined in parmlib member IEASYSxx SYSNAME parameter.
Reassembly Area:					
0	0	SMF77RBR	2	binary	Total number of broken records built from the original large record.
2	2	SMF77RSQ	2	binary	Sequence number of this broken record. Every broken record built from the same large record must have a unique sequence number, it is in the range from 1 to SMF77RBR.
4	4	SMF77RIO	4	binary	Offset to first reassembly information block relative to start of reassembly area header.
8	8	SMF77RIL	2	binary	Length of reassembly information block.
10	A	SMF77RIN	2	binary	Number of reassembly information blocks (same value as SMF77TRN in header section).
12	C		4		Reserved.
Reassembly Area Information Block:					
0	0	SMF77RNN	2	binary	Total number of sections in the original large record. This field contains information of how many sections of a specific type were contained in the original SMF record. This field is a copy of the number field of the triplet in the original (non broken) record.
2	2	SMF77RPP	2	binary	Position of the first of one or more consecutive sections described by this block as in the original record. Values in the range of 1 to SMF77RNN are valid for correct processing. A value of 0 will skip processing of this information block. This field provides information where the sections that are part of this broken record were placed in the original record before the split took place. The actual number of consecutive sections contained in this record is available from the actual triplet in the header extension.

Enqueue Control Section

Offsets		Name	Length	Format	Description
0	0	SMF77FG1	1	binary	Enqueue status indicator **Bit** **Meaning** **0** Enqueue summary table full **1** Specified resource had no contention **2** Enqueue had bad CPU clock **3** Enqueue event processing abend **4** On — detail data requested Off — summary data requested **5** On — GRS=NONE (local sysplex) **6** Off — GRS=RING, if bit 5 = '0' **7** On — bits 5 and 6 are valid

Offsets		Name	Length	Format	Description
1	1	SMF77RF2	1	binary	Second status indicator **Bit** **Meaning** **0** GRS system problems **1** RMF/GRS interface problems **2-7** Reserved.
2	2		2		Reserved.

Enqueue Data Section

Offsets		Name	Length	Format	Description
0	0	SMF77QNM	8	EBCDIC	Major name of resource.
8	8	SMF77RNM	44	EBCDIC	Minor name of resource.
52	34	SMF77WTM	4	binary	Minimum resource contention time during the measurement interval, in 1024-microsecond units. After an internal RMF restart (for example, due to a change of gatherer options) the contention time can be larger than the measurement interval.
56	38	SMF77WTX	4	binary	Maximum resource contention time during the measurement interval, in 1024-microsecond units. After an internal RMF restart (for example, due to a change of gatherer options) the contention time can be larger than the measurement interval.
60	3C	SMF77WTT	4	binary	Total resource contention time during the measurement interval, in 1024-microsecond units. After an internal RMF restart (for example, due to a change of gatherer options) the contention time can be larger than the measurement interval.
64	40		2		Reserved.
66	42	SMF77QL1	2	binary	Counter for queue length of 1.
68	44	SMF77QL2	2	binary	Counter for queue length of 2.
70	46	SMF77QL3	2	binary	Counter for queue length of 3.
72	48	SMF77QL4	2	binary	Counter for queue length of 4 or more.
74	4A		2		Reserved.
76	4C	SMF77EXM	2	binary	Minimum number of exclusive requests waiting.
78	4E	SMF77EXX	2	binary	Maximum number of exclusive requests waiting.
80	50	SMF77SHM	2	binary	Minimum number of share requests waiting.
82	52	SMF77SHX	2	binary	Maximum number of share requests waiting.
84	54	SMF77EVT	2	binary	Total number of contention events that occurred during the measurement interval. A contention event is the period starting from the time when the resource has contention until the resource no longer has contention.
86	56	SMF77RLN	1	binary	Minor name length.

Offsets		Name	Length	Format	Description
87	57	SMF77DFG	1	binary	Current resource detail indicator **Bit** **Meaning when set** **0** Resource still in contention **1** On — scope of systems Off — scope of system **2** On — owner has exclusive control of the resource Off — owner shares the resource **3** On — first job is waiting for exclusive use Off — first job is waiting for shared use **4** On — second job is waiting for exclusive use Off — second job is waiting for shared use **5** Resource is global **6-7** Reserved.
88	58	SMF77DOW	2	binary	Number of owners using the resource at maximum contention.
90	5A	SMF77DWR	2	binary	Number of jobs waiting for the resource at maximum contention.
92	5C	SMF77DO1	8	EBCDIC	Job name 1 of resource owner during period of maximum contention.
100	64	SMF77DO2	8	EBCDIC	Job name 2 of resource owner during period of maximum contention.
108	6C	SMF77DW1	8	EBCDIC	Job name 1 waiting for the resource owner during period of maximum contention.
116	74	SMF77DW2	8	EBCDIC	Job name 2 waiting for the resource owner during period of maximum contention.
124	7C	SMF77SY1	8	EBCDIC	System identifier of job name 1 (resource owner at maximum contention).
132	84	SMF77SY2	8	EBCDIC	System identifier of job name 2 (resource owner at maximum contention).
140	8C	SMF77SY3	8	EBCDIC	System identifier of job name 1 (waiting for the resource at maximum contention).
148	94	SMF77SY4	8	EBCDIC	System identifier of job name 2 (waiting for the resource at maximum contention).
156	9C	SMF77AQL	4	binary	Total number of waiting requests during the measurement interval.
160	A0	SMF77CSC	4	binary	Total number of contention status change events that occurred during the measurement interval.
164	A4	SMF77NOD	4	binary	Total number of contention status change events accumulated during the measurement interval which did not provide separate contention detail data.

Record type 78 (X'4E') — RMF Virtual Storage and I/O Queuing Activity

RMF writes record type 78 during a Monitor I session. It has these subtypes:

- **Subtype 2** — Reports virtual storage activity. It contains a Common Storage data section and may contain one or more Private Area data sections.
- **Subtype 3** — Reports I/O queuing activity and HyperPAV and SuperPAV activity. It contains an entry for each logical control unit that had any activity during the interval.

  Note: Your installation may produce several type 78 subtype 3 records.

This subtype contains the following sections:

- I/O Queuing Global section
- IOP Initiative Queue and Utilization data section
- I/O Queuing Configuration control section
- I/O Queuing Configuration data section
- I/O Queuing data section
- HyperPAV/SuperPAV data section

Each subtype contains a header section followed by the RMF Product section.

Macro to Symbolically Address Record Type 78: The SMF record mapping macro for all records produced by RMF is ERBSMFR. Its format is ERBSMFR (*n1*,*n2*,...) where *n1*,*n2*, ... are the SMF record types you want to map. Note that the parentheses are required only when two or more record types are specified. The mapping macro resides in SYS1.MACLIB.

For more information on using RMF, see *z/OS RMF Reporter User's Guide*. For information on Monitor I and II, see *z/OS RMF Report Analysis*.

Record environment

The following conditions exist for the generation of this record:

Macro
SMFWTM (record exit: IEFU83)

Mode
Task

Storage Residency
31-bit

Record mapping

Header/Self-defining Section

This section contains the common SMF record headers fields and the triplet fields (offset/length/number), if applicable, that locate the other sections on the record.

Offsets		Name	Length	Format	Description
0	0	SMF78LEN	2	binary	Record length. This field and the next field (total of four bytes) form the RDW (record descriptor word). See "Standard and Extended SMF record headers" on page 162 for a detailed description.
2	2	SMF78SEG	2	binary	Segment descriptor (see record length field).

Offsets		Name	Length	Format	Description
4	4	SMF78FLG	1	binary	System indicator **Bit** **Meaning when set** **0** New record format **1** Subtypes used **2** Reserved. **3-6** Version indicators* **7** System is running in PR/SM mode. *See "Standard and Extended SMF record headers" on page 162 for a detailed description.
5	5	SMF78RTY	1	binary	Record type 78 (X'4E').
6	6	SMF78TME	4	binary	Time since midnight, in hundredths of a second, when the record was moved into the SMF buffer.
10	A	SMF78DTE	4	packed	Date when the record was moved into the SMF buffer, in the form 0*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for a detailed description.
14	E	SMF78SID	4	EBCDIC	System identification (from the SMFPRMxx SID parameter).
18	12	SMF78SSI	4	EBCDIC	Subsystem identification ('RMF').
22	16	SMF78STY	2	binary	Subtype.
24	18	SMF78TRN	2	binary	Number of triplets in record. A triplet is a set of three SMF fields (offset/length/number values) that defines a section of the record.
26	1A		2		Reserved.
28	1C	SMF78PRS	4	binary	Offset to RMF Product section from start of record, including record descriptor word (RDW).
32	20	SMF78PRL	2	binary	Length of RMF Product section.
34	22	SMF78PRN	2	binary	Number of RMF Product sections.
Individual header extension for subtype 2:					
36	24	SMF78DCS	4	binary	Offset to Virtual Storage Common Storage data section.
40	28	SMF78DCL	2	binary	Length of Virtual Storage Common Storage data section.
42	2A	SMF78DCN	2	binary	Number of Virtual Storage Common Storage data sections.
44	2C	SMF78ASS	4	binary	Offset to Virtual Storage Private Area data section.
48	30	SMF78ASL	2	binary	Length of Virtual Storage Private Area data section.
50	32	SMF78ASN	2	binary	Number of Virtual Storage Private Area data sections.
52	34	SMF78SPS	4	binary	Offset to Private Area Subpool section.
56	38	SMF78SPL	2	binary	Length of Private Area Subpool section.
58	3A	SMF78SPN	2	binary	Number of Private Area Subpool sections.
Individual header extension for subtype 3:					
36	24	SMF78DCS	4	binary	Offset to Queuing control section.
40	28	SMF78DCL	2	binary	Length of Queuing control section.
42	2A	SMF78DCN	2	binary	Number of Queuing control sections.
44	2C	SMF78ASS	4	binary	Offset to Queuing data section.
48	30	SMF78ASL	2	binary	Length of Queuing data section.

Offsets		Name	Length	Format	Description
50	32	SMF78ASN	2	binary	Number of Queuing data sections.
52	34	SMF78QDS	4	binary	Offset to I/O Queue (IOQ) global section.
56	38	SMF78QDL	2	binary	Length of IOQ global section.
58	3A	SMF78QDN	2	binary	Number of IOQ global sections.
60	3C	SMF78HPS	4	binary	Offset to HyperPAV/SuperPAV data section.
64	40	SMF78HPL	2	binary	Length of HyperPAV/SuperPAV data section.
66	42	SMF78HPN	2	binary	Number of HyperPAV/SuperPAV data sections.

RMF Product Section

Offsets		Name	Length	Format	Description
0	0	SMF78MFV	2	packed	RMF version number.
2	2	SMF78PRD	8	EBCDIC	Product name (‘RMF’).
10	A	SMF78IST	4	packed	Time that the RMF Monitor I measurement interval started, in the form 0*hhmmssF*, where *hh* is the hours, *mm* is the minutes, *ss* is the seconds, and *F* is the sign.
14	E	SMF78DAT	4	packed	Date when the RMF Monitor I measurement interval started, in the form 0*cyydddF*. See “Standard and Extended SMF record headers” on page 162 for a detailed description.
18	12	SMF78INT	4	packed	Duration of the RMF Monitor I measurement interval, in the form *mmsstttF* where *mm* is the minutes, *ss* is the seconds, *ttt* is the milliseconds, and *F* is the sign, (The end of the measurement interval is the sum of the recorded start time and this field.)
22	16		2		Reserved.
24	18	SMF78SAM	4	binary	Number of RMF samples.
28	1C		2		Reserved.
30	1E	SMF78FLA	2	binary	Flags **Bit** **Meaning when set** **0** Reserved **1** Samples have been skipped **2** Record was written by RMF Monitor III **3** Interval was synchronized with SMF **4 - 15** Reserved.
32	20		4		Reserved.
36	24	SMF78CYC	4	packed	Sampling cycle length, in the form 000*ttttF*, where *tttt* is the milliseconds and *F* is the sign (taken from CYCLE option). The range of values is 0.050 to 9.999 seconds.
40	28	SMF78MVS	8	EBCDIC	z/OS software level (consists of an acronym and the version, release, and modification level - ZV*vvrrmm*).
48	30	SMF78IML	1	binary	Indicates the type of processor complex on which data measurements were taken. **Value** **Meaning** **3** 9672, zSeries

Offsets		Name	Length	Format	Description
49	31	SMF78PRF	1	binary	Processor flags. **Bit** **Meaning when set** **0** The system has expanded storage **1** The processor is enabled for ES connection architecture (ESCA) **2** There is an ES connection director in the configuration **3** System is running in z/Architecture mode **4** At least one zAAP is currently installed **5** At least one zIIP is currently installed **6** Enhanced DAT facility 1 available **7** Enhanced DAT facility 2 available
50	32	SMF78PTN	1	binary	PR/SM partition number of the partition that wrote this record.
51	33	SMF78SRL	1	binary	SMF record level change number (X'8E' for z/OS V2R4 RMF with RMF Data Gatherer APAR OA59330). This field enables processing of SMF record level changes in an existing release.
52	34	SMF78IET	8	char	Interval expiration time token. This token can be used to identify other than RMF records that belong to the same interval (if interval was synchronized with SMF).
60	3C	SMF78LGO	8	binary	Offset GMT to local time (STCK format).
68	44	SMF78RAO	4	binary	Offset to reassembly area relative to start of RMF Product section.
72	48	SMF78RAL	2	binary	Length of reassembly area. Area consists of a fixed header and a variable number of information blocks. Length depends on the record type/subtype, but is fixed for a specific type/subtype.
74	4A	SMF78RAN	2	binary	Reassembly area indicator. **Value** **Meaning** **0** Record is not broken **1** Record is broken. **Note:** This field is used to indicate whether an SMF record is a broken record. Therefore, offset (SMF78RAO) and length (SMF78RAL) are only valid if SMF78RAN = 1. A reassembly area is only present in broken records.
76	4C	SMF78OIL	2	binary	Original interval length as defined in the session or by SMF (in seconds).
78	4E	SMF78SYN	2	binary	SYNC value in seconds.
80	50	SMF78GIE	8	binary	Projected gathering interval end (STCK format) GMT time.
88	58	SMF78XNM	8	EBCDIC	Sysplex name as defined in parmlib member COUPLExx.
96	60	SMF78SNM	8	EBCDIC	System name for current system as defined in parmlib member IEASYSxx SYSNAME parameter.
Reassembly Area:					
0	0	SMF78RBR	2	binary	Total number of broken records built from the original large record.

Offsets		Name	Length	Format	Description
2	2	SMF78RSQ	2	binary	Sequence number of this broken record. Every broken record built from the same large record must have a unique sequence number, it is in the range from 1 to SMF78RBR.
4	4	SMF78RIO	4	binary	Offset to first reassembly information block relative to start of reassembly area header.
8	8	SMF78RIL	2	binary	Length of reassembly information block.
10	A	SMF78RIN	2	binary	Number of reassembly information blocks (same value as SMF78TRN in header section).
12	C		4		Reserved.
Reassembly Area Information Block:					
0	0	SMF78RNN	2	binary	Total number of sections in the original large record. This field contains information of how many sections of a specific type were contained in the original SMF record. This field is a copy of the number field of the triplet in the original (non broken) record.
2	2	SMF78RPP	2	binary	Position of the first of one or more consecutive sections described by this block as in the original record. Values in the range of 1 to SMF78RNN are valid for correct processing. A value of 0 will skip processing of this information block. This field provides information where the sections that are part of this broken record were placed in the original record before the split took place. The actual number of consecutive sections contained in this record is available from the actual triplet in the header extension.

Subtype 2 Virtual Storage Activity

Virtual Storage Common Storage Data Section

This section describes triplet SMF78DCS.

Offsets		Name	Length	Format	Description
Virtual Storage Common Storage data section (described by triplet SMF78DCS):					
0	0	R782PA	4	binary	Private area address below 16 megabytes.
4	4	R782PS	4	binary	Private area size (in bytes) below 16 megabytes.
8	8	R782EPA	4	binary	Private area address above 16 megabytes.
12	C	R782EPS	4	binary	Private area size (in bytes) above 16 megabytes.
16	10	R782CA	4	binary	CSA address below 16 megabytes.
20	14	R782CS	4	binary	CSA size (in bytes) below 16 megabytes.
24	18	R782ECA	4	binary	CSA address above 16 megabytes.
28	1C	R782ECS	4	binary	CSA size (in bytes) above 16 megabytes.
32	20	R782FLG	1	binary	Flags: **Bit** **Meaning when set** **0** Restricted use common service area (RUCSA) is defined.
33	21	*	7	binary	Reserved.
40	28	R782MLA	4	binary	Modified link pack area (MLPA) address below 16 megabytes.
44	2C	R782MLS	4	binary	Modified link pack area (MLPA) size (in bytes) below 16 megabytes.
48	30	R782EMLA	4	binary	Modified link pack area (MLPA) address above 16 megabytes.
52	34	R782EMLS	4	binary	Modified link pack area (MLPA) size (in bytes) above 16 megabytes.
56	38	R782FLA	4	binary	Fixed link pack area (FLPA) address below 16 megabytes.

Offsets		Name	Length	Format	Description
60	3C	R782FLS	4	binary	Fixed link pack area (FLPA) size (in bytes) below 16 megabytes.
64	40	R782EFLA	4	binary	Fixed link pack area (FLPA) address above 16 megabytes.
68	44	R782EFLS	4	binary	Fixed link pack area (FLPA) size (in bytes) above 16 megabytes.
72	48	R782PLA	4	binary	Pageable link pack area (PLPA) address below 16 megabytes.
76	4C	R782PLS	4	binary	Pageable link pack area (PLPA) size (in bytes) below 16 megabytes.
80	50	R782ELPA	4	binary	Pageable link pack area (PLPA) address above 16 megabytes.
84	54	R782ELPS	4	binary	Pageable link pack area (PLPA) size (in bytes) above 16 megabytes.
88	58	R782SA	4	binary	System queue area (SQA) address below 16 megabytes.
92	5C	R782SS	4	binary	System queue area (SQA) size (in bytes) below 16 megabytes.
96	60	R782ESA	4	binary	System queue area (SQA) address above 16 megabytes.
100	64	R782ESS	4	binary	System queue area (SQA) size (in bytes) above 16 megabytes.
104	68	R782NA	4	binary	Nucleus address below 16 megabytes.
108	6C	R782NS	4	binary	Nucleus size (in bytes) below 16 megabytes.
112	70	R782ENA	4	binary	Nucleus address above 16 megabytes.
116	74	R782ENS	4	binary	Nucleus size (in bytes) above 16 megabytes.
120	78	R782NL	4	binary	Pageable link pack area (PLPA) space redundant with MLPA/FLPA below 16 megabytes.
124	7C	R782ENL	4	binary	Pageable link pack area (PLPA) space redundant with MLPA/FLPA above 16 megabytes.
128	80	R782LPAI	4	binary	Intermodule space in Pageable link pack area (PLPA) below 16 megabytes.
132	84	R782ELPI	4	binary	Intermodule space in Pageable link pack area (PLPA) above 16 megabytes.
136	88	R782MR	4	binary	Maximum possible user region below 16 megabytes.
140	8C	R782EMR	4	binary	Maximum possible user region above 16 megabytes.
144	90	R782SQAU	40	Mixed(1)	System queue area (SQA) usage both above and below 16 megabytes. The description of the format of all fields being marked as 'Mixed(1)' can be found in Table 12 on page 722 and Table 13 on page 722.
184	B8	R782CSAU	40	Mixed(1)	CSA usage both above and below 16 megabytes, including RUCSA.
224	E0	R782CSAK	360	Mixed(1)	CSA used both above and below 16 megabytes by subpool key. 40 bytes for each of 9 keys.
584	248	R782CSAF	40	Mixed(1)	Free CSA both above and below 16 megabytes, including RUCSA.
624	270	R782CSLF	40	Mixed(1)	Largest free block of CSA both above and below 16 megabytes; can either be CSA or RUCSA.
664	298	R782CSAL	40	Mixed(1)	CSA allocated area size (in bytes) both above and below 16 megabytes, including RUCSA.
704	2C0	R782SQAF	40	Mixed(1)	Free system queue area (SQA) both above and below 16 megabytes.
744	2E8	R782SQLF	40	Mixed(1)	Largest free block of system queue area (SQA) both above and below 16 megabytes.
784	310	R782SQAL	40	Mixed(1)	System queue area (SQA) allocated area size (in bytes) both above and below 16 megabytes.
824	338	R782SQEX	40	Mixed(1)	System queue area (SQA) expansion into CSA both above and below 16 megabytes.

Offsets		Name	Length	Format	Description
864	360	R782227K	200	Mixed(1)	CSA subpool 227 (below 16 megabytes) by key. The key data appears in the following order: 0, 1, 2, 3, 4, 5, 6, 7, 8-F, ALL. 20 bytes for each of 10 keys.
1064	428	R782228K	200	Mixed(1)	CSA subpool 228 (below 16 megabytes) by key. The key data appears in the following order: 0, 1, 2, 3, 4, 5, 6, 7, 8-F, ALL. 20 bytes for each of 10 keys.
1264	4F0	R782231K	200	Mixed(1)	CSA subpool 231 (below 16 megabytes) by key. The key data appears in the following order: 0, 1, 2, 3, 4, 5, 6, 7, 8-F, ALL. 20 bytes for each of 10 keys.
1464	5B8	R782241K	200	Mixed(1)	CSA subpool 241 (below 16 megabytes) by key. The key data appears in the following order: 0, 1, 2, 3, 4, 5, 6, 7, 8-F, ALL. 20 bytes for each of 10 keys.
1664	680	R782226	20	Mixed(1)	System queue area (SQA) subpool 226 (below 16 megabytes).
1684	694	R782239	20	Mixed(1)	System queue area (SQA) subpool 239 (below 16 megabytes).
1704	6A8	R782245	20	Mixed(1)	System queue area (SQA) subpool 245 (below 16 megabytes).
1724	6BC	R782RUCA	4	binary	RUCSA address below 16 megabytes.
1728	6C0	R782RUCS	4	binary	RUCSA size (in bytes) below 16 megabytes. Zero when RUCSA is not defined.
1732	6C4	R782ERUCA	4	binary	RUCSA address above 16 megabytes. Equal to R782EPA when extended RUCSA (ERUCSA) is not defined.
1736	6C8	R782ERUCS	4	binary	RUCSA size (in bytes) above 16 megabytes. Zero when ERUCSA is not defined.

Virtual Storage Private Area Data Section

This section contains triplet SMF78ASS.

Offsets		Name	Length	Format	Description
0	0	R782JOBN	8	EBCDIC	Name of job being monitored.
8	8	R782RDTM	4	binary	Reader start time.
12	C	R782RDDT	4	packed	Reader start date.
16	10	R782SUBI	2	binary	Index of first subpool entry in the Private Area Subpool section for this job. This field provides the first array element for this job's Private Area Subpool sections.
18	12	R782SUBN	2	binary	Index of last subpool entry for this job. This field provides the last array element for this job's private area subpools.
20	14	R782STEP	8	EBCDIC	Name of step active when monitoring began.
28	1C	R782PGMN	8	EBCDIC	Program name (taken from PGM= parameter on EXEC card) of job being monitored.

Offsets		Name	Length	Format	Description
36	24	R782FLGS	2	binary	Flags **Bit** **Meaning when set** **0** Job active at start of interval **1** Job terminated during interval **2** GETMAIN limit changed during interval **3** Data incorrect because RMF terminated abnormally while sampling **4-15** Reserved.
38	26		2		Reserved.
40	28	R782SAMP	4	binary	Number of samples. This field is used to calculate the averages in the private area data and Private Area Subpool sections.
44	2C	R782REGR	4	binary	Region requested by JCL (in bytes).
48	30	R782RGAB	4	binary	Region below 16 megabytes assigned by exits (in bytes).
52	34	R782RGAA	4	binary	Region above 16 megabytes assigned by exits (in bytes).
56	38	R782GMLB	4	binary	GETMAIN limit below 16 megabytes (in bytes).
60	3C	R782GMLA	4	binary	GETMAIN limit above 16 megabytes (in bytes).
64	40	R782URAB	4	binary	User region address below 16 megabytes.
68	44	R782URAA	4	binary	User region address above 16 megabytes.
72	48	R782LSFP	40	Mixed(1)[1]	LSQA/SWA/229/230/249 free pages both above and below 16 megabytes.
112	70	R782LSFB	40	Mixed(1)	LSQA/SWA/229/230/249 largest free block both above and below 16 megabytes.
152	98	R782LSAL	40	Mixed(1)	LSQA/SWA/229/230/249 allocated area size (in bytes) both above and below 16 megabytes.
192	C0	R782LSPA	40	Mixed(1)	LSQA/SWA/229/230/249 allocated pages both above and below 16 megabytes.
232	E8	R782USFP	40	Mixed(1)	User region free pages both above and below 16 megabytes.
272	110	R782USFB	40	Mixed(1)	User region largest free block both above and below 16 megabytes.
312	138	R782USAL	40	Mixed(1)	User region allocated area size (in bytes) above 16 megabytes.
352	160	R782USPA	40	Mixed(1)	User region pages allocated both below and above 16 megabytes.
392	188	R782TOBY	48	Mixed(2)[2]	Number of bytes allocated in storage above the 2-GB-line.
440	1B8	R782SHBY	48	Mixed(2)	Number of bytes allocated in shared memory objects.
488	1E8	R782COBY	48	Mixed(2)	Number of high virtual common bytes allocated.
536	218	R782TOMO	40	Mixed(3)[3]	Total number of memory objects allocated in high virtual storage.
576	240	R782SHMO	40	Mixed(3)	Number of memory objects allocated in high virtual shared storage.
616	268	R782COMO	40	Mixed(3)	Number of memory objects allocated in high virtual common storage.
656	290	R782LGMO	40	Mixed(3)	Number of fixed memory objects that can be backed in 1 MB frames.
696	2B8	R782TOFR	40	Mixed(3)	Number of 1 MB frames that are fixed in central storage.
736	2E0	R782MEML	8	binary	Address space memory limit in MB.
744	2E8	R782FIFR	40	Mixed(3)	Number of 1 MB frames that can be used by fixed memory objects.

Offsets		Name	Length	Format	Description
784	310	R782PAFR	40	Mixed(3)	Number of 1 MB frames that are used by pageable/DREF memory objects.
824	338	R782LSMO	40	Mixed(3)	Number of shared memory objects that can be backed in 1 MB frames.
864	360	R782GFMO	40	Mixed(3)	Number of fixed memory objects that are backed in 2 GB frames.
904	388	R782GFFR	40	Mixed(3)	Number of 2 GB pages that are fixed in central storage.
[1] **Mixed(1):** These bytes have formats as described in Table 12 on page 722 and Table 13 on page 722. [2] **Mixed(2):** These bytes have formats as described in Table 14 on page 723. [3] **Mixed(3):** These bytes have formats as described in Table 15 on page 723.					

Virtual Storage Private Area Subpool Section

This section contains triplet SMF78SPS.

Offsets		Name	Length	Format	Description
0	0	R782SPN	2	binary	Subpool number. Each Private Area data section occurs one after the other. All Private Area Subpool sections follow all Private Area data sections. To relate a subpool to a job, see the R782SUBN fields in the Private Area data section.
2	2		2		Reserved.
4	4	R782SPD	20	Mixed(1)[1]	Subpool data.
[1] **Mixed(1):** These bytes have formats as described in Table 12 on page 722 and Table 13 on page 722.					

Format descriptions

For fields of format Mixed(1) containing data from below 16 megabytes, use only the first 20 bytes. For fields of this format containing data from both below and above 16 megabytes, use all 40 bytes.

Table 12. Byte structure for data collected below 16 megabytes - Mixed(1)

Offsets		Name	Length	Format	Description
0	0	VSDBMIN	4	binary	Minimum value for below 16 megabytes.
4	4	VSDBNTME	4	binary	Time stamp for minimum. Format is high-order bytes of time-of-day (TOD) clock.
8	8	VSDBMAX	4	binary	Maximum value for below 16 megabytes.
12	C	VSDBXTME	4	binary	Time stamp for maximum. Format is high-order bytes of time-of-day (TOD) clock.
16	10	VSDBTOTL	4	floating	Total for all samples below 16 megabytes (used to calculate average). See SMF78SAM to calculate averages for Common Storage data section fields, and R782SAMP to calculate averages for private area data and Private Subpool section fields.

Table 13. Byte structure for data collected above 16 megabytes - Mixed(1)

Offsets		Name	Length	Format	Description
20	14	VSDAMIN	4	binary	Minimum value for above 16 megabytes.
24	18	VSDANTME	4	binary	Time stamp for minimum. Format is high-order bytes of time-of-day (TOD) clock.
28	1C	VSDAMAX	4	binary	Maximum value for above 16 megabytes.
32	20	VSDAXTME	4	binary	Time stamp for maximum. Format is high-order bytes of time-of-day (TOD) clock.
36	24	VSDATOTL	4	floating	Total for all samples above 16 megabytes (used to calculate average).

Table 14. Byte structure for Mixed(2)

Offsets		Name	Length	Format	Description
0	0	VSDGMIN	8	floating	Minimum number of bytes allocated above 2GB.
8	8	VSDGNTME	4	binary	Time stamp for minimum value.
12	C		4		Reserved.
16	10	VSDGMAX	8	floating	Maximum number of bytes allocated above 2GB.
24	18	VSDGXTME	4	binary	Time stamp for maximum value.
28	1C		4		Reserved.
32	20	VSDGTOTL	8	floating	Total for all samples above 2GB (used to calculate the average).
40	28	VSDGHWM	8	floating	Peak number of bytes allocated in storage above 2GB.

Table 15. Byte structure for Mixed(3)

Offsets		Name	Length	Format	Description
0	0	VSDCMIN	8	floating	Minimum number high virtual memory objects / frames
8	8	VSDCNTME	4	binary	Time stamp for minimum value.
12	C		4		Reserved.
16	10	VSDCMAX	8	floating	Maximum number of high virtual memory objects / frames
24	18	VSDCXTME	4	binary	Time stamp for maximum value.
28	1C		4		Reserved.
32	20	VSDCTOTL	8	floating	Total for all samples (used to calculate the average).

Subtype 3 I/O Queuing Activity

I/O queuing global section

This section contains triplet SMF78QDS.

Offsets		Name	Length	Format	Description
0	0	R783GFLG	1	binary	IOQ global flags **Bit** **Meaning when set** **0** Incorrect data because channel measurement facility failed **1** DIAGNOSE interface failed **2** Store Primary Queue Data not supported **3** DCM supported by hardware **4** Configuration contains DCM managed channels **5** IOP utilization data supported **6** Initial command response time measurements supported **7** First-transfer-ready-disabled data available

Offsets		Name	Length	Format	Description
1	1	R783GFLX	1	binary	IOQ global flags extended **Bit** **Meaning when set** **0** Alias management groups available. **1** EADM compression facility available. **2** Storage-class memory measurement facility available. **3 - 7** Reserved.
2	2	R783GNTR	2	binary	Number of descriptor triplets following.
4	4	R783GIDS	4	binary	Offset to I/O Processor (IOP) Initiative Queue data section.
8	8	R783GIDL	2	binary	Length of I/O Processor (IOP) Initiative Queue data section.
10	A	R783GIDN	2	binary	Number of I/O Processor (IOP) Initiative Queue data sections.
12	C		4		Reserved.
16	10	R783TSR	2	binary	Total number of small records written during interval.
18	12		2		Reserved.
20	14	R783TOT	4	binary	Total number of data sections recorded during the interval.
24	18	R783NXT	4	binary	Total number of data sections in the following record.
28	1C	R783CFL	1	binary	Configuration change flags **Bit** **Meaning when set** **0** Configuration changed. Used to decide whether to provide the text “POR” or “ACTIVATE” on reports. Also used to check whether data can be combined in a duration report. **1** Configuration change since power on reset (POR). **2** POR using IOC data set that contains a token. **3** I/O token is valid. **4** Hardware allows multiple channel subsystems. **5-7** Reserved.
29	1D	R783CSS	1	binary	Channel Subsystem ID. Only valid if bit 4 of R783CFL is set.
30	1E		2		Reserved.
32	20	R783TNM	44	EBCDIC	IODF name.
76	4C	R783TSF	2	EBCDIC	IODF name suffix.
78	4E		2		Reserved.
80	50	R783TOK	16	EBCDIC	Partial token information.
80	50	R783TDT	8	EBCDIC	IODF creation date, in the form *mm/dd/yy*.
88	58	R783TTM	8	EBCDIC	IODF creation time, in the form *hh.mm.ss*.
96	60	R783TDY	10	EBCDIC	IODF creation date, in the form *mm/dd/yyyy*.
106	6A		2		Reserved.

IOP Initiative Queue and Utilization Data Section

This section contains one entry per IOP described by triplet R783GIDS. The contents of the fields R783IIPB through R783IDVB are valid if bit 5 of R783GFLG is set.

Offsets		Name	Length	Format	Description
0	0	R783IQID	2	binary	Input output processor (IOP) initiative queue identifier.
2	2	R783IFLG	1	binary	Input output processor (IOP) Flags **Bit** **Meaning when set** **0** Input output processor (IOP) is installed. **1-7** Reserved.
3	3	*	1	*	Reserved.
4	4	R783IQSM	4	binary	Accumulator is incremented by the current queue length in the Input output processor (IOP) whenever a request is enqueued.
8	8	R783IQCT	4	binary	Number of elements enqueued on the Input output processor (IOP) initiative queue.
12	C	*	4	*	Reserved.
16	10	R783IIPB	8	floating	Number of times the I/O processor was busy.
24	18	R783IIPI	8	floating	Number of times the I/O processor was idle.
32	20	R783IIFS	8	floating	Number of I/O functions initially started.
40	28	R783IPII	8	floating	Number of processed I/O interrupts.
48	30	R783ICPB	8	floating	Number of times an I/O was retried due to channel path busy.
56	38	R783IDPB	8	floating	Number of times an I/O was retried due to director port busy.
64	40	R783ICUB	8	floating	Number of times an I/O was retried due to control unit busy.
72	48	R783IDVB	8	floating	Number of times an I/O was retried due to device busy.
80	50	R783ISCB	8	floating	Number of times the I/O processor was busy with SCM operations.
88	58	R783IECB	8	floating	Number of times the I/O processor was busy with compression or decompression.
96	60	*	8	*	Reserved.

I/O Queuing Configuration Control Section

This section contains one entry per LCU, described by triplet SMF78DCS.

Offsets		Name	Length	Format	Description
0	0	R783ID1	2	binary	Logical control unit identifier.
2	2	R783NTR	2	binary	Number of triplets following.
4	4	R783CPDS	4	binary	Offset to I/O Queuing Configuration data section from start of section.
8	8	R783CPDL	2	binary	Length of I/O Queuing Configuration data section.
10	A	R783CPDN	2	binary	Number of I/O Queuing Configuration data sections.
12	C	*	3	*	Reserved.
15	F	R783AMGC	1	binary	The alias management group number defined on the physical controller for this LCU. This number is valid, if the LCU is assigned to a DASD subsystem that supports alias management groups and bit 7 of R783DST is set.

Offsets		Name	Length	Format	Description
16	10	R783AMGS	4	binary	The alias management group number assigned by z/OS for this LCU on this system. This number is valid, if the LCU is assigned to a DASD subsystem that supports alias management groups and bit 7 of R783DST is set.

I/O Queuing Configuration Data Section

This section contains one entry per channel path, described by triplet R783CPDS in the I/O Queuing Configuration control section.

Offsets		Name	Length	Format	Description
0	0	R783CPID	1	binary	Channel path identifier.
1	1	R783CPST	1	binary	Channel path status **Bit** **Meaning when set** **0** Channel path installed **1** Channel path online **2** Channel path varied **3** Channel path offline to all devices of the LCU **4** Channel path connection to all devices of the LCU altered by VARY PATH command during interval **5** Measured channel path data incorrect **6** Channel path is DCM managed **7** CHPID manipulated, requiring data reset
2	2	R783CUN	2	binary	Number of control units attached.
4	4	R783CU1	2	binary	First control unit attached.
6	6	R783CU2	2	binary	Second control unit attached.
8	8	R783CU3	2	binary	Third control unit attached.
10	A	R783CU4	2	binary	Fourth control unit attached.
12	C	R783CUB	4	binary	Number of times control unit was busy.
16	10	R783PT	4	binary	Number of times channel path was taken.
20	14		4		Reserved.
24	18	R783DPB	4	binary	Number of times that the Director Port was busy.
28	1C	R783CBT	4	binary	Delay time of an I/O request because the control unit was busy.
32	20	R783CMR	4	binary	Initial command response time until the first command is indicated as accepted by the device.
36	24	R783SBS	4	binary	Switch busy count summation: contains the switch busy counts received for all partitions.
40	28		4		Reserved.

Offsets		Name	Length	Format	Description
44	2C	R783CPXF	1	binary	Channel path extended flags **Bit** **Meaning when set** **0** Extended I/O measurement-block format-1 data available **1** Extended I/O measurement-block format-2 data available **2** First-transfer-ready-disabled supported **3-7** Reserved.
45	2D	R783CPAT	1	binary	Path attributes **Value** **Meaning** **0** Not specified for this path. **1** Preferred path. **2** Non-preferred path.
46	2E		2		Reserved.
48	30	R783CTMW	4	binary	Transport mode write count
52	34	R783CTRD	4	binary	First-transfer-ready-disabled write count
56	38		8		Reserved.

I/O Queuing Data Section

This section contains entry one per LCU, described by triplet SMF78ASS.

Offsets		Name	Length	Format	Description
0	0	R783ID2	2	binary	Logical control unit identifier.
2	2	R783DST	1	binary	Data Status **Bit** **Meaning when set** **0** No hardware measurements available **1** Dynamically changed **2** Dynamically added **3** Configuration change attempted **4** LCU contains DCM managed channels **5** Path attributes are valid. **6** LCU has HyperPAV devices. **7** LCU has SuperPAV devices.

Offsets		Name	Length	Format	Description
3	3	R783DSTX	1	binary	Data status extension. **Bit** **Meaning when set** **0** LCU contains at least one FICON channel. **1** Connect time of at least one device is invalid. **2** Disconnect time of at least one device is invalid. **3-7** Reserved.
4	4	R783QSM	4	binary	Sum of total length of the CU-HDR queue.
8	8	R783QCT	4	binary	Number of entries on the CU-HDR queue.
12	C	R783MCMN	2	binary	Minimum number of DCM managed channels used.
14	E	R783MCMX	2	binary	Maximum number of DCM managed channels used.
16	10	R783MCDF	2	binary	Defined number of DCM managed channels.
18	12		2		Reserved.
20	14	R783PTM	4	binary	Accumulated path taken count for DCM managed channels.
24	18	R783DPBM	4	binary	Accumulated director port busy count for DCM managed channels.
28	1C	R783CUBM	4	binary	Accumulated control unit busy count for DCM managed channels.
32	20	R783CBTM	4	binary	Accumulated delay time for DCM-managed channels because of a busy control unit.
36	24	R783CMRM	4	binary	Accumulated initial command response time for DCM-managed channels.
40	28	R783SBSM	4	binary	Switch busy count summation for DCM-managed channels.
44	2C	R783DCTM	4	binary	Accumulated device connect time in units of 128 microseconds.
48	30	R783DDTM	4	binary	Accumulated device disconnect time in units of 128 microseconds.
52	34	R783CSST	4	binary	Channel subsystem wait time in units of 128 microseconds.
56	38	R783HCNT	2	binary	Number of HyperPAV/SuperPAV data sections for that LCU.
58	3A	R783HIX	2	binary	Index to first HyperPAV/SuperPAV data section for that LCU.
60	3C	R783TMWM	4	binary	Accumulated transport mode write count for DCM managed channels.
64	40	R783TRDM	4	binary	Accumulated first-transfer-ready-disabled write count for DCM managed channels.
68	44		8		Reserved.

HyperPAV/SuperPAV Data Section

This section contains one entry per CU, described by SMF78HPS.

Note: The fields in this data section contain valid data when bit 6 of R783DST is set, unless indicated otherwise in the Description column.

Offsets		Name	Length	Format	Description
0	0	R783HLCU	2	binary	HyperPAV Logical control unit identifier.
2	2	R783HCU	2	binary	HyperPAV control unit identifier.
4	4		4		Reserved.
8	8	R783HNAI	4	floating	The number of times an I/O could not start because no HyperPAV-aliases were available.
12	C	R783HTIO	4	floating	The total number of HyperPAV I/O requests for the LSS.
16	10	R783HAIU	4	binary	The high water mark of the number of in-use HyperPAV-alias devices for the LSS (does not include borrowed alias devices).
20	14	R783HCAD	4	binary	The high water mark of the number of aliases concurrently in use by one of the HyperPAV-base devices of the LSS (including loaned alias devices).
24	18	R783HIOQ	4	binary	The high water mark of queued I/O requests.
28	1C		12		Reserved.
40	28	R783XANC	4	floating	The number of times an alias was needed to start an I/O.
44	2C	R783XAUC	4	floating	The number of times an alias was needed to start an I/O and one was used.
48	30	R783XNHC	4	floating	The number of times an alias was needed to start an I/O, but none was available in the home LCU. Valid only if bit 7 of R783DST is set.
52	34	R783XABC	4	floating	The number of times an alias was borrowed from a peer LCU. Valid only if bit 7 of R783DST is set.
56	38	R783XCBC	4	binary	The number of aliases concurrently borrowed from peer LCUs. Valid only if bit 7 of R783DST is set.
60	3C	R783XHBC	4	binary	The high water mark of concurrently borrowed aliases from peer LCUs. Valid only if bit 7 of R783DST is set.
64	40	R783XALC	4	floating	The number of times an alias was loaned to a peer LCU. Valid only if bit 7 of R783DST is set.
68	44	R783XCLC	4	binary	The number of aliases concurrently loaned to peer LCUs. Valid only if bit 7 of R783DST is set.
72	48	R783XHLC	4	binary	The high water mark of concurrently loaned aliases to peer LCUs. Valid only if bit 7 of R783DST is set.
76	4C	R783XNAG	4	floating	The number of attempts that were made to borrow an alias from peer LCUs, but none were available. Valid only if bit 7 of R783DST is set.
80	50	R783XCQD	4	floating	The cumulative number of I/Os queued at the subsystem level when aliases were needed.
84	54	R783XCIU	4	floating	The cumulative number of aliases defined to this subsystem that were in use when aliases were needed.

Record type 79 (X'4F') — RMF Monitor II activity

Reference information:

- For information on using RMF, see *z/OS RMF Reporter User's Guide*.
- For information on Monitor I and II, see *z/OS RMF Report Analysis*.
- For more information on performance groups, see *z/OS MVS Initialization and Tuning Guide*.

Record type 79 is written during a Monitor II background session when feedback is requested as SMF records. It is written at each measurement interval and when the session is terminated. It contains a section that is identical for all Monitor II reports and a subtype section that is unique for each report. The subtypes are:

Subtype 1
Contains information that describes address space state data (and address space state data by job name) for each address space identifier included.

Subtype 2
Contains information that describes address space resource data (and address space resource data by job name) activity. The length depends on the number of devices.

Subtype 3
Contains information that describes central storage/processor/SRM activity.

Subtype 4
Contains information that describes paging activity.

Subtype 5
Contains information that describes address space SRM data (and address space SRM data by job name).

Subtype 6
Contains information that describes reserve data.

Subtype 7
Contains information that describes enqueue contention data.

Subtype 9
Contains information that describes device activity. The length depends upon the number of devices.

Subtype 11
Contains information that describes paging data set activity. The length is variable.

Subtype 12
Contains information that describes channel path activity. The length is variable.

Subtype 14
contains information that describes I/O queuing activity by logical control unit. The length is variable.

Note: Your installation may produce several type 79 subtype 14 records.

Subtype 15
contains information about IRLM long locks.

Note: The records of this subtype have no RMF Product section (as indicated in field SMF79PRN) and have no Monitor II control section.

Note: All fields with format s_*float* have the type *short format floating point*.

Macro to symbolically address record type 79

The SMF record mapping macro for all records produced by RMF is ERBSMFR. Its format is ERBSMFR (*n1*,*n2*,...) where *n1*,*n2*, ... are the SMF record types you want to map. Note that the parentheses are required only when two or more record types are specified. The mapping macro resides in SYS1.MACLIB.

Record environment

The following conditions exist for the generation of this record:

Macro
SMFWTM (record exit: IEFU83)

Mode
Task

Storage Residency
31-bit

Record mapping

Header/Self-defining Section

This section contains the common SMF record headers fields and the triplet fields (offset/length/number), if applicable, that locate the other sections on the record.

Offsets		Name	Length	Format	Description
0	0	SMF79LEN	2	binary	Record length. This field and the next field (total of four bytes) form the RDW (record descriptor word). See "Standard and Extended SMF record headers" on page 162 for a detailed description.
2	2	SMF79SEG	2	binary	Segment descriptor (see record length field).
4	4	SMG79FLG	1	binary	System indicator: **Bit** **Meaning when set** **0** New SMF record format **1** Subtypes used **2** Reserved. **3-6** Version indicators* **7** System is running in PR/SM mode. *See "Standard and Extended SMF record headers" on page 162 for a detailed description.
5	5	SMF79RTY	1	binary	Record type 79 (X'4F').
6	6	SMF79TME	4	binary	Time since midnight, in hundredths of a second, when the record was moved into the SMF buffer.
10	A	SMF79DTE	4	packed	Date when the record was moved into the SMF buffer, in the form 0*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for a detailed description.
14	E	SMF79SID	4	EBCDIC	System identification (from the SMFPRMxx SID parameter).
18	12	SMF79SSI	4	EBCDIC	Sub-system identification ('RMF').
22	16	SMF79STY	2	binary	Record subtype.
24	18	SMF79TRN	2	binary	Number of triplets in this record. A triplet is a set of three SMF fields (offset/length/number values) that defines a section of the record.
26	1A		2		Reserved.
28	1C	SMF79PRS	4	binary	Offset to RMF Product section from start of record, including record descriptor word (RDW).
32	20	SMF79PRL	2	binary	Length of RMF Product section.
34	22	SMF79PRN	2	binary	Number of RMF Product sections.
Individual header extension for subtypes 1 - 14:					
36	24	SMF79MCS	4	binary	Offset to Monitor II control section from start of record, including record descriptor word (RDW).
40	28	SMF79MCL	2	binary	Length of Monitor II control section.
42	2A	SMF79MCN	2	binary	Number of Monitor II control sections.
44	2C	SMF79ASS	4	binary	Offset to data section from start of record, including record descriptor word (RDW).

Offsets		Name	Length	Format	Description
48	30	SMF79ASL	2	binary	Length of data section.
50	32	SMF79ASN	2	binary	Number of data sections.
The following six fields are not present for all subtypes:					
52	34	SMF79DCS	4	binary	Offset to control section from start of record, including record descriptor word (RDW).
56	38	SMF79DCL	2	binary	Length of control section.
58	3A	SMF79DCN	2	binary	Number of control sections.
60	3C	SMF79QSS	4	binary	Offset to Input/Output Queue (IOQ) queuing control from start of record, including record descriptor word (RDW).
64	40	SMF79QSL	2	binary	Length of Input/Output Queue (IOQ) global section.
66	42	SMF79QSN	2	binary	Number of Input/Output Queue (IOQ) global sections.
Individual header extension for subtype 15:					
36	24	SMF79FPO	4	binary	Offset to IMS Long Lock data section.
40	28	SMF79FPL	2	binary	Length of IMS Long Lock data section.
42	2A	SMF79FPN	2	binary	Number of IMS Long Lock data sections.

RMF Product Section

Offsets		Name	Length	Format	Description
0	0	SMF79MFV	2	packed	RMF version number.
2	2	SMF79PRD	8	EBCDIC	Product name.
10	A	SMF79IST	4	packed	Snap shot time for Monitor II report, in the form 0*hhmmssF*, where *hh* is the hours, *mm* is the minutes, *ss* is the seconds, and *F* is the sign.
14	E	SMF79DAT	4	packed	Snap shot date for Monitor I report, in the form 0*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for a detailed description.
18	12	SMF79INT	4	packed	Duration of the RMF Monitor I measurement interval, in the form *mmsstttF* where *mm* is the minutes, *ss* is the seconds, *ttt* is the milliseconds, and *F* is the sign. (The end of the measurement interval is the sum of the recorded start time and this field.)
22	16		2		Reserved.
24	18	SMF79SAM	4	binary	Number of RMF samples.
28	1C		2		Reserved.

Offsets		Name	Length	Format	Description
30	1E	SMF79FLA	2	binary	Flags **Bit** **Meaning when set** **0** Reserved. **1** Samples have been skipped. **2** Record was written by RMF Monitor III. **3** Interval was synchronized with SMF. **4 - 8** Reserved. **9** zIIP boost was active during entire interval. **10** Speed boost was active during entire interval. **11 - 12** Reserved. **13 - 15** Boost class: `001`: IPL `010`: Shutdown `011`: Recovery process **Note:** The boost class value is valid only when one or more boosts is active; that is, a boost active bit is also on.
32	20		4		Reserved.
36	24	SMF79CYC	4	packed	Sampling cycle length, in the form 000*tttt**F*, where *tttt* is the milliseconds and *F* is the sign (taken from CYCLE option). The range of values is 0.050 to 9.999 seconds.
40	28	SMF79MVS	8	EBCDIC	z/OS software level (consists of an acronym and the version, release, and modification level - ZV*vvrrmm*).
48	30	SMF79IML	1	binary	Indicates the type of processor complex on which data measurements were taken. **Value** **Meaning** **3** 9672, zSeries

Offsets		Name	Length	Format	Description
49	31	SMF79PRF	1	binary	Processor flags. **Bit** **Meaning when set** **0** The system has expanded storage **1** The processor is enabled for ES connection architecture (ESCA) **2** There is an ES connection director in the configuration **3** System is running in z/Architecture mode **4** At least one zAAP is currently installed **5** At least one zIIP is currently installed **6** Enhanced DAT facility 1 available **7** Enhanced DAT facility 2 available
50	32	SMF79PTN	1	binary	PR/SM partition number of the partition that wrote this record.
51	33	SMF79SRL	1	binary	SMF record level change number (X'8E' for z/OS V2R4 RMF with RMF Data Gatherer APAR OA59330). This field enables processing of SMF record level changes in an existing release.
52	34	SMF79IET	8	char	Interval expiration time token. This token can be used to identify other than RMF records that belong to the same interval (if interval was synchronized with SMF). (The value of the field is zero for Monitor II records.)
60	3C	SMF79LGO	8	binary	Offset GMT to local time (STCK format).
68	44	SMF79RAO	4	binary	Offset to reassembly area relative to start of RMF Product section.
72	48	SMF79RAL	2	binary	Length of reassembly area. Area consists of a fixed header and a variable number of information blocks. Length depends on the record type/subtype, but is fixed for a specific type/subtype.
74	4A	SMF79RAN	2	binary	Reassembly area indicator. **Value** **Meaning** **0** Record is not broken. **1** Record is broken. **Note:** This field is used to indicate whether an SMF record is a broken record. Therefore, offset (SMF79RAO) and length (SMF79RAL) are only valid if SMF79RAN = 1. A reassembly area is only present in broken records.
76	4C	SMF79OIL	2	binary	Original interval length as defined in the session or by SMF (in seconds).
78	4E	SMF79SYN	2	binary	SYNC value in seconds.
80	50	SMF79GIE	8	binary	Projected gathering interval end (STCK format) GMT time.
88	58	SMF79XNM	8	EBCDIC	Sysplex name as defined in parmlib member COUPLExx.
96	60	SMF79SNM	8	EBCDIC	System name for current system as defined in parmlib member IEASYSxx SYSNAME parameter.
Reassembly Area:					

Offsets		Name	Length	Format	Description
0	0	SMF79RBR	2	binary	Total number of broken records built from the original large record.
2	2	SMF79RSQ	2	binary	Sequence number of this broken record. Every broken record built from the same large record must have a unique sequence number, it is in the range from 1 to SMF79RBR.
4	4	SMF79RIO	4	binary	Offset to first reassembly information block relative to start of reassembly area header.
8	8	RMF79RIL	2	binary	Length of reassembly information block.
10	A	SMF79RIN	2	binary	Number of reassembly information blocks (same value as SMF79TRN in header section).
12	C		4		Reserved.
Reassembly Area Information Block:					
0	0	SMF79RNN	2	binary	Total number of sections in the original large record. This field contains information of how many sections of a specific type were contained in the original SMF record. This field is a copy of the number field of the triplet in the original (non broken) record.
2	2	SMF79RPP	2	binary	Position of the first of one or more consecutive sections described by this block as in the original record. Values in the range of 1 to SMF79RNN are valid for correct processing. A value of 0 will skip processing of this information block. This field provides information where the sections that are part of this broken record were placed in the original record before the split took place. The actual number of consecutive sections contained in this record is available from the actual triplet in the header extension.

Monitor II Control Section

Offsets		Name	Length	Format	Description
0	0	R79GTOD	4	packed	Time when the call to data gatherer was issued, in the form 0*hhmmssF*, where *hh* is the hours, *mm* is the minutes, *ss* is the seconds, and *F* is the sign.
4	4	R79LF2	1	binary	Flags **Bit** — **Meaning when set** **0** — Not enough relocate data sections to complete data gathering **1** — Report will be sorted by storage group **2** — Incorrect RSM data obtained **3** — Reserved. **4** — Invalid transaction data **5** — SRM mode changed **6** — Invalid data from Monitor I (DEV PGSP IOQ). **7** — Incomplete device data due to too many active devices in the system.
5	5		1		Reserved.
6	6	R79SES	2	EBCDIC	RMF session identifier.

Offsets		Name	Length	Format	Description
8	8		2		Reserved.
10	A		2		Reserved for user.
12	C	R79RID	8	EBCDIC	Measurement name.
20	14	R79CTXTL	2	binary	Length of command text.
22	16	R79CTEXT	32	EBCDIC	Text of command.
54	36	R79DTXTL	2	binary	Length of data reporter default text.
56	38	R79DTEXT	32	EBCDIC	Default data reporter text.
88	58	R79IST	4	EBCDIC	Monitor I internal start time, in the form 0*hhmmssF*, where *hh* is the hours, *mm* is the minutes, *ss* is the seconds, and *F* is the sign.
92	5C	R79TSR	2	binary	Total number of small records.
94	5E		2		Reserved.
96	60	R79TOT	4	binary	Total number of data sections in large record.
100	64	R79NXT	4	binary	Number of data sections in following small records.
104	68	R79IWMTK	8	EBCDIC	Token returned from IWMRCOLL service.

Subtype 1 — Address Space State Data

ASD and ASDJ data section

Offsets		Name	Length	Format	Description
0	0	R791ASID	2	binary	Address space identifier.
2	2	R791JBN	8	EBCDIC	Name of job.
10	A	R791DMN	2	binary	Reserved.
12	C	R791NPG	2	binary	Reserved.
14	E	R791PGP	2	binary	Reserved.
16	10	R791TTOD	4	binary	Real time into transaction (milliseconds).

Offsets		Name	Length	Format	Description
20	14	R791CL	2	EBCDIC	Current location. (Set to IN when all other indicators are off.) **Contents** **Meaning** **DL** Out queue/delayed **IN** In storage **LO** Logically swapped out **NS** Non-swappable **PR** Privileged **OT** Swapped out and ready **WL** Wait queue/long wait **WM** Wait queue/MSO **WO** Wait queue/reasons other than WM, WL, or WT **WT** Wait queue/terminal wait **>>** Transitioning out **<<** Transitioning in.
22	16	R791TAS	2	binary	Type of user **Contents** **Meaning** **0** Batch **1** Started task **2** Mount task **3** TSO/E **4** ASCH **5** OMVS address space.

Offsets		Name	Length	Format	Description
24	18	R791SRC	2	EBCDIC	Reason for last swap-out **Contents** **Meaning** **TO** Terminal output **TI** Terminal input **LW** Long wait **XS** Auxiliary storage shortage **RS** Central storage shortage **DW** Detected wait **MP** Memory Pool shortage **NQ** CAP enqueue **EX** CAP exchange **US** CAP uni-swap **TS** Transition swap **IC** Improve central storage usage **IP** Improve system paging rate **MR** Make room for a user who has been swapped out too long **AW** APPC WAIT (swapped out, because waiting for APPC services) **IW** OMVS input wait **OW** OMVS output wait **SR** In-real swap **00** Unknown.
26	1A	R791DP	2	binary	Dispatcher priority.
28	1C		6		Reserved.
34	22	R791SWC	2	binary	Transaction swap count.
36	24	R791SWMR	2	binary	SRM work load recommendation value.
38	26		4		Reserved.
42	2A	R791WMS	4	binary	SRM service for the current transaction since the last swap-in.
46	2E	R791TCPU	4	binary	CPU time (TCB + SRB) for current job step, in milliseconds.
50	32		4		Reserved.
54	36	R791ESCT	4	binary	Number of pages on expanded storage frames.
58	3A		2		Reserved.
60	3C	R791PIN	4	binary	Page-in count.

Offsets		Name	Length	Format	Description
64	40	R791TRTM	4	binary	Transaction residency time, in milliseconds.
68	44	R791FLG	1	binary	**Bit** **Meaning when set** **0** Cross memory address space **1** Data in R791CTAR is valid **2** Data in R791VAL is valid **3** Reserved. **4** If ON: this address space is a server address space If OFF: goal specified for this address space is being honored by WLM **5** Address space has been quiesced by a RESET command **6** Address space matched a classification rule in the active policy which prevents managing the region based on the response time goals of its served transactions **7** Server has temporal affinity to clients.
69	45	R791FLG2	1	binary	Additional bits. **Bit** **Meaning when set** **0** Service class assigned by classification, or RESET SRVCLASS was designated CPU-critical in the active policy. **1** Address space matched a classification rule in the active policy which was designated storage-critical. **2** Address space is serving transactions which belong to a service class that was designated storage-critical in the active policy's classification rules, or is running in SYSTEM/SYSSTC. **3** CPU protection was assigned either to the address space or to transaction service classes being served by the space. **4** Storage protection was assigned either to the address space or to transaction service classes being served by the space. **5** The dispatching priority of the address space is currently promoted due to a chronic resource contention. **6** Address space is a CICS TOR that matched a classification rule in the active policy which allows managing the region based on the region goals but also ensures that completed transactions are reported and used for management of the CICS AORs. **7** Honor priority ineligibility was assigned either to the address space or to transaction service classes being served by the space.
70	46	R791FMCT	4	binary	Number of central storage frames.
74	4A	R791WSS	4	binary	Working set at last swap in.

Offsets		Name	Length	Format	Description
78	4E	R791TWSS	4	binary	RSM target working set size.
82	52	R791ESHP	4	binary	Number of hiperspace expanded storage pages used by job.
86	56	R791ESVI	4	binary	Number of VIO expanded storage pages used by job.
90	5A	R791HIN	4	binary	Number of ESO hiperspace page-ins by block.
94	5E	R791HRMS	4	binary	Number of ESO hiperspace read misses by job (a read miss is an attempt to read a frame that is not in expanded storage).
98	62	R791BPIN	4	binary	Number of blocked pages brought in from DASD.
102	66	R791PINE	4	binary	Number of pages brought in from expanded storage.
106	6A	R791BPNE	4	binary	Number of blocked pages brought in from expanded storage.
110	6E	R791CTAR	4	binary	Central storage target number of frames.
114	72	R791VAL	4	binary	Recommendation value for working-set-managed address spaces.
118	76	R791SCL	8	EBCDIC	Service class name.
126	7E	R791SCP	2	binary	Service class period.
128	80	R791WKLD	8	EBCDIC	Workload name.
136	88	R791RGRP	8	EBCDIC	Resource group name.
144	90	R791SPI	4	binary	Number of page-ins from auxiliary storage for shared page groups.
148	94	R791CMNI	4	binary	Number of common pages for current transaction.
152	98	R791PNV	4	binary	Number of non-VIO pages for current transaction.
156	9C	R791PVIO	4	binary	Number of VIO pages for current transaction.
160	A0	R791EXCT	4	binary	EXCP count for this step.
164	A4	R791TCPC	4	binary	Total CPU time consumed in this address space, in milliseconds.
168	A8	R791ASST	4	binary	CPU time consumed by preemptible-class SRBs running on behalf of this address space, in milliseconds.
172	AC	R791PHTM	4	binary	CPU time consumed by preemptible-class SRBs running in this address space, in milliseconds.
176	B0	R791RCL	8	EBCDIC	Report class name.
184	B8	R791MLIM	8	binary	Address space memory limit, in megabytes.
192	C0	R791TIFA	4	binary	CPU time in milliseconds consumed on zAAPs.
196	C4	R791TCP	4	binary	CPU time in milliseconds consumed on standard CPs. Only valid if zAAPs or zIIPs are in the configuration.
200	C8	R791TIFC	4	binary	CPU time in milliseconds consumed on standard CPs by work that was eligible for zAAP.
204	CC	R791NFFI	4	binary	Normalization factor for zAAP time. Used to convert between real zAAP times and "normalized" zAAP times, that is, the equivalent time on a standard CP. Multiply R791TIFA by this value and divide by 256 to calculate the normalized zAAP time.
208	D0	R791TSUP	4	binary	CPU time in milliseconds consumed on zIIPs
212	D4	R791TSUC	4	binary	CPU time in milliseconds consumed on standard CPs by work that was eligible for zIIP.
216	D8	R791NFFS	4	binary	Normalization factor for zIIP time. Used to convert between real zIIP times and "normalized" zIIP times, that is, the equivalent time on a standard CP. Multiply R791TSUP by this value and divide by 256 to calculate the normalized zIIP time.
220	DC	R791EXCW	8	binary	EXCP count (double word).

Offsets		Name	Length	Format	Description
228	E4	R791PHTA	4	binary	zAAP-only equivalent of R791PHTM. This is normalized time.
232	E8	R791PHTI	4	binary	zIIP-only equivalent of R791PHTM. This is normalized time.
236	EC	R791FLG3	1	binary	Additional flags. **Bit** **Meaning when set** **0** Service class was assigned by classification, or RESET SRVCLASS belongs to I/O priority group HIGH in the active policy. **1** I/O priority group HIGH was assigned either to the address space or to transaction service classes served by the address space. **2** R791RGRP is the name of a tenant resource group and R791RCL is the name of a tenant report class. **3** General purpose and specialty processor consumption is considered by WLM capping algorithms for this address space. **4-7** Reserved.
237	ED		3		Reserved.

Subtype 2 — Address Space Resource Data

ARD and ARDJ data section

Offsets		Name	Length	Format	Description
0	0	R792ASID	2	binary	Address space identifier.
2	2	R792JBN	8	EBCDIC	Name of job.
10	A	R792DMN	2	binary	Reserved.
12	C	R792NPG	2	binary	Reserved.

Offsets		Name	Length	Format	Description
14	E	R792CL	2	EBCDIC	Current location **Contents** **Meaning** **DL** Out queue/delayed **IN** In storage **LO** Logically swapped out **NS** Non-swappable **PR** Privileged **OT** Swapped out and ready **WL** Wait queue/long wait **WM** Wait queue/MSO **WO** Wait queue/reasons other than WM, WL, or WT **WT** Wait queue/terminal wait **>>** Transitioning out **<<** Transitioning in.
16	10	R792TAS	2	binary	Type of user **Contents** **Meaning** **0** Batch **1** Started task **2** Mount task **3** TSO/E **4** ASCH **5** OMVS address space.
18	12	R792TRC	2	binary	Transaction count.
20	14	R792TTOD	4	binary	Transaction elapsed time, in milliseconds.
24	18	R792PRFX	4	binary	Number of private fixed frames.
28	1C		2		Reserved.
30	1E	R792SVAR	4	binary	SRM service absorption rate for step.
34	22	R792TCPU	4	binary	Total TCB time for step, in milliseconds.
38	26	R792PSS1	4	binary	High order word - CPU page seconds, in milliseconds. One page in storage for one second is one page second.
42	2A	R792PSS2	4	binary	Low order word - step product of frame, in milliseconds. One page in storage for one second is one page second.
46	2E	R792EJST	4	binary	Total processor time (TCB+SRB), in milliseconds.

Offsets		Name	Length	Format	Description
50	32	R792TSRM	4	binary	Total SRM service for job or session.
54	36	R792RTM	4	binary	Resident time for step, in milliseconds.
58	3A	R792EXCP	2	binary	EXCP count for this step.
60	3C	R792CMNI	4	binary	Number of common pages for current transaction.
64	40	R792PNV	4	binary	Number of non-VIO pages for current transaction.
68	44	R792PVIO	4	binary	Number of VIO pages for current transaction.
72	48	R792FXBL	4	binary	Number of fixed frames below 16 megabytes.
76	4C	R792PSWP	4	binary	Number of pages swapped in and out for current transaction.
80	50	R792LPAI	4	binary	Number of link pack area (LPA) pages paged in for current transaction.
84	54	R792CSAI	4	binary	Number of CSA pages paged in for current transaction.
88	58	R792LSQA	4	binary	Number of fixed local system queue area (LSQA) fixed frames.
92	5C	R792NLQF	4	binary	Number of non-local system queue area (LSQA) fixed frames.
96	5E	R792TDEV	4	binary	Total device connect time in milliseconds.
100	64		2		Reserved.
102	66	R792PIN	4	binary	Page-in count.
106	6A	R792TRTM	4	binary	Transaction residency time.
110	6E	R792FLG	1	binary	Flags **Bit** **Meaning when set** **0** Cross-memory address space **1** Incorrect RSM data obtained for address space **2** Reserved **3** Reserved **4** If ON: this address space is a server address space If OFF: goal specified for this address space is being honored by WLM **5** Address space has been quiesced by a RESET command **6** Address space matched a classification rule in the active policy which prevents managing the region based on the response time goals of its served transactions **7** Server has temporal affinity to clients.

Offsets		Name	Length	Format	Description
111	6F	R792FLG2	1	binary	Additional bits. **Bit** **Meaning when set** **0** Service class assigned by classification, or RESET SRVCLASS was designated CPU-critical in the active policy. **1** Address space matched a classification rule in the active policy which was designated storage-critical. **2** Address space is serving transactions which belong to a service class that was designated storage-critical in the active policy's classification rules, or is running in SYSTEM/ SYSSTC. **3** CPU protection was assigned either to the address space or to transaction service classes being served by the space. **4** Storage protection was assigned either to the address space or to transaction service classes being served by the space. **5** The dispatching priority of the address space is currently promoted due to a chronic resource contention. **6** Address space is a CICS TOR that matched a classification rule in the active policy which allows managing the region based on the region goals but also ensures that completed transactions are reported and used for management of the CICS AORs. **7** Honor priority ineligibility was assigned either to the address space or to transaction service classes being served by the space.
112	70	R792LSQR	4	binary	Local system queue area (LSQA) pages in central storage.
116	74	R792LSQE	4	binary	Local system queue area (LSQA) pages in expanded storage.
120	78	R792ARS	4	binary	Average number of real frames for step.
124	7C	R792TWSS	4	binary	SRM target working set size for this job.
128	80	R792PHSP	4	binary	Number of hiperspace pages for the current transaction.
132	84	R792EXCT	4	binary	EXCP count for this step.
136	88	R792SCL	8	EBCDIC	Service class name.
144	90	R792SCP	2	binary	Service class period.
146	92	R792WKLD	8	EBCDIC	Workload name.
154	9A	R792RGRP	8	EBCDIC	Resource group name.
162	A2		2		Reserved.
164	A4	R792TCPC	4	binary	Total CPU time consumed in this address space, in milliseconds.
168	A8	R792ASST	4	binary	CPU time consumed by preemptible-class SRBs running on behalf of this address space, in milliseconds.
172	AC	R792PHTM	4	binary	CPU time consumed by preemptible-class SRBs running in this address space, in milliseconds.
176	B0	R792FXAB	4	binary	Number of fixed frames between 16M and 2G (z/Architecture mode).
180	B4	R792TIFA	4	binary	CPU time in milliseconds consumed on zAAPs.

Offsets		Name	Length	Format	Description
184	B8	R792TCP	4	binary	CPU time in milliseconds consumed on standard CPs. Only valid if zAAPs or zIIPs are in the configuration.
188	BC	R792TIFC	4	binary	CPU time in milliseconds consumed on standard CPs by work that was eligible for zAAP.
192	C0	R792NFFI	4	binary	Normalization factor for zAAP time. Used to convert between real zAAP times and "normalized" zAAP times, that is, the equivalent time on a standard CP. Multiply R792TIFA by this value and divide by 256 to calculate the normalized zAAP time.
196	C4	R792TSUP	4	binary	CPU time in milliseconds consumed on zIIPs.
200	C8	R792TSUC	4	binary	CPU time in milliseconds consumed on standard CPs by work that was eligible for zIIP.
204	CC	R792NFFS	4	binary	Normalization factor for zIIP time. Used to convert between real zIIP times and "normalized" zIIP times, that is, the equivalent time on a standard CP. Multiply R792TSUP by this value and divide by 256 to calculate the normalized zIIP time.
208	D0	R792EXCW	8	binary	EXCP count (double word).
216	D8	R792PHTA	4	binary	zAAP-only equivalent of R792PHTM. This is normalized time.
220	DC	R792PHTI	4	binary	zIIP-only equivalent of R792PHTM. This is normalized time.
224	E0	R792FLG3	1	binary	Additional flags. **Bit** **Meaning when set** **0** Service class was assigned by classification, or RESET SRVCLASS belongs to I/O priority group HIGH in the active policy. **1** I/O priority group HIGH was assigned either to the address space or to transaction service classes served by the address space. **2** R792RGRP is the name of a tenant resource group. **3** General purpose and specialty processor consumption is considered by WLM capping algorithms for this address space. **4-7** Reserved.
225	E1		3		Reserved.

Subtype 3 — Storage/Processor Data

SRCS Data Section

Offsets		Name	Length	Format	Description
0	0		2		Reserved.
2	2	R793CRI	2	binary	Current system UIC (MCTCurSystemUIC).
4	4	R793SQA	2	binary	Number of system queue area (SQA) frames (replaced by R793SQA4).
6	6	R793CMNF	2	binary	Number of frames allocated to the common area (replaced by R793CMN4).
8	8	R793CMFF	2	binary	Number of common (LPA + CSA) fixed frames (replaced by R793CMF4).

Offsets		Name	Length	Format	Description
10	A	R793PRFX	2	binary	Number of private fixed frames (local system queue area (LSQA) + non-LSQA) (replaced by R793PFX4).
12	C	R793CPUU	2	binary	LPAR utilization, if in LPAR mode and RMF Monitor I is active. X'7FFF' indicates no value available in PR/SM environment.
14	E	R793DQ	2	binary	Length of out wait queue.
16	10	R793INC	2	binary	Number of address spaces swapped in storage (SRM in queue).
18	12	R793OUTU	2	binary	Number of address spaces swapped out of storage (SRM out queue).
20	14		4		Reserved.
24	18	R793LPAF	2	binary	Number of link pack area (LPA) pageable frames (replaced by R793LPF4).
26	1A	R793CSAF	2	binary	Number of CSA pageable frames (replaced by R793CSF4).
28	1C	R793LPFX	2	binary	Number of link pack area (LPA) fixed frames (replaced by R793LFX4).
30	1E	R793CSFX	2	binary	Number of CSA fixed frames (replaced by R793CFX4).
32	20	R793LSQA	2	binary	Number of local system queue area (LSQA) frames (replaced by R793LSQ4).
34	22	R793NLQF	2	binary	Number of private non-local system queue area (LSQA) fixed frames (replaced by R793NLF4).
36	24	R793LOUT	2	binary	Number of address spaces logically swapped out.
38	26	R793SQR	4	binary	System queue area (SQA) pages in central storage.
42	2A	R793SQE	4	binary	System queue area (SQA) pages in expanded storage.
46	2E	R793LSQR	4	binary	Local system queue area (LSQA) pages in central storage.
50	32	R793LSQE	4	binary	Local system queue area (LSQA) pages in expanded storage.
54	36	R793AFC	4	binary	Number of available frames.
58	3A	R793CUT	4	binary	MVS utilization, that is, MVS non-wait time as a percentage of the interval length. For systems not running in LPAR mode in a PR/SM environment, this field is identical to R793CPUU. For details, see *z/OS RMF Report Analysis*.
62	3E	R793SQA4	4	unsigned binary	Number of fixed system queue area (SQA) frames (replaces R793SQA).
66	42	R793CMN4	4	unsigned binary	Number of common (LPA+CSA) pageable and fixed frames (replaces R793CMNF).
70	46	R793CMF4	4	unsigned binary	Number of common (LPA+CSA) fixed frames (replaces R793CMFF).
74	4A	R793PFX4	4	unsigned binary	Number of private fixed frames (LSQA+NON-LSQA) (replaces R793PRFX).
78	4E	R793LPF4	4	unsigned binary	Number of total link pack area (LPA) frames (replaces R793LPAF).
82	52	R793CSF4	4	unsigned binary	Number of total CSA frames (replaces R793CSAF) including user-key common storage allocated in restricted use common service area (RUCSA).
86	56	R793LFX4	4	unsigned binary	Number of link pack area (LPA) fixed frames (replaces R793LPFX).
90	5A	R793CFX4	4	unsigned binary	Number of CSA fixed frames (replaces R793CSFX) including user-key common storage allocated in RUCSA.
94	5E	R793LSQ4	4	unsigned binary	Number of fixed local system queue area (LSQA) frames (replaces R793LSQA).

Offsets		Name	Length	Format	Description
98	62	R793NLF4	4	unsigned binary	Number of private NON-LSQA fixed frames (replaces R793NLQF).

Subtype 4 — Paging Activity

SPAG Data Section

Offsets		Name	Length	Format	Description
0	0	R794CMNI	4	binary	System common (LPA + CSA) pages in to central storage from auxiliary storage.
4	4	R794CMNO	4	binary	System common (CSA) pages out from central storage to auxiliary storage.
8	8		4		Reserved.
12	C	R794SWPO	4	binary	Number of swap-outs between central storage and auxiliary storage.
16	10	R794PSPI	4	binary	Number of pages swapped in to central storage from auxiliary storage.
20	14	R794PSPO	4	binary	Number of pages swapped out from central storage to auxiliary storage.
24	18	R794PRVI	4	binary	Number of private pages (VIO + non-VIO) swapped in to central storage from auxiliary storage.
28	1C	R794PRVO	4	binary	Number of private pages (VIO + non-VIO) swapped out from central storage to auxiliary storage.
32	20		4		Reserved.
36	24	R794VIO	4	binary	Number of VIO pages (in + out) between central storage and auxiliary storage.
40	28		2		Reserved.
42	2A	R794CRI	2	binary	Current system UIC (MCTCurSystemUIC).
44	2C		4		Reserved.
48	30	R794LPAI	4	binary	System link pack area (LPA) pages in to central storage from auxiliary storage.
52	34	R794CSAI	4	binary	System CSA pages out from central storage to auxiliary storage.
56	38		12		Reserved.
68	44	R794ERTE	4	binary	Number of pages sent from central storage to expanded storage.
72	48	R794EVAL	4	binary	Number of available expanded storage frames not in use.
76	4C		4		Reserved.
80	50	R794MRTE	4	binary	Number of pages migrated from expanded storage to auxiliary storage.
84	54	R794MAGE	4	binary	Migration age.
88	58	R794AFC	4	binary	Number of available frames.
92	5C	R794TWSS	4	binary	Target working set size for the common area.
96	60	R794HSP	4	binary	Number of hiperspace pages (in + out) between central storage and auxiliary storage.
100	64	R794PPIA	4	binary	Number of blocked pages paged in from private auxiliary storage.
104	68	R794LPIA	4	binary	Number of blocks paged in from private auxiliary storage.

Subtype 5 — Address Space SRM Data

ASRM and ASRMJ Data Section

Offsets		Name	Length	Format	Description
0	0	R795ASID	2	binary	Address space identifier.
2	2	R795JBN	8	EBCDIC	Name of job.
10	A	R795DMN	2	binary	Reserved.
12	C	R795NPG	2	binary	Reserved.
14	E	R795PGP	2	binary	Reserved.
16	10	R795TTOD	4	binary	Real time into transaction.
20	14	R795CL	2	EBCDIC	Current location (set to IN when all other indicators are off) **Contents** **Meaning** **DL** Out queue/delayed **IN** In storage **LO** Logically swapped out **NS** Non-swappable **PR** Privileged **OT** Swapped out and ready **WL** Wait queue/long wait **WM** Wait queue/MSO **WO** Wait queue/reasons other than WM, WL, or WT **WT** Wait queue/terminal wait **>>** Transitioning out **<<** Transitioning in.
22	16	R795TAS	2	binary	Type of user **Contents** **Meaning** **0** Batch **1** Started task **2** Mount task **3** TSO/E **4** ASCH **5** OMVS address space.
24	18	R795TROD	4	binary	Transaction resident time.

Offsets		Name	Length	Format	Description
28	1C	R795TCNT	2	binary	Transaction count.
30	1E	R795SWC	2	binary	Transaction swap count.
32	20	R795CPUS	4	binary	Total processor service units for transaction (zeros when ASID is out of storage).
36	24	R795MSOS	4	binary	Total main storage origin (MSO) service units for transaction (zeros when ASID is out of storage).
40	28	R795IOCS	4	binary	Total IOC service units for transaction (zeros when ASID is out of storage).
44	2C	R795WMS	4	binary	Total service units for transaction (zeros when ASID is out of storage).
48	30	R795TOTL	4	binary	Total service units for job or TSO/E session (zeros when ASID is out of storage).
52	34	R795TOT	4	binary	Total service units for transaction since last swap-in.
56	38	R795SRBS	4	binary	Total SRB service units for transaction (zeros when ASID is out of storage).
60	3C	R795FLG	1	binary	Flags. **Bit** **Meaning when set** **0-2** Reserved **3** Reserved **4** If ON: this address space is a server address space If OFF: goal specified for this address space is being honored by WLM **5** Address space has been quiesced by a RESET command **6** R795RGRP is the name of a tenant resource group. **7** Reserved.
61	3D	R795SCL	8	EBCDIC	Service class name.
69	45	R795SCP	2	binary	Service class period.
71	47	R795WKLD	8	EBCDIC	Workload name.
79	4F	R795RGRP	8	EBCDIC	Resource group name.

Subtype 6 — Reserve Data

SENQR Data Section

Offsets		Name	Length	Format	Description
0	0	R796ASID	2	binary	Address space ID of the job that issued the RESERVE.
2	2	R796MAJ	8	EBCDIC	Major name of the resource.
10	A	R796MIN	44	EBCDIC	Minor name of the resource.
54	36	R796JBN	8	EBCDIC	Name of the job that issued the RESERVE.
62	3E	R796VOLS	6	EBCDIC	Volume serial of the volume against which the RESERVE was issued.
68	44	R796UCB	3	EBCDIC	Device number or 'UCB' for 4-digit device numbers.

Offsets		Name	Length	Format	Description
71	47	R796REQ	2	EBCDIC	Type and status of request for the resource.
73	49	R796MINL	2	binary	Length of the minor name field (used for reporting).
75	4B	R796FLG	1	binary	Reserve flag byte **Bit** **Meaning when set** **0** Device reserved by this processor **1** Minor name truncated **2** Global resource **3** Reserve request converted to global enqueue **4-7** Reserved.
76	4C	R796SID	8	EBCDIC	System identifier of the job that issued the RESERVE.
84	54	R796DVN	2	binary	Device number (binary).
86	56	R796SCS	1	binary	Subchannel set ID.
87	57		1		Reserved.

Subtype 7 — Enqueue Contention Data

SENQ Data Section

Offsets		Name	Length	Format	Description
0	0	R797MAJ	8	EBCDIC	Major name of resource.
8	8	R797MIN	44	EBCDIC	Minor name of resource.
52	34	R797FLG	1	binary	Data type flags **Bit** **Meaning when set** **0** ON=detail data OFF=summary data **1** ON=major name specified **2** ON=minor name specified **3** ON=minor name truncated **4** Global resource **5** Data is for all resources held by a specified system in a global resource serialization complex. **6** Data is for all resources held exclusively by a specified system in a global resource serialization complex. **7** Reserved.
53	35	R797MINL	4	binary	Length of the minor name field (used for reporting).
57	39	R797OWN	2	binary	Count of requestors that own the resource.

Offsets		Name	Length	Format	Description
59	3B	R797EXCW	2	binary	Count of requestors waiting for exclusive use of a resource.
61	3D	R797SHRW	2	binary	Count of requestors waiting for shared use of a resource.
63	3F	R797REQ	2	EBCDIC	Type and status of request for a resource (‘SO’, ‘SW’, ‘EO’, or ‘EW’).
65	41	R797JBN	8	EBCDIC	Name of the job that issued the ENQ.
73	49	R797ASID	2	binary	Address space ID of the job that issued the ENQ.
75	4B	R797SCOP	4	EBCDIC	Scope of the resource (‘SYS’, ‘SYSS’, or ‘STEP’).
79	4F		2		Reserved.
81	51	R797SID	8	EBCDIC	System identifier of the job that issued the ENQ.
89	59		3		Reserved.

Subtype 9 — Device Activity

Device Data Section

This section contains one per device.

Offsets		Name	Length	Format	Description
0	0	R799NUM	2	packed	Device number.
2	2	R799LCU	2	binary	Logical control unit number X'00' to X'FF'.
4	4		1		Reserved.
5	5	R799CNF	1	binary	Device flags **Bit** **Meaning when set** **0** IOS queue-length incorrect **1** No logical control unit information **2** Data contained in fields R799SSC through R799DIS is incorrect **3** Connect, pending, or disconnect time for device is not valid **4-5** Reserved **6** Device was reconfigured or DDR activity was detected through Monitor I interval **7** Device is currently online.
6	6	R799SER	6	EBCDIC	Volume serial number of the volume mounted on this device.
12	C	R799TYP	4	binary	Device type.
16	10	R799NUX	4	binary	Number of base and alias devices for a parallel access volume (PAV). This field is 1 for a non-PAV device. For HyperPAV base devices (bit 6 of R799CNX is set), this is the accumulated number of HyperPAV aliases.
20	14	R799SSC	4	binary	Start subchannel (SSCH) count.
24	18	R799MEC	4	binary	Measurement event count; number of SSCH instructions for which connect, pending, and active times were stored.
28	1C	R799CNN	4	binary	Device connect time.
32	20	R799PEN	4	binary	Function pending time.

Offsets		Name	Length	Format	Description
36	24	R799ATV	4	binary	Function active time.
40	28	R799DIS	4	binary	Device disconnect time.
44	2C	R799QUE	4	binary	Number of requests queued in IOS for this device.
48	30	R799UTL	4	binary	Number of samples when the device was reserved but an SSCH had not been issued to the device.
52	34	R799RSV	4	binary	Number of samples taken during the measurement interval that indicated that the device was reserved.
56	38		4		Reserved.
60	3C	R799ALC	4	binary	Number of samples taken during the measurement interval that indicated that the device was allocated.
64	40	R799DVB	4	binary	Device busy delay time.
68	44	R799CUB	4	binary	Shows control unit busy delay time if bit 4 in R799CNX is set off.
72	48	R799ICT	2	binary	Incorrect sample count.
74	4A	R799CNX	1	binary	Device flag extensions. **Bit** **Meaning when set** **0** Base exposure of a parallel access volume **1** Number of alias exposures has changed **2** Timing facility not active **3** Extended CMB mode **4** Model-dependant data not available by STSCH **5** Initial command response time available **6** HyperPAV base device. **7** Interrupt-Delay-Time facility is provided by channel subsystem.
75	4B		1		Reserved.
76	4C	R799SGN	8	EBCDIC	Storage group name.
84	54	R799NDA	4	binary	Total number of allocations in effect for the device.
88	58	R799DPB	4	binary	Shows the amount of time during the measurement interval that I/O requests to a device were delayed because a director port was busy if bit 4 of R799CNX is set off.
92	5C	R799CMR	4	unsigned binary	Shows initial command response time in units of 128 microseconds if bit 5 of R799CNX is set on.
96	60	R799PCT	4	binary	Number of unsuccessful PAV samples.
100	64	R799PSM	4	binary	Number of successful PAV samples.
104	68	R799IDT	4	binary	Interrupt delay time in units of 128 microseconds. This field is zero if not supported by the hardware.
108	6C	R799CUQ	4	binary	Control Unit Queuing Time.
112	70	R799CN2	1	binary	Device flag extension 2 **Bit** **Meaning when set** **0** Device connected to FICON.

Offsets		Name	Length	Format	Description
113	71	R799SCS	1	binary	Subchannel set ID.
114	72	R799NM2	2	binary	Device number (same as R799NUM).
116	74	R799IOS	4	binary	IOS Queue time in microseconds

Subtype 11 — Page Data Set Activity

PGSP Control Section

This section contains one control section followed by a data set section for each data set in the report.

Offsets		Name	Length	Format	Description
0	0	R79BETYP	1	EBCDIC	Type of data that follows: P — PAGE data sets
1	1		3		Reserved.
PGSP Data Set Section:					
0	0	R79BSALC	4	binary	Number of slots/sets in this data set.
4	4	R79BSAVL	4	binary	Number of slots/sets available.
8	8	R79BSLBD	4	binary	Number of bad slots/sets.
12	C	R79BSUSE	4	binary	Number of samples that indicate ASM is using the data set.
16	10	R79BSIOS	4	binary	Number of SSCH instructions issued for the data set.
20	14	R79BREQS	4	binary	Number of pages transferred to/from the data set.
24	18	R79BFLG	1	binary	Flags **Bit** **Meaning when set** **0** Indicates that the data set is bad **1** Indicates a pageable link pack area (PLPA) data set **2** Indicates a common data set **3** Reserved **4** Indicates a local data set **5** Indicates a paging data **6** Reserved **7** Indicates that the data set accepts VIO pages.
25	19	R79BDEV	1	binary	Device type.
26	1A	R79BDADR	3	EBCDIC	Device number or 'UCB' for 4-digit device numbers.
29	1D	R79BVSER	6	EBCDIC	Volume serial number.
35	23	R79BDSN	44	EBCDIC	Data set name.

Offsets		Name	Length	Format	Description
79	4F	R79BFL2	1	binary	Flags **Bit** **Meaning when set** **0** Reserved. **1** Alternate control unit device indicator **2** R79BDEVN contains a valid device name **3** Page space type SCM **4-7** Reserved.
80	50	R79BDEVN	8	EBCDIC	Device name (blank if device name cannot be determined).
88	58	R79BCU	8	EBCDIC	Control unit name (blank if control unit name cannot be determined).
96	60	R79BDVN	2	binary	Device number (binary).
98	62	R79BSCS	1	binary	Subchannel set ID.
99	63		1		Reserved.

Subtype 12 — Channel Path Activity

Channel Path Control Section

This section contains one per record.

Offsets		Name	Length	Format	Description
0	0	R79CSMP	4	binary	Number of samples as weighted by SRM. Only valid if bit 5 of R79CFLG1 is not set.
4	4	R79CFLG1	1	binary	Flags. **Bit** **Meaning when set** **0** CPMF (channel path measurement facility) available **1** Configuration change **2** DCM supported by hardware **3** Configuration contains DCM managed channels **4** RMF address space not active **5** Hardware allows multiple logical channel subsystems **6** Enhanced channel path measurement facility available **7** Reserved.

Offsets		Name	Length	Format	Description
5	5	R79CCMI	1	binary	CPMF mode. **Value** **Meaning** **0** CPMF is not active **1** Compatibility mode **2** Extended mode
6	6		2		Reserved.
8	8	R79CCFRC	4	binary	CPMF (channel path measurement facility) restart count.
12	12	R79CCFSC	4	binary	CPMF (channel path measurement facility) sample count.
16	10	R79CCSS	1	binary	Channel subsystem ID. Only valid if bit 5 of R79CFLG1 is set.
17	11		3		Reserved.

Channel Path Data Section

This section contains one per channel path.

Offsets		Name	Length	Format	Description
0	0	R79CCPID	1	binary	Channel path identification. The range of values is X'00' to X'FF'.
1	1	R79CFG2	1	binary	Channel flags **Bit** **Meaning when set** **0-1** Reserved **2** Block multiplexor **3** Byte multiplexor **4** ES conversion channel **5** ES connection channel **6** ES connection director attached to channel path **7** CTC adapter.

Offsets		Name	Length	Format	Description
2	2	R79CFG3	1	binary	Channel flags **Bit** **Meaning when set** **0** Channel path is shared between logical partitions **1** CPMF (channel path measurement facility) indicator, this entry is not valid **2** Reserved **3** Channel converter 3090 **4** Channel path is DCM managed **5** Channel characteristics changed **6** Extended channel path measurement supported **7** Reserved.
3	3	R79CCPD	1	binary	Channel path description. For an explanation, you can issue the command `D M=CHP`.
4	4	R79CBSY	4	binary	Number of samples in which the channel path was busy, weighted by SRM.
8	8	R79CPBY	4	binary	Channel-path-busy time of the partition since the last interval in units of 128 microseconds.
12	C		1		Reserved.
13	D	R79CCPTS	3	binary	Last CPMB (channel path measurement block) entry time stamp in units of 128 microseconds. This value wraps approximately every 35.79 minutes.
16	10	R79CACR	5	EBCDIC	Channel path acronym.
21	15	R79CCMG	1	binary	CPMF Channel measurement group.
22	16	R79CFG4	1	binary	CPMF validation flags - each bit (if on) indicates that the corresponding measurement data is available and valid. This refers to the first five words of the channel measurement data in field R79CCCM. **Bit** **Measurement Data** **0** Channel measurement data — word 1 **1** Channel measurement data — word 2 **2** Channel measurement data — word 3 **3** Channel measurement data — word 4 **4** Channel measurement data — word 5 **5-7** Reserved.
23	17	R79CCPP	1	binary	Channel path parameter.
24	18	R79CCCM	48	*	CPMF Channel measurement data (extended mode). The contents of this field is different for each measurement group, as described in the following tables.

Offsets		Name	Length	Format	Description
72	48	R79CGEN	1	binary	Channel type generation.
73	49		3		Reserved.
76	4C	R79CCCMX	32		Extended CPMF measurement data. This field is only available for measurement group 2. See table "R79CCCMX - CPMF Extended Channel Measurement Data (Measurement Group 2)" on page 758 for the contents of the field.

R79CCCM - CPMF Channel Measurement Data (Measurement Group 1)

Offsets		Name	Length	Format	Description
0	0	R79CTUT	4	binary	Total channel path busy time (in units of 128 microseconds).
4	4	R79CPUT	4	binary	LPAR channel path busy time (in units of 128 microseconds).
8	8		40		Reserved.

R79CCCM - CPMF Channel Measurement Data (Measurement Group 2)

Offsets		Name	Length	Format	Description
0	0	R79CMBC	4	binary	Maximum bus cycles per second.
4	4	R79CMCU	4	binary	Maximum channel work units per second.
8	8	R79CMWU	4	binary	Maximum WRITE data units per second.
12	C	R79CMRU	4	binary	Maximum READ data units per second.
16	10	R79CUS	4	binary	Data unit size (in bytes).
20	14	R79CTBC	4	binary	Total bus cycles count.
24	18	R79CTUC	4	binary	Total channel work unit count.
28	1C	R79CPUC	4	binary	LPAR channel work units count.
32	20	R79CTWU	4	binary	Total WRITE data units count.
36	24	R79CPWU	4	binary	LPAR WRITE data units count.
40	28	R79CTRU	4	binary	Total READ data units count.
44	2C	R79CPRU	4	binary	LPAR READ data units count.

R79CCCM - CPMF Channel Measurement Data (Measurement Group 3)

Offsets		Name	Length	Format	Description
0	0	R79CPDU	4	binary	LPAR data unit size (in bytes).
4	4	R79CTDU	4	binary	Total data unit size (in bytes).
8	8	R79CPUM	4	binary	LPAR message sent unit size (in bytes)
12	C	R79CTUM	4	binary	Total message sent unit size (in bytes)
16	10		4		Reserved.
20	14	R79CPMS	4	binary	LPAR count of message sent units.
24	18	R79CTMS	4	binary	Total count of message sent units.
28	1C	R79CPUS	4	binary	LPAR count of unsuccessful attempts to send messages.
32	20	R79CPUB	4	binary	LPAR count of unsuccessful attempts to receive messages due to unavailable buffers.
36	24	R79CTUB	4	binary	Total count of unsuccessful attempts to receive messages due to unavailable buffers.
40	28	R79CPDS	4	binary	LPAR count of data units sent.

Offsets		Name	Length	Format	Description
44	2C	R79CTDS	4	binary	Total count of data units sent.

R79CCCMX - CPMF Extended Channel Measurement Data (Measurement Group 2)

Offsets		Name	Length	Format	Description
0	0	R79CXOC	4	binary	Total number of FICON command-mode operations (CPC) that have been attempted by the channel.
4	4	R79CXOD	4	binary	Total number of FICON command-mode operations (CPC) that could not be initiated by the channel because of a lack of available resources.
8	8	R79CXOS	8	binary	Summation count of FICON command-mode operations (CPC). Each time the number of FICON command-mode operations is incremented, the number of FICON command-mode operations active at the channel, including the one being initiated, is added to this field.
16	10	R79CXTC	4	binary	Total number of FICON transport-mode operations (CPC) that have been attempted by the channel. Zero when zHPF is not available.
20	14	R79CXTD	4	binary	Total number of FICON transport-mode operations (CPC) that could not be initiated by the channel because of a lack of available resources. Zero when zHPF is not available.
24	18	R79CXTS	8	binary	Summation count of FICON transport-mode operations (CPC). Each time the number of FICON transport-mode operations is incremented, the number of transport-mode operations active at the channel, including the one being initiated, is added to this field. Zero when zHPF is not available.

Subtype 14 — I/O Queuing Activity

I/O Queuing Global Section

This section contains processors described by triplet SMF79QSS.

Offsets		Name	Length	Format	Description
0	0	R79EGFLG	1	binary	Global input/output queue (IOQ) status **Bit** **Meaning when set** **0** Data is invalid due to failure of the channel measurement facility **1** Diagnose interface failure **2** ESCON director in the configuration **3** CHSC store secondary queue data not supported **4** DCM is supported by hardware **5** Configuration contains DCM managed channels **6** Measurement of initial command response time supported **7** First-transfer-ready-disabled data available
1	1		7		Reserved.
8	8	R79EGSMP	4	binary	Number of RMF samples for store secondary queue data

I/O Queuing Configuration Control Section

This section contains one per logical control unit described by SMF79.

Offsets		Name	Length	Format	Description
0	0	R79EID1	2	EBCDIC	Logical control unit identifier.
2	2	R79ENTR	2	binary	Number of triplets following.
4	4	R79ECPDS	4	binary	Offset to I/O Queuing Configuration data section (relative to beginning of I/O Queuing Configuration control section).
8	8	R79ECPDL	2	binary	Length of I/O Queuing Configuration data section.
10	A	R79ECPDN	2	binary	Number of I/O Queuing Configuration data sections for the LCU.

I/O Queuing Configuration Data Section

This section contains one per channel path within a logical control unit described by triplet R79ECPDS.

Offsets		Name	Length	Format	Description
0	0	R79ECPID	1	binary	Channel path identifier.
1	1	R79ECPST	1	binary	Channel path status **Bit** **Meaning when set** **0** Channel path installed **1** Channel path online **2** Channel path varied **3** Channel path offline to all devices of the LCU **4** Channel path connection to devices of the LCU altered by VARY PATH processing **5** Reserved. **6** Channel path is DCM managed. **7** CHPID manipulated, requiring data reset.
2	2	R79ECUN	2	binary	Number of control units attached.
4	4	R79ECU1	2	binary	First control unit identifier.
6	6	R79ECU2	2	binary	Second control unit identifier.
8	8	R79ECU3	2	binary	Third control unit identifier.
10	A	R79ECU4	2	binary	Fourth control unit identifier.
12	C	R79ECUB	4	binary	Number of initial selection attempts that were unsuccessful because the control unit was busy.
16	10	R79EPT	4	binary	Number of I/O operations accepted on this channel path.
20	14		4		Reserved.
24	18	R79EDPBC	4	binary	Number of initial selection attempts that were unsuccessful because the director port was busy.
28	1C	R79ECBT	4	binary	Control unit busy delay time.
32	20	R79ECMR	4	binary	Initial command response time.

Offsets		Name	Length	Format	Description
36	24	R79ESBS	4	binary	Switch busy count summation; contains the switch busy counts received for all partitions.
40	28		4		Reserved.
44	2C	R79ECPXF	1	binary	Channel path extended flags **Bit** **Meaning when set** **0** Extended I/O measurement block format-1 data available **1** Extended I/O measurement block format-2 data available **2** First-transfer-ready-disabled supported **3-7** Reserved.
45	2D	R79ECPAT	1	binary	Path attributes **Value** **Meaning** **0** Not specified for this path. **1** Preferred path. **2** Non-preferred path.
46	2E		2		Reserved.
48	30	R79ECTMW	4	Binary	Transport mode write count
52	34	R79ECTRD	4	Binary	First-transfer-ready-disabled write count
56	38	*	8		Reserved for future use

I/O Queuing Data Section

This section contains one per logical control unit, described by triplet SMF79ASS.

Offsets		Name	Length	Format	Description
0	0	R79EID2	2	EBCDIC	Logical control unit identifier.
2	2	R79EDST	1	binary	Data status **Bit** **Meaning when set** **0** Reserved **1** No hardware measurements available **2-3** Reserved. **4** LCU contains DCM managed channels. **5** Path attributes are valid. **6-7** Reserved.
3	3		1		Reserved.
4	4	R79EQSM	4	binary	Accumulated length of CU-HDR queue.
8	8	R79EQCT	4	binary	Number of entries placed on the CU-HDR queue.

Offsets		Name	Length	Format	Description
12	C	R79EMCMN	2	binary	Minimum number of DCM managed channels used.
14	E	R79EMCMX	2	binary	Maximum number of DCM managed channels used.
16	10	R79EMCDF	2	binary	Defined number of DCM managed channels.
18	12		2		Reserved.
20	14	R79EPTM	4	binary	Accumulated path taken count for DCM managed channels.
24	18	R79EDPBM	4	binary	Accumulated director port busy count for DCM managed channels.
28	1C	R79ECUBM	4	binary	Accumulated control unit busy count for DCM managed channels.
32	20	R79ECBTM	4	binary	Accumulated control unit busy delay time for DCM managed channels.
36	24	R79ECMRM	4	binary	Accumulated initial command response time for DCM managed channels.
40	28	R79ESBSM	4	binary	Accumulated switch busy count summation for DCM managed channels.
44	2C	R79ETMWM	4	binary	Accumulated transport mode write count for DCM managed channels
48	30	R79ETRDM	4	binary	Accumulated first-transfer-ready-disabled write count for DCM managed channels
52	34	R79ECSST	4	binary	Channel subsystem wait time.

Subtype 15 — IRLM Long Lock Detection

IMS Long Lock Data Section

Offsets		Name	Length	Format	Description
0	0	R79FISTN	16	EBCDIC	IRLM lock structure name.
16	10	R79FDLKC	4	binary	Dead lock cycle number.
20	14	R79FETYP	1	EBCDIC	'B'=Blocker / 'W'=Waiter.
21	15		3		Reserved.
24	18	R79FIMSI	8	EBCDIC	IMS subsystem ID.
32	20	R79FPSTN	2	EBCDIC	PST number.
34	22	R79FPSBN	8	EBCDIC	PSB name.
42	2A	R79FRGTY	1	EBCDIC	Region type.
43	2B	R79FRCVT	16	EBCDIC	Recovery token.
59	3B	R79FCTID	8	EBCDIC	CICS task ID (if CICS).
67	43	R79FLHTI	8	binary	Scheduled elapsed time (TOD format).
75	4B	R79FLHCN	4	binary	Max lock held.
79	4F	R79FLKNA	16	EBCDIC	Lock name.
95	5F	R79FTRNM	8	EBCDIC	Transaction name / Job name.
103	67	R79FRSNA	8	EBCDIC	Resource (DB/Area) name.

Record type 80 (X'50') — Security Product Processing

Record type 80 is produced during Resource Access Control Facility (RACF) processing and Public Key Infrastructure (PKI) Services processing. RACF writes a record whenever one of the following events is detected:

- Unauthorized attempts to enter the system
- Authorized accesses or unauthorized attempts to access RACF-protected resources
- Authorized or unauthorized attempts to modify profiles on a RACF data base
- Successful or unsuccessful partner LU verification.

PKI Services writes a record for each CRL that is successfully published to LDAP.

For information, see *z/OS Security Server RACF Macros and Interfaces*.

Record type 81 (X'51') — RACF Initialization

Record type 81 is written at the completion of the initialization of Resource Access Control Facility (RACF). For more information, see *z/OS Security Server RACF Macros and Interfaces*.

Record type 82 (X'52') — CUSP Record

Record type 82 was used to record information about the events and operations of the Cryptographic Unit Support Program (CUSP).

Record type 82 was written to the SMF data set at the completion of each of the following cryptography functions:

- **Initialization**:

  The record is written when the Cryptographic Unit Support Program is initialized, either when cryptography is started or as a part of the key generator utility program.
- **Start**:

  The record is written when a START command is issued for cryptography.
- **Stop**:

  The record is written when a STOP command is issued for cryptography.
- **Modify**:

  The record is written when a MODIFY command is issued for cryptography.
- **Unit check**:

  The record is written when the cryptographic unit is switched offline and then brought online again.
- **Generation of an operational key**:

  If specified in the installation options for cryptography, a record is written after processing each GENKEY macro instruction.
- **Transformation of an operational key**:

  If specified in the installation options for cryptography, a record is written after processing each RETKEY macro instruction.
- **Execution of the key generator utility**:

  The record is written after the execution of the key generator utility program, thus providing a record of changes to the cryptographic key data set (CKDS).

Record type 82 consists of a header section and six possible relocate sections. The header section identifies the RACF user ID and group name or the job and step name of the non-RACF cryptography user, the cryptography function when the record describes, and the return code issued by the function. The header section is 45 bytes long.

The six possible variable relocate sections are:

- Key generator utility, which indicates changes made by the utility to the host system master key, the local keys the cross keys, and the remote keys.
- GENKEY function, which indicates the action taken in response to a GENKEY macro instruction.
- RETKEY function, which indicates the action taken in response to a RETKEY macro instruction.
- Cryptography initialization, which describes the SMF recording options in effect at initialization and the cryptography function and key manager user SVC numbers.
- Installation data, which contains any information supplied by an installation exit routine.
- Cryptographic unit data, which indicates the status of the cryptographic unit.

Note: The number of relocate sections depends on the type of action taken. For instance, the record written when the Cryptographic Unit Support Program stops consists only of the header section. The number of relocate sections is indicated in CRY82CVT (offset 41).

Record mapping

Header/Self-defining Section

This section contains the common SMF record headers fields and the triplet fields (offset/length/number), if applicable, that locate the other sections on the record.

Offsets		Name	Length	Format	Description
0	0	SMF82LEN	2	binary	Record length. This field and the next field (total of four bytes) form the RDW (record descriptor word). See "Standard and Extended SMF record headers" on page 162 for a detailed description.
2	2	SMF82SEG	2	binary	Segment descriptor (see record length field).
4	4	SMF82FLG	1	binary	System indicator: **Bit** **Meaning when set** **0-2** Reserved **3-6** Version indicators* **7** Reserved. *See "Standard and Extended SMF record headers" on page 162 for a detailed description.
5	5	SMF82RTY	1	binary	Record type 82 (X'52').
6	6	SMF82TME	4	binary	Time since midnight, in hundredths of a second, that the record was moved into the SMF buffer.
10	A	SMF82DTE	4	packed	Date when the record was moved into the SMF buffer, in the form 0*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for a detailed description.
14	E	SMF82SID	4	EBCDIC	System identification (from the SID parameter).
18	12	SMF82LNG	4	binary	Length of record header.
22	16	SMF82TID	2	binary	Security product identifier: X'0002' for Cryptographic Unit Support Program.
24	18	CRY82USR	8	EBCDIC	Job name (for RACF users, user ID).
32	20	CRY82GRP	8	EBCDIC	Step-name (for RACF users, RACF group-name).

Offsets		Name	Length	Format	Description
40	28	CRY82FLG	1	binary	Flags **Bit** **Meaning when set** **0** Fields CRY82USR and CRY82GRP contain RACF user ID and group name. (When this bit is off, the fields contain the job name and step name). **1-7** Reserved.
41	29	CRY82VCT	2	binary	Number of variable relocate sections.
43	2B	CRY82FTN	1	binary	Function code **Code** **Meaning** **1** Key generator function **2** GENKEY function **3** RETKEY function **4** Start cryptography **5** Stop cryptography **6** Modify cryptography **7** Hardware check.
44	2C	CRY82RTC	1	binary	Return code issued by function or X'FF' if function terminated abnormally.

Key Generator Utility Relocate Section

Offsets		Name	Length	Format	Description
0	0	CRY82DTP	1	binary	Data type indicator: X'01' for key generator utility.
1	1	CRY82DLN	1	binary	Length of the data that follows.
2	2	CRY82SMK	1	binary	Host system master key flags **Bit** **Meaning when set** **0** Host system master key was successfully changed (this bit is set even if an error occurs in the key generator). **1-7** Reserved.
3	3	CRY82LMK	1	binary	Local key flags **Bit** **Meaning when set** **0** At least one local key was updated **1** At least one local key was added **2** At least one local key was deleted from the CKDS **3-7** Reserved.

Offsets		Name	Length	Format	Description
4	4	CRY82CMK	1	binary	Cross key flags **Bit** **Meaning when set** **0** At least one pair of cross keys was updated **1** At least one pair of cross keys was added **2** At least one pair of cross keys was deleted from the CKDS **3-7** Reserved.
5	5	CRY82RMK	1	binary	Remote key flags **Bit** **Meaning when set** **0** At least one remote key was updated **1** At least one remote key was added **2** At least one remote key was deleted from the CKDS **3-7** Reserved.

GENKEY Function Relocate Section

Offsets		Name	Length	Format	Description
0	0	CRY82DTP	1	binary	Data type indicator: X'02' for GENKEY function.
1	1	CRY82DLN	1	binary	Length of the data that follows.
2	2	CRY82GFG	1	binary	GENKEY activity flags **Bit** **Meaning when set** **0** ‘LOCKEY’ parameter was in error **1** ‘LOCKEY2’ parameter was in error **2** ‘REMKEY’ parameter was in error **3** ‘OPKEY’ was generated by the key manager. When bit 3 is off, ‘OPKEY’ was supplied to the key manager. **4** Installation data relocate section was omitted from this record because the data supplied by the installation exit exceeded the length of CRY82ID (64 bytes) **5-7** Reserved.
3	3	CRY82LK1	8	EBCDIC	‘LOCKEY’ key name.
11	B	CRY82LK2	8	EBCDIC	‘LOCKEY2’ key name.
19	13	CRY82REM	8	EBCDIC	‘REMKEY’ key name.

RETKEY Function Relocate Section

Offsets		Name	Length	Format	Description
0	0	CRY82DTP	1	binary	Data type indicator: X'03' for RETKEY function.
1	1	CRY82DLN	1	binary	Length of the data that follows.
2	2	CRY82RFG	1	binary	RETKEY activity flags **Bit** **Meaning when set** **0** Installation data relocate section was omitted from this record because the data supplied by the installation exit exceeded the length of CRY82ID (64 bytes) **1-7** Reserved.
3	3	CRY82RKN	8	EBCDIC	‘REMKEY’ key name.

Cryptography Initialization Relocate Section

Offsets		Name	Length	Format	Description
0	0	CRY82DTP	1	binary	Data type indicator, X'04' for initialization.
1	1	CRY82DLN	1	binary	Length of the data that follows.
2	2	CRY82SMF	1	binary	SMF option flags **Bit** **Meaning when set** **0** SMF records not written for GENKEY function **1** SMF records not written for RETKEY function **2-7** Reserved.
3	3	CRY82SIM	2	binary	Cryptography function user SVC number in the form X'cccc'.
5	5	CRY82KMG	2	binary	Key manager user SVC number in the form X'cccc'.

Installation Data Relocate Section

Offsets		Name	Length	Format	Description
0	0	CRY82DTP	1	binary	Data type indicator: X'05' for installation data.
1	1	CRY82DLN	1	binary	Length of the data that follows.
2	2	CRY82ID	VAR	EBCDIC	Installation data written by an installation exit routine (the maximum length is 64 bytes).

Cryptographic Unit Data Relocate Section

Offsets		Name	Length	Format	Description
0	0	CRY82DTP	1	binary	Data type indicator: X'06' for Cryptographic unit data.
1	1	CRY82DLN	1	binary	Length of the data that follows.
2	2	CRY82CID	1	EBCDIC	Cryptographic unit address.

Offsets		Name	Length	Format	Description
5	5	CRY82CST	1	binary	Cryptographic unit status **Bit** **Meaning when set** **0** Unit is online and available **1** Unit is unavailable **2** Unit check-key verification has failed **3** Unit check-key verification was successful **4-7** Reserved.

Record type 82 (X'52') — ICSF record

Reference information: For information about ICSF events and operations, see *z/OS Cryptographic Services ICSF System Programmer's Guide* and *z/OS Cryptographic Services ICSF Administrator's Guide*.

Record type 82 is used to record information about the events and operations of the Integrated Cryptographic Service Facility (ICSF) program product. Record type 82 is written to the SMF data set at the completion of certain cryptographic functions.

For a description of the Type 82 SMF Record, see Record type 82 (52) - ICSF record in *z/OS Cryptographic Services ICSF System Programmer's Guide*.

Record type 82 (X'52') — PCF Record

Record type 82 was used to record information about the events and operations of the Programmed Cryptographic Facility (PCF).

Record type 82 was written to the SMF data set at the completion of each of the following cryptography functions:

- **Initialization**:

  The record is written when the Programmed Cryptographic Facility is initialized, either when cryptography is started or as a part of the key generator utility program.
- **Start**:

  The record is written when a START command is issued for cryptography.
- **Stop**:

  The record is written when a STOP command is issued for cryptography.
- **Generation of an operational key**:

  If specified in the initialization options for cryptography, a record is written after processing each GENKEY macro instruction.
- **Transformation of an operational key**:

  If specified in the initialization options for cryptography, a record is written after processing each RETKEY macro instruction.
- **Execution of the key generator utility**:

  The record is written after the execution of the key generator utility program, thus providing a record of changes to the cryptographic key data set (CKDS).

Record type 82 consists of a header section and five possible relocate sections. The header section identifies the RACF user ID and group name or the job and step name of the non-RACF cryptography user, the cryptography function when the record describes, and the return code issued by the function. The header section is 45 bytes long.

The five possible variable relocate sections are:

- Key generator utility, which indicates changes made by the utility to the host system master key, the local keys, the cross keys, and the remote keys.
- GENKEY function, which indicates the action taken in response to a GENKEY macro instruction.
- RETKEY function, which indicates the action taken in response to a RETKEY macro instruction.
- Cryptography initialization, which describes the SMF recording options in effect at initialization and the cryptography function and key manager user SVC numbers.
- Installation data, which contains any information supplied by an installation exit routine.

Note: The number of relocate sections depends on the type of action taken. For instance, the record written when the Programmed Cryptographic Facility stops consists only of the header section. When the Programmed Cryptographic Facility has previously been initialized within the same IPL, the record written when cryptography starts consists of only the header section. The number of relocate sections is indicated in CRY82VCT (offset 37).

Record mapping

Header/Self-defining Section

This section contains the common SMF record headers fields and the triplet fields (offset/length/number), if applicable, that locate the other sections on the record.

Offsets		Name	Length	Format	Description
0	0	SMF82LEN	2	binary	Record length. This field and the next field (total of four bytes) form the RDW (record descriptor word). See “Standard and Extended SMF record headers” on page 162 for a detailed description.
2	2	SMF82SEG	2	binary	Segment descriptor (see record length field).
4	4	SMF82FLG	1	binary	System indicator: **Bit** **Meaning when set** **0-2** Reserved **3-6** Version indicators* **7** Reserved. *See “Standard and Extended SMF record headers” on page 162 for a detailed description.
5	5	SMF82RTY	1	binary	Record type 82 (X'52').
6	6	SMF82TME	4	binary	Time since midnight, in hundredths of a second, that the record was moved into the SMF buffer.
10	A	SMF82DTE	4	packed	Date when the record was moved into the SMF buffer, in the form 0*cyydddF*. See “Standard and Extended SMF record headers” on page 162 for a detailed description.
14	E	SMF82SID	4	EBCDIC	System identification (from the SID parameter).
18	12	SMF82LNG	4	binary	Length of record header.
22	16	SMF82TID	2	binary	Security product identifier: X'0001' for Programmed Cryptographic Facility.

Offsets		Name	Length	Format	Description
24	18	CRY82USR	8	EBCDIC	Job name (for RACF users, user ID).
32	20	CRY82GRP	8	EBCDIC	Step-name (for RACF users, RACF group-name).
40	28	CRY82FLG	1	binary	Flags **Bit** **Meaning when set** **0** Fields CRY82USR and CRY82GRP contain RACF user ID and group name. (When this bit is off, the fields contain the job name and step name). **1-7** Reserved.
41	29	CRY82VCT	2	binary	Number of variable relocate sections.
43	2B	CRY82FTN	1	binary	Function code **Code** **Meaning** **1** Key generator function **2** GENKEY function **3** RETKEY function **4** Start cryptography **5** Stop cryptography.
44	2C	CRY82RTC	1	binary	Return code issued by function or X'FF' if function terminated abnormally.

Key Generator Utility Relocate Section

Offsets		Name	Length	Format	Description
0	0	CRY82DTP	1	binary	Data type indicator: X'01' for key generator utility.
1	1	CRY82DLN	1	binary	Length of the data that follows.
2	2	CRY82SMK	1	binary	Host system master key flags **Bit** **Meaning when set** **0** Host system master key was successfully changed **1-7** Reserved.
3	3	CRY82LMK	1	binary	Local key flags **Bit** **Meaning when set** **0** At least one local key was updated **1** At least once local key was added **2** At least one local key was deleted from the CKDS **3-7** Reserved.

Offsets		Name	Length	Format	Description
4	4	CRY82CMK	1	binary	Cross key flags **Bit** **Meaning when set** **0** At least one pair of cross keys was updated **1** At least one pair of cross keys was added **2** At least one pair of cross keys was deleted from the CKDS **3-7** Reserved.
5	5	CRY82RMK	1	binary	Remote key flags **Bit** **Meaning when set** **0** At least one remote key was updated **1** At least one remote key was added **2** At least one remote key was deleted from the CKDS **3-7** Reserved.

GENKEY Function Relocate Section

Offsets		Name	Length	Format	Description
0	0	CRY82DTP	1	binary	Data type indicator: X'02' for GENKEY function.
1	1	CRY82DLN	1	binary	Length of the data that follows.
2	2	CRY82GFG	1	binary	GENKEY activity flags **Bit** **Meaning when set** **0** 'LOCKEY' parameter was in error **1** 'LOCKEY2' parameter was in error **2** 'REMKEY' parameter was in error **3** 'OPKEY' was generated by the key manager. When bit 3 is off, 'OPKEY' was supplied to the key manager. **4** Installation data relocate section was omitted from this record because the data supplied by the installation exit exceeded the length of CRY82ID (64 bytes). **5-7** Reserved.
3	3	CRY82LK1	8	EBCDIC	'LOCKEY' key name.
11	B	CRY82LK2	8	EBCDIC	'LOCKEY2' key name.
19	13	CRY82REM	8	EBCDIC	'REMKEY' key name.

RETKEY Function Relocate Section

Offsets		Name	Length	Format	Description
0	0	CRY82DTP	1	binary	Data type indicator: X'03' for RETKEY function.
1	1	CRY82DLN	1	binary	Length of the data that follows.
2	2	CRY82RFG	1	binary	RETKEY activity flags **Bit** **Meaning when set** **0** Installation data relocate section was omitted from this record because the data supplied by the installation exit exceeded the length of CRY82ID (64 bytes) **1-7** Reserved.
3	3	CRY82RKN	8	EBCDIC	‘REMKEY’ key name.

Cryptography Initialization Relocate Section

Offsets		Name	Length	Format	Description
0	0	CRY82DTP	1	binary	Data type indicator, X'04' for initialization.
1	1	CRY82DLN	1	binary	Length of the data that follows.
2	2	CRY82SMF	1	binary	SMF option flags **Bit** **Meaning when set** **0** SMF records not written for GENKEY function **1** SMF records not written for RETKEY function **2-7** Reserved.
3	3	CRY82SIM	2	binary	Cryptography function user SVC number in the form X'cccc'.
5	5	CRY82KMG	2	binary	Key manager user SVC number in the form X'cccc'.

Installation Data Relocate Section

Offsets		Name	Length	Format	Description
0	0	CRY82DTP	1	binary	Data type indicator: X'05' for installation data.
1	1	CRY82DLN	1	binary	Length of the data that follows.
2	2	CRY82ID	VAR	EBCDIC	Installation data written by an installation exit routine (the maximum length is 64 bytes).

Record type 83 (X'53') — RACF Audit Record For Data Sets

Record type 83 is a Resource Access Control Facility (RACF) processing record. Subtype 1 is written in order to audit data sets that are affected by a RACF command (ADDSD, ALTDSD, and DELDSD) that caused the security label associated with a data set to be changed. For more information, see *z/OS Security Server RACF Macros and Interfaces*.

Record type 84 (X'54') — JES monitoring facility data

Reference information:

For records generated by JES3, additional information on producing and using this record, a description of JMF, and how multi-segmented subtypes can be handled, see *z/OS JES3 Diagnosis*.

Record type 84 contains information collected by either JES2 or JES3 monitors. This record is intended to provide insights into what the subsystems are doing during the interval the record represents.

In JES3, the information is collected by the JES3 monitoring facility (JMF). When JMF is called with the SMF option selected, then these records are generated for each JMF interval. SMF records can be produced on both the global and local processors.

In JES2, the information is collected by the JES2 health monitor. The records are generated by each JES2 subsystem address space at the top of every hour.

Each record type 84 contains a common section (with header, product, and general information portions) and a subtype section unique for each record. Subtypes 1, 2, 5, and 6 can be multi-segmented due to the large amount of information that is produced. The subtypes used by JES3 are:

Subtype 1
FCT (Function Control Table) analysis.

Subtype 2
FCT summary and highlight.

Subtype 3
Spool data management.

Subtype 4
Res-queue cellpool, JCT and control block utilization.

Subtype 5
Job analysis.

Subtype 6
JES3 hot spot analysis.

Subtype 7
JES3 internal reader DSP analysis.

Subtype 8
JES3 SSI response time analysis.

Subtype 9
JES3 SSI destination queue analysis.

Subtype 10
JES3 Workload Manager Analysis.

The subtypes used by JES2 are:

Subtype 21
Resource limit and usage information.

Macro to symbolically address record type 84

The mapping macro for SMF type 84 record is IAZSMF84. IAZSMF84 resides in SYS1.MACLIB.

Record environment

The following conditions exist for the generation of this record:

Macro
SMFEWTM, BRANCH=NO (record exit: IEFU83).

Storage Residency
31-bit.

Record mapping

Header/Self-defining Section

This section contains the common SMF record headers fields and the triplet fields (offset/length/number), if applicable, that locate the other sections on the record.

Offsets		Name	Length	Format	Description
0	0	SMF84LEN	2	Binary	Record length. This field and the next field (total of four bytes) form the RDW (record descriptor word). See "Standard and Extended SMF record headers" on page 162 for a detailed description.
2	2	SMF84SEG	2	Binary	Segment descriptor (see record length field).
4	4	SMF84FLG	1	Binary	System indicator: **Bit** **Meaning when set** **0-2** Reserved. **3-6** Version indicators*. **7** Reserved. *See "Standard and Extended SMF record headers" on page 162 for a detailed description.
5	5	SMF84RTY	1	Binary	Record type 84 (X'54').
6	6	SMF84TME	4	Packed	Time since midnight, in hundredths of a second, that the record was written to the SMF buffer.
10	A	SMF84DTE	4	Packed	Date when the record was moved into the SMF buffer, in the form 0*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for a detailed description.
14	E	SMF84SID	4	EBCDIC	System identification (from the SID parameter).
18	12	SMF84SBS	2	Binary	Subsystem identification - (X'0002' signifies JES2, X'0005' signifies JES3).
20	14	SMF84SGN	2	Binary	Segment number.
22	16	SMF84FL1	1	Binary	Flag byte **Value** **Meaning** **X'80'** Indicates last SMF segment.
23	17	SMF84VER	1		SMF 84 version number **Value** **Meaning** **X'03'** Indicates OS/390® JES3 2.4.0 level.
24	18	SMF84STY	2	Binary	Record subtype.
26	1A	SMF84TRN	2	Binary	Number of triplets in this record. A triplet is a set of offset/length/number values that defines a section of the record.
28	1C	SMF84PRS	4	Binary	Offset to JES product section.
32	20	SMF84PRL	2	Binary	Length of JES product section.
34	22	SMF84PRN	2	Binary	Number of JES product sections.
36	24	SMF84GNS	4	Binary	Offset to JES general section.
40	28	SMF84GNL	2	Binary	Length of JES general section.

Offsets		Name	Length	Format	Description
42	2A	SMF84GNN	2	Binary	Number of JES general sections.
44	2C	SMF84J1O	4	Binary	Offset to JES data section.
48	30	SMF84J1L	2	Binary	Length of JES data section.
50	32	SMF84J1N	2	Binary	Number of JES data sections.

Product Section

This section contains information about JES.

Offsets		Name	Length	Format	Description
0	0	R84MFVER	2	Binary	Version number.
2	2	R84PRDNM	8	EBCDIC	Product name ('SC1BA' for JES3 and 'SC1BH' for JES2).
10	A	R84INTST	4	Packed	Time of day that the measurement interval started, in the form *hhmmsstF*.
14	E	R84SDATE	4	Packed	Date when the measurement interval started, in the form 0*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for a detailed description.
18	12	R84INTEN	4	Packed	Time that the measurement interval ended, in the form *hhmmsstF*.
22	16	R84EDATE	4	Packed	Date when the measurement interval ended, in the form 0*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for a detailed description.
26	1A	R84INTER	4	Packed	Duration of the measurement interval, in seconds.
30	1E	R84MFCYC	4	Packed	Sampling cycle length, in the form 00*sssttF*, (where *F* is the sign).
34	22		2		Reserved.
36	24	R84SAMPL	4	Binary	Number of samples.
40	28	R84MFCMD	80	EBCDIC	*CALL, JMF command (first 80 characters) JES3 only.
120	78	R84MVSRL	8	EBCDIC	MVS software level (consists of an acronym and the version, release, and modification level numbers).
128	80	R84JESRL	8	EBCDIC	JES release level (consists of an acronym and the version, release, and modification level numbers).
136	88	R84CPUM	4	EBCDIC	CPU model number.
140	8C	R84RSTO	4	Binary	Central storage size in KB.
144	90	R84CPUNM	8	EBCDIC	CPU serial number (JES3 only).
152	98	R84CPUID	4	EBCDIC	JES3 CPU ID (JES3 only).
156	9C	R84MPNAM	8	EBCDIC	Main processor name.
164	A4	R84J3FLG	1		JES status indicator **Bit** **Meaning when set** **X'80'** JES3 local (JES3 only). **X'40'** JES is in the APG priority level. **X'20'** JES non-swappable.
165	A5		1		Reserved.
166	A6	R84JPRTY	2	Binary	JES dispatching priority.
168	A8	R84JMFMN	4	Binary	Minimum overhead time, in microseconds.
172	AC	R84JMFMX	4	Binary	Maximum overhead time, in microseconds.

Offsets		Name	Length	Format	Description
176	B0	R84JMFAV	4	Binary	Average overhead time, in microseconds. The percentage of interval time is equal to (average overhead time * number of samples) / (Interval time, in microseconds * 100).
180	B4	R84MVSMN	4	Binary	Minimum MVS overhead time, in microseconds.
184	B8	R84MVSMX	4	Binary	Maximum MVS overhead time, in microseconds.
188	BC	R84MVSAV	4	Binary	Average MVS overhead time, in microseconds. The percentage of interval time is equal to (average MVS overhead time * number of samples) / (Interval time in microseconds * 100).

General Section

This section contains information about primary (nucleus) and auxiliary task activity.

Offsets		Name	Length	Format	Description
0	0	R84CPUSC	4	Binary	CPU busy sample count.
4	4	R84NPA	4	Binary	JES3 nucleus or JES2 main task posted-active count.
8	8	R84APA	4	Binary	JES3 (only) auxiliary task posted-active count.
12	C	R84NPNA	4	Binary	JES3 nucleus or JES2 main task posted-not active count.
16	10	R84APNA	4	Binary	JES3 (only) auxiliary task posted-not active count.
20	14	R84NNP	4	Binary	JES3 nucleus or JES2 main task not-posted count.
24	18	R84ANP	4	Binary	JES3 (only) auxiliary task not-posted count.
28	1C	R84NNW	4	Binary	JES3 nucleus or JES2 main task non-standard wait count.
32	20	R84ANW	4	Binary	JES3 (only) auxiliary task non-standard wait count.
36	24	R84NSLLR	4	Binary	JES3 nucleus or JES2 main suspended local lock request count.
40	28	R84ASLLR	4	Binary	JES3 (only) auxiliary task suspended local lock request count.
44	2C	R84NSO	4	Binary	JES3 nucleus or JES2 main task suspended-other count.
48	30	R84ASO	4	Binary	JES3 (only) auxiliary task suspended-other count.

Subtype 1 — FCT Analysis

This subtype consists of a header followed by three sections:

1. JES3 general information section. Contains general information about JES3 program activity including paging, working set sizes, and task information.
2. IRB header section. Contains general information about interruption request blocks (IRBs).
3. FCT and AWAIT analysis section. Contains information about each JES3 function control table (FCT) entry found during the JMF interval. Contains information about each FCT AWAIT entry found during the JMF interval.

Subtype Header Section

Offsets		Name	Length	Format	Description
0	0	R84JES3O	4	binary	Offset to JES3 general information section.
4	4	R84IRBSC	4	binary	Offset to the IRB section.
8	8	R84FCTO	4	binary	Offset to FCT and AWAIT analysis section.

Offsets		Name	Length	Format	Description
12	C	R84FFLG1	1	binary	Miscellaneous flag **Bit** **Meaning when set** **X'80'** Record contains JES3 general information section **X'40'** Record contains FCT and AWAIT analysis section **X'20'** Record contains IRB section.
13	D		3		Reserved.

General Information Section

Offsets		Name	Length	Format	Description
0	0	R84FOE	4	binary	Number of fixed pages in thousands.
4	4	R84FOESZ	4	binary	Total size of all fixed pages in thousands.
8	8	R84SLOT	4	binary	Auxiliary slot count.
12	C	R84SLOTS	4	binary	Total size of all auxiliary slots, in thousands.
16	10	R84JPIN	4	binary	JES3 page-ins during JMF monitoring.
20	14	R84JPOUT	4	binary	JES3 page-outs during JMF monitoring.
24	18	R84JPREC	4	binary	JES3 page reclaims during JMF monitoring.
28	1C	R84JPGCT	4	binary	JES3 paging count during JMF monitoring.
32	20	R84SPGCT	4	binary	System paging count (non-swappable, non-VIO) during JMF monitoring.
JES3 working set information:					
36	24	R84WSPLO	4	binary	Low range of working set plot scale, in thousands.
40	28	R84WSPHI	4	binary	High range of working set plot scale, in thousands.
44	2C	R84WSINC	4	binary	Increment for working set plot, in thousands.
48	30	R84WSMIN	4	binary	Minimal working set size, in thousands.
52	34	R84WSMAX	4	binary	Maximum working set size, in thousands.
56	38	R84WSAVG	4	binary	Average working set size, in thousands.
60	3C	R84JMFSZ	4	binary	JMF size included in working set sizes, in thousands.
64	40	R84WSPTN	4	binary	Total number of working set plot counter entries.
68	44	R84WSPTO	4	binary	Offset of first working set plot counter entry.
JES3 subtasks information:					
72	48	R84ONES	4	binary	Number of times there was a single JES3 subtask posted.
76	4C	R84TWOS	4	binary	Number of times there were two JES3 subtasks posted concurrently.
80	50	R84THREE	4	binary	Number of times there were three JES3 subtasks posted concurrently.
84	54	R84FOURS	4	binary	Number of times there were four or more JES3 subtasks posted concurrently.
88	58	R84SUBNM	4	binary	Total number of JES3 subtask entries.
92	5C	R84SUBOF	4	binary	Offset to the first JES3 subtask entry.
96	60	R84NNFCT	4	binary	Number of times JES3 nucleus task posted (but no FCT posted).

Offsets		Name	Length	Format	Description
100	64	R84ANFCT	4	binary	Number of times JES3 auxiliary task posted (but no FCT posted).

JES3 Subtask Entry

This section contains one for each subtask.

Offsets		Name	Length	Format	Description
0	0	R84SSEQN	4	binary	Subtask sequence number.
4	4	R84SNAME	8	EBCDIC	Subtask name.
12	C	R84SPPC	4	binary	Number of times subtask posted.

Working Set Plot Counter Entry

This section contains one for each working set plot counter.

Offsets		Name	Length	Format	Description
0	0	R84WSPTS	4	binary	Working set plot scale.
4	4	R84WSPTC	4	binary	Number of working set sizes for the working set plot scale.

Interruption Request Block Header Section

Offsets		Name	Length	Format	Description
0	0	R84NIRBO	4	binary	Offset of the first nucleus task IRB table entry.
4	4	R84NIRBC	4	binary	Total number of JES3 IRBs in JES3 nucleus task.
8	8	R84NTOTA	4	binary	Total number of active nucleus task IRB entries.
12	C	R84NTOTS	4	binary	Total number of suspended nucleus task IRB entries.
16	10	R84NTOTO	4	binary	Total number of IN-OS-WAIT IRB entries in JES3 nucleus task.
20	14	R84AIRBO	4	binary	Offset of the first auxiliary task IRB table entry.
24	18	R84AIRBC	4	binary	Total number of JES3 IRBs in JES3 auxiliary task.
28	1C	R84ATOTA	4	binary	Total number of active auxiliary task IRB entries.
32	20	R84ATOTS	4	binary	Total number of suspended auxiliary task IRB entries.
36	24	R84ATOTO	4	binary	Total number of IN-OS-WAIT IRB entries in JES3 auxiliary task.
40	28	R84IRBFG	1	binary	Miscellaneous flag for the IRB section **Bit** **Meaning** **X'40'** Nucleus task IRB table has overflowed **X'80'** Auxiliary task IRB table has overflowed.
41	29		3		Reserved.

IRB Table Entry

This section contains one for each nucleus task IRB and auxiliary task IRB.

Offsets		Name	Length	Format	Description
0	0	R84IRBNM	8	EBCDIC	Name or address of the JES3 IRB.
8	8	R84IRBAC	4	binary	Number of times for active JES3 IRB.
12	C	R84IRBSU	4	binary	Number of times for suspended JES3 IRB.

Offsets		Name	Length	Format	Description
16	10	R84IRBWT	4	binary	Number of times for IN-OS-WAIT JES3 IRB.

FCT and AWAIT Analysis Section

There is a header section for the FCT and AWAIT analysis section of subtype 1. After this header, there is an entry for each FCT. Each FCT is immediately followed by a series of entries, one for each type of AWAIT it incurred.

AWAIT entries have two formats. The format for the first part is the same for every AWAIT entry. The format for the second part depends on what type of AWAIT it is (based on the value of R84AWFL2).

Offsets		Name	Length	Format	Description
0	0	R84FAWLN	4	binary	Length of the FCT and AWAIT section.
4	4	R84NMFMA	4	binary	Number of times multi-function monitor active in JES3 nucleus task.
8	8	R84NMFMS	4	binary	Number of times multi-function monitor suspended in JES3 nucleus task.
12	C	R84NMFMW	4	binary	Number of times multi-function monitor IN-OS-WAIT in JES3 nucleus task.
16	10	R84AMFMA	4	binary	Number of times multi-function monitor active in JES3 auxiliary task.
20	14	R84AMFMS	4	binary	Number of times multi-function monitor suspended in JES3 auxiliary task.
24	18	R84AMFMW	4	binary	Number of times multi-function monitor IN-OS-WAIT JES3 auxiliary task.
28	1C	R84FCTN	2	binary	Total number of FCT entries.
30	1E		2		Reserved.
32	20	R84FCTOF	4	binary	Offset of the first FCT entry.

FCT Entry

This section contains one for each FCT.

Offsets		Name	Length	Format	Description
0	0	R84FSEQN	2	binary	FCT sequence number.
2	2		2		Reserved.
4	4	R84FNEXT	4	binary	Length of next FCT entry.
8	8	R84FNAM	8	EBCDIC	Name of the Dynamic Support Program (DSP) associated with the FCT.
16	10	R84FDEV	8	EBCDIC	Name of the device associated with the FCT.
24	18	R84FPRTY	2	binary	FCT priority.
26	1A	R84FCXOF	2	binary	Offset of FCT entry extension from the start of this FCT entry.
28	1C	R84FFCT	4	binary	Number of times this FCT found on FCT chain.
32	20	R84FNUC	4	binary	Number of times this FCT in JES3 nucleus task.
36	24	R84FAUX	4	binary	Number of times this FCT in JES3 auxiliary task.
40	28	R84FNFPA	4	binary	Number of times FCT found to be the active JES3 FCT in nucleus task.
44	2C	R84FNFNA	4	binary	Number of times the FCT in nucleus task was dispatchable (posted) but not the active JES3 FCT.

Offsets		Name	Length	Format	Description
48	30	R84FNFNP	4	binary	Number of times in the nucleus task the FCT was found to be not the active JES3 FCT and not posted.
52	34	R84FNFW	4	binary	Number of times in the nucleus task the FCT was IN-OS-WAIT condition.
56	38	R84FNFS	4	binary	Number of times in the nucleus task the FCT was suspended because the local lock was unavailable.
60	3C	R84FNFSO	4	binary	Number of times in the nucleus task the FCT was suspended for any reason other than waiting for local lock.
64	40	R84FNENT	2	binary	Total number of FCT AWAIT entries in the JES3 nucleus task.
66	42		2		Reserved.
68	44	R84FNOFF	4	binary	Offset to the first AWAIT entry in the JES3 nucleus task.
72	48	R84FAFPA	4	binary	Number of times FCT posted, active, in auxiliary task.
76	4C	R84FAFNA	4	binary	Number of times FCT posted, but not active, in auxiliary task.
80	50	R84FAFNP	4	binary	Number of times FCT found to be not posted in auxiliary task.
84	54	R84FAFW	4	binary	Number of times FCT was found IN-OS-WAIT condition in auxiliary task.
88	58	R84FAFS	4	binary	Number of times FCT suspended in auxiliary task because local lock unavailable.
92	5C	R84FAFSO	4	binary	Number of times FCT suspended in auxiliary task for any reason other than waiting for local lock.
96	60	R84FAENT	2	binary	Total number of FCT AWAIT entries in JES3 auxiliary task.
98	62		2		Reserved.
100	64	R84FAOFF	4	binary	Offset of the first AWAIT entry in JES3 auxiliary task.

FCT Entry Extension

Offsets		Name	Length	Format	Description
0	0	R84FCXLN	2	binary	Length of extension.
2	2	R84FCXRS	2	binary	Reserved.
4	4	R84MRFRI	4	binary	Number of multi-record file read I/O's.
8	8	R84MRFWI	4	binary	Number of multi-record file write I/O's.
12	C	R84SRFRI	4	binary	Number of single record file read I/O's.
16	10	R84SRFRB	4	binary	Number of single record file buffers read.
20	14	R84SRFWI	4	binary	Number of single record file write I/O's.
24	18	R84SRFWB	4	binary	Number of single record file buffers written.
28	1C	R84FCXR2	100	binary	Reserved.

FCT AWAIT Entry (JES3)

This section contains one for each JES3 AWAIT entry that waits longer than one cycle.

Offsets		Name	Length	Format	Description
0	0	R84AWFL1	1	binary	FCT AWAIT Flag 1 **Value** **Meaning when set** **X'80'** AWAIT is for generalized subtask **X'40'** AWAIT is for RJP I/O **X'20'** AWAIT is for specialized rescheduling **X'10'** AWAIT is for catalog locate **X'08'** AWAIT is for generalized subtask to become available **X'04'** AWAIT is for MVS/CI. **X'02'** AWAIT is described by a reason code.
1	1	R84AWFL2	1	binary	FCT AWAIT Flag 2 **Value** **Meaning when set** **X'80'** AWAIT is standard AWAIT **X'40'** AWAIT is for ALOAD of a module **X'20'** AWAIT is for FDB **X'10'** AWAIT is for SDM **X'08'** AWAIT is for AENQ on a resource **X'04'** AWAIT is for console buffers **X'02'** AWAIT is unknown.
2	2	R84AWFL3	1	binary	FCT AWAIT Flag 3 **Value** **Meaning when set** **1** AWAIT is for locate schedule **2** AWAIT is for catalog setup.
3	3		1		Reserved.
4	4	R84AWUSE	4	binary	Number of times FCT found using this AWAIT.
8	8	R84AWPA	4	binary	Number of times FCT active after waiting on this AWAIT.
12	C	R84AWPNA	4	binary	Number of times FCT waiting on this AWAIT, ECF is posted but FCT is not the active JES3 FCT.
16	10	R84AWNP	4	binary	Number of times FCT waiting on this AWAIT but the ECF not posted.
20	14	R84AWAVG	4	binary	Average AWAIT duration time.
24	18	R84AWTOT	4	binary	Total AWAIT duration time.
28	1C	R84AWMAX	4	binary	Maximum AWAIT duration time.
32	20	R84AWMOD	8	EBCDIC	Name of module with maximum AWAIT duration time.

Offsets		Name	Length	Format	Description
40	28	R84AWDIS	4	binary	Displacement in module to AWAIT with maximum duration time.
44	2C		8		Reserved.

FCT AWAIT Entry

The information in the AWAIT entry depends on the value of R84AWFL1 or R84AWFL2.

Offsets		Name	Length	Format	Description
For AWAITs described by a reason code (when R84AWFL1 = X'02'):					
52	34	R84AWRSN	2	binary	AWAIT reason code.
53	36	R84AWRSV	1	binary	Reserved.
54	37	R84AWDLN	1	binary	AWAIT data length or zero.
56	38	R84AWDAT	16	EBCDIC	Up to 16 bytes of AWAIT related data or zero.
For STANDARD AWAIT (when R84AWFL2 = X'80'):					
52	34	R84STDAW	8	EBCDIC	Standard AWAIT name.
60	3C		12		Reserved.

Offsets		Name	Length	Format	Description
For ALOAD AWAIT (when R84AWFL2 = X'40'):					
52	34	R84MODNM	8	EBCDIC	Name of module with this AWAIT.
60	3C		12		Reserved.

Offsets		Name	Length	Format	Description
For FDB AWAIT (when R84AWFL2 = X'20'):					
52	34	R84FDBIO	6	EBCDIC	Input/output FDB.
58	3A	R84FDBRF	3	EBCDIC	MRF or SRF.
61	3D		1		Reserved.
62	3E	R84FDBTY	3	EBCDIC	Set to 'I/O' or blanks.
65	41		7		Reserved.

Offsets		Name	Length	Format	Description
For SDM AWAIT (when R84AWFL2 = X'10'):					
52	34	R84SDMTY	20	EBCDIC	SDM AWAIT type; buffers or file directory space.

Offsets		Name	Length	Format	Description
For AENQ AWAIT (when R84AWFL2 = X'08'):					
52	34	R84ENQRN	8	EBCDIC	AENQ Resource name.
60	3C		12		Reserved.

Offsets		Name	Length	Format	Description
For CONSOLE BUFFERS AWAIT (when R84AWFL2 = X'04'):					
52	34	R84CNBTY	8	EBCDIC	Console buffers AWAIT type.
60	3C		12		Reserved.

Offsets		Name	Length	Format	Description
For Unknown AWAIT (when R84AWFL2 = X'02'):					
52	34	R84AWMSK	1	binary	AWAIT mask.
53	35		3		Reserved.
56	38	R84AWADR	4	EBCDIC	AWAIT address.
60	3C		12		Reserved.

Subtype 2 — FCT Summary and Highlight

This subtype consists of a header followed by three sections:

1. FCT summary section. This section summarizes the FCT analysis report. Its length is variable depending on the number of FCT summary entries. It has a general section followed by an entry for each FCT describing nucleus and auxiliary mode activity.
2. FCT and AWAIT highlight section. This section lists FCTs in various categories for both nucleus and auxiliary modes:
   - Five most active FCTs
   - Five most posted and not active FCTs
   - Five most “IN-OS-WAIT” FCTs
   - Ten AWAIT entries with the largest total AWAIT duration time

   The five most active, most posted-not-active, and most “IN-OS-WAIT” FCTs are mapped by a common DSECT. The format follows the FCT and AWAIT highlight section. The ten AWAIT entries with the largest total AWAIT duration time are each mapped by a common DSECT.
3. JES3 WAIT analysis section. This section lists the unexpected OS WAIT SVC occurrences within JES3. Its length is variable depending on the number of WAIT entries.

Subtype 2 Header

Offsets		Name	Length	Format	Description
0	0	R84FCTNM	4	binary	Number of FCT summary entries.
4	4	R84FSMLN	4	binary	Length of the FCT summary section.
8	8	R84FSMOF	4	binary	Offset to the first FCT summary entry.
12	C	R84FAHOF	4	binary	Offset to the FCT and AWAIT highlight section.
16	10	R84WAITO	4	binary	Offset to the JES3 WAIT analysis section.
20	14	R84S2FLG	1	binary	Subtype 2 header flag **Value** **Meaning when set** **X'80'** FCT summary and highlight segment **X'40'** WAIT analysis segment.
21	15		3		Reserved.

FCT Summary Entry

This section contains one for each FCT.

Offsets		Name	Length	Format	Description
0	0	R84FSNUM	4	binary	FCT sequence number.
4	4	R84FSNAM	8	EBCDIC	DSP name.

Offsets		Name	Length	Format	Description
12	C	R84DEV	8	EBCDIC	Device.
20	14	R84FSPRT	2	binary	FCT priority.
22	16		2		Reserved.
24	18	R84FCHN	4	binary	Number of times this FCT appeared on FCT chain.
28	1C	R84FSNUC	4	binary	Number of times FCT in JES3 nucleus mode.
32	20	R84FSAUX	4	binary	Number of times FCT in JES3 auxiliary mode.
36	24	R84FNPA	4	binary	Number of times FCT was posted-active in the JES3 nucleus task.
40	28	R84FAPA	4	binary	Number of times FCT was posted-active in the JES3 auxiliary task.
44	2C	R84FNPNA	4	binary	Number of times FCT was posted-not active in the JES3 nucleus task.
48	30	R84FAPNA	4	binary	Number of times FCT was posted-not active in the JES3 auxiliary task.
52	34	R84FNNP	4	binary	Number of times FCT was not posted in the JES3 nucleus task.
56	38	R84FANP	4	binary	Number of times FCT was not posted in JES3 auxiliary task.
60	3C	R84FNSOS	4	binary	Number of times FCT was IN-OS-Wait in the JES3 nucleus task.
64	40	R84FASOS	4	binary	Number of times FCT was IN-OS-WAIT in the JES3 auxiliary task.

FCT and AWAIT Highlight Section

Offsets		Name	Length	Format	Description
0	0	R84FHLNG	4	binary	Length of the FCT and AWAIT highlight data section.
4	4	R84N1MA	20	binary	Most active FCT in the JES3 nucleus.
24	18	R84N2MA	20	binary	Second most active FCT in the JES3 nucleus.
44	2C	R84N3MA	20	binary	Third most active FCT in the JES3 nucleus.
64	40	R84N4MA	20	binary	Fourth most active FCT in the JES3 nucleus.
84	54	R84N5MA	20	binary	Fifth most active FCT in JES3 nucleus.
104	68	R84A1MA	20	binary	Most active FCT in JES3 auxiliary task.
124	7C	R84A2MA	20	binary	Second most active FCT in JES3 auxiliary task.
144	90	R84A3MA	20	binary	Third most active FCT in JES3 auxiliary task.
164	A4	R84A4MA	20	binary	Fourth most active FCT in JES3 auxiliary task.
184	B8	R84A5MA	20	binary	Fifth most active FCT in JES3 auxiliary task.
204	CC	R84N1PNA	20	binary	Most posted-not-active FCT in JES3 nucleus.
224	E0	R84N2PNA	20	binary	Second most posted-not-active FCT in JES3 nucleus.
244	F4	R84N3PNA	20	binary	Third most posted-not-active FCT in JES3 nucleus.
264	108	R84N4PNA	20	binary	Fourth most posted-not-active FCT in JES3 nucleus.
284	11C	R84N5PNA	20	binary	Fifth most posted-not-active FCT in JES3 nucleus.
304	130	R84A1PNA	20	binary	Most posted-not-active FCT in JES3 auxiliary task.
324	144	R84A2PNA	20	binary	Second most posted-not-active FCT in JES3 auxiliary task.
344	158	R84A3PNA	20	binary	Third most posted-not-active FCT in JES3 auxiliary task.
364	16C	R84A4PNA	20	binary	Fourth most posted-not-active FCT in JES3 auxiliary task.
384	180	R84A5PNA	20	binary	Fifth most posted-not-active FCT in JES3 auxiliary task.

Offsets		Name	Length	Format	Description
404	194	R84N1OSW	20	binary	FCT in JES3 nucleus with the most OS WAITs.
424	1A8	R84N2OSW	20	binary	FCT in JES3 nucleus with the second most OS WAITs.
444	1BC	R84N3OSW	20	binary	FCT in JES3 nucleus with the third most OS WAITs.
464	1D0	R84N4OSW	20	binary	FCT in JES3 nucleus with the fourth most OS WAITs.
484	1E4	R84N5OSW	20	binary	FCT in JES3 nucleus with the fifth most OS WAITs.
504	1F8	R84A1OSW	20	binary	FCT in JES3 auxiliary task with the most OS WAITs.
524	20C	R84A2OSW	20	binary	FCT in JES3 auxiliary task with the second most OS WAITs.
544	220	R84A3OSW	20	binary	FCT in JES3 auxiliary task with the third most OS WAITs.
564	234	R84A4OSW	20	binary	FCT in JES3 auxiliary task with the fourth most OS WAITs.
584	248	R84A5OSW	20	binary	FCT in JES3 auxiliary task with the fifth most OS WAITs.
604	25C	R84AW1BN	48	binary	FCT causing the largest JES3 AWAIT delay.
652	28C	R84AW2BN	48	binary	FCT causing the second largest JES3 AWAIT delay.
700	2BC	R84AW3BN	48	binary	FCT causing the third largest JES3 AWAIT delay.
748	2EC	R84AW4BN	48	binary	FCT causing the fourth largest JES3 AWAIT delay.
796	31C	R84AW5BN	48	binary	FCT causing the fifth largest JES3 AWAIT delay.
844	34C	R84AW6BN	48	binary	FCT causing the sixth largest JES3 AWAIT delay.
892	37C	R84AW7BN	48	binary	FCT causing the seventh largest JES3 AWAIT delay.
940	3AC	R84AW8BN	48	binary	FCT causing the eighth largest JES3 AWAIT delay.
988	3DC	R84AW9BN	48	binary	FCT causing the ninth largest JES3 AWAIT delay.
1036	40C	R84AWABN	48	binary	FCT causing the tenth largest JES3 AWAIT delay.
1084	43C	R84DMMXA	4	binary	Maximum number of active DMJA FCTs allowed.
1088	440	R84DMMN	4	binary	Minimum number of active DMJA FCTs.
1092	444	R84DMMX	4	binary	Largest number of active DMJA FCTs.
1096	448	R84DMAV	4	binary	Average number of active DMJA FCTs.

The five most active, most posted-not-active, and five most in “OS WAIT” entries are mapped as follows:

Offsets		Name	Length	Format	Description
0	0	R84FSQNM	4	binary	FCT sequence number.
4	4	R84FNAME	8	EBCDIC	DSP name.
12	C	R84TPA	4	binary	Number of times task posted — active.
16	10	R84FPA	4	binary	Number of times FCT posted — active.

Each of the 40-byte entries for the ten largest JES3 AWAIT delays is mapped as follows:

Offsets		Name	Length	Format	Description
0	0	R84BSEQN	4	binary	FCT sequence number.
4	4	R84BNAME	8	EBCDIC	DSP name.
12	C	R84BTSK	8	EBCDIC	Task name.
20	14	R84BADAT	8	EBCDIC	Up to 8 bytes of AWAIT data.

Offsets		Name	Length	Format	Description
28	1C	R84BRSN	1	binary	Reason for awaiting **Value** **Meaning when set** **X'80'** AENQ **X'40'** SDM - waiting for file directory **X'20'** SDM - waiting for JSAM buffers **X'10'** JES3 521 - Reserved JES3 511 or prior releases - Waiting for console buffers **X'08'** Waiting for catalog locate **X'04'** Waiting for locate schedule. **X'02'** AWAIT reason code describes the bottleneck.
29	1D	R84BARSN	2	binary	AWAIT reason code.
31	1F	R84BADLN	1	binary	AWAIT data length.
32	20	R84CNNM	8	binary	Reserved.
40	28	R84BTOTD	4	binary	Total AWAIT duration time.
44	2C	R84BMAXD	4	binary	Maximum AWAIT duration time.

JES3 Wait Analysis Section

Offsets		Name	Length	Format	Description
0	0	R84WTLNG	4	binary	Length of the JES3 WAIT analysis data section.
4	4	R84WTNUM	4	binary	Total number of WAIT analysis entries.
8	8	R84WTOFF	4	binary	Offset to the first entry.

WAIT analysis entry

This section contains one for each nucleus and auxiliary task WAIT.

Offsets		Name	Length	Format	Description
0	0	R84WTNAM	8	EBCDIC	DSP name.
8	8	R84WTFSN	4	binary	FCT sequence number.
12	C	R84WTTSK	8	EBCDIC	Task name.
20	14	R84WTFOS	4	binary	Number of FCTs IN-OS-WAIT.
24	18	R84WTFLG	1	binary	Type of WAIT: **Value** **Meaning when wet** **X'80'** Page fault **X'40'** SVC WAIT **X'20'** Load WAIT.
25	19		3		Reserved.

Offsets		Name	Length	Format	Description
The following fields apply only to Page fault WAITs:					
28	1C	R84PADR	4	binary	Address of location of page fault.
32	20	R84PNAM	8	EBCDIC	Module name.
40	28	R84PMOF	4	binary	Offset into the module.
44	2C	R84PCNT	4	binary	Number of page faults.
48	30		12		Reserved.

Offsets		Name	Length	Format	Description
The following fields apply only to SVC WAITs:					
28	1C	R84SNUM	4	binary	SVC number.
32	20	R84SNAM	8	EBCDIC	SVC name.
40	28	R84SADR	4	binary	Address of location of SVC WAIT.
44	2C	R84SMNAM	8	EBCDIC	Module name.
52	34	R84SMOFS	4	binary	Offset into the module.
56	38	R84SCNT	4	binary	SVC count.
The following fields apply only to Load WAITs:					
28	1C	R84LMNAM	8	EBCDIC	Name of module being loaded (LOAD).
36	24	R84LCNT	4	binary	Number of times LOAD invoked.
40	28		20		Reserved.

Subtype 3 — Spool Data Management (SDM)

This subtype contains data relating to JES3 spool data management and consists of a header followed by eight sections:

1. General spool data management data
2. Spool data set description
3. Spool partition description
4. Spool space utilization snapshot
5. Single track table space allocation snapshot
6. Spool I/O activity
7. Buffers chaining by spool data set
8. Minimal/marginal track condition.

General Spool Data Management Data Section

Offsets		Name	Length	Format	Description
0	0	R84SDMLN	4	binary	Length of the SDM section.
4	4	R84BUFSZ	4	binary	Spool buffer size.
8	8	R84NBFPG	4	binary	Number of buffers per 4K page.
12	C	R84FDENT	4	binary	File directory entries.
16	10	R84SPDSU	4	binary	Number of spool data sets in use.
20	14	R84JSAMB	4	binary	Number of JSAM buffers.
24	18	R84JSAMT	4	binary	JSAM threshold for JSAM minbuf condition.

Offsets		Name	Length	Format	Description
28	1C	R84PBUFC	4	binary	Number of protected user spool access method (USAM) buffers in common service area.
32	20	R84PBUFA	4	binary	Number of protected user spool access method (USAM) buffers in AUX.
36	24	R84UPBUF	4	binary	Number of unprotected user spool access method (USAM) buffers per open USAM data set.
40	28	R84MAXB	4	binary	Maximum data bytes in a user spool access method (USAM) buffer.
44	2C	R84DSENT	4	binary	Total number of spool data set description entries.
48	30	R84DSOFF	4	binary	Offset to the first spool data set description entry.
52	34	R84PRENT	4	binary	Total number of spool partition description entries.
56	38	R84PROFF	4	binary	Offset to the first spool partition description entry.
60	3C	R84SUENT	4	binary	Total number of spool space utilization snapshot entries.
64	40	R84SUOFF	4	binary	Address of the first spool space utilization snapshot entry.
68	44	R84STENT	4	binary	Total number of single track table space allocation snapshot entries.
72	48	R84STOFF	4	binary	Offset to the first single track table space allocation snapshot entry.
76	4C	R84IOENT	4	binary	Total number of spool I/O activity — buffers read and written (entries).
80	50	R84IOOFF	4	binary	Offset to the first spool I/O activity — buffers read and written (entry).
84	54	R84BCENT	4	binary	Total number of buffer chaining by spool data set entries.
88	58	R84BCOFF	4	binary	Offset to the first buffer chaining by spool data set entry.
92	5C	R84JSAMU	4	binary	Number of times JSAM buffers were unavailable.
96	60	R84USAMU	4	binary	Number of times user spool access method (USAM) unavailable buffers occurred.
100	64	R84MMENT	4	binary	Total number of minimal/marginal track condition entries.
104	68	R84MMOFF	4	binary	Offset to the first minimal/marginal track condition entry.
108	6C	R84AWBUF	4	binary	Number of AWAITS of buffers during JMF monitoring.
112	70	R84AWEVR	4	binary	Number of AWAITS of buffers since JES3 initialization.

Spool Data Set Description Section

Offsets		Name	Length	Format	Description
0	0	R84DSDSN	2	binary	Data set number.
2	2	R84DSDDN	8	EBCDIC	Data definition name (DDNAME).
10	A	R84DSPRT	8	EBCDIC	Partition name.

Offsets		Name	Length	Format	Description
18	12	R84DSFLG	1		Extent status flag **Value** **Meaning when set** **X'80'** Extent unavailable **X'40'** Extent moved to draining partition **X'20'** Extent held **X'10'** Extent in use.
19	13	R84DSDVA	3	EBCDIC	3-digit device number.
22	16	R84DSVLS	6	EBCDIC	Volume serial (VOLSER).
28	1C	R84DSDVT	7	EBCDIC	Device type.
35	23		1		Reserved.
36	24	R84DSLWA	4	binary	Low address.
36	24	R84DSLWC	2	binary	Low cylinder, lower portion.
38	26	R84DSLWH	2	binary	Low head and low cylinder, upper portion.
40	28	R84DSHIA	4	binary	High address.
40	28	R84DSHIC	2	binary	High cylinder, lower portion.
42	2A	R84DSHIH	2	binary	High head and high cylinder, upper portion.
44	2C	R84DSRT	2	binary	Records per tracks.
46	2E	R84DSRTG	2	binary	Records per track group.
48	30	R84DSBUF	4	binary	Buffer size in bytes.
52	34	R84DSDV4	4	EBCDIC	4-digit device number.

Spool Partition Description Section

Offsets		Name	Length	Format	Description
0	0	R84PRPRT	8	EBCDIC	Partition name.
8	8	R84PRMIN	1	binary	Minimal spool threshold percent.
9	9	R84PRMRG	1	binary	Marginal spool threshold percent.
10	A	R84PROVP	8	EBCDIC	Name of overflow partition.
18	12	R84PRFLG	1	binary	Default partition indicator **Value** **Meaning when set** **X'80'** Default partition.
19	13		1		Reserved.

Spool Space Utilization Snapshot Section

Offsets		Name	Length	Format	Description
0	0	R84SUPRT	8	EBCDIC	Partition name.
8	8	R84SUDDN	8	EBCDIC	Data definition name (DDNAME).
16	10	R84SUDEF	4	binary	Number of track groups defined.

Offsets		Name	Length	Format	Description
20	14	R84SUALO	4	binary	Track groups allocated.

Single Track Table Space Utilization Section

Offsets		Name	Length	Format	Description
0	0	R84STDSN	2	binary	Data set number.
2	2		2		Reserved.
4	4	R84STDDN	8	EBCDIC	Data definition name (DDNAME).
12	C	R84STLWA	4	binary	Low address.
12	C	R84STLWC	2	binary	Low cylinder, lower portion.
14	E	R84STLWH	2	binary	Low head and low cylinder, upper portion.
16	10	R84STHIA	4	binary	High address.
16	10	R84STHIC	2	binary	High cylinder, lower portion.
18	12	R84STHIH	2	binary	High head and high cylinder, upper portion.
20	14	R84STDEF	4	binary	Number of records defined.
24	18	R84STALO	4	binary	Number of records allocated.
28	1C	R84STFLG	1		Single track table flag **Value** **Meaning when set** **X'80'** Expansion indicator for any or all subsequent STT entries that match data set number.
29	1D		3		Reserved.

Spool I/O Activity Section

Offsets		Name	Length	Format	Description
0	0	R84IOVLS	6	EBCDIC	Volume serial (VOLSER).
6	6	R84IODDN	8	EBCDIC	Data definition name (DDNAME).
14	E		2		Reserved.
16	10	R84IOTOT	4	binary	Total I/O counts.
20	14	R84IOLOC	4	binary	I/O counts for low number cylinders.
24	18	R84IO2CY	4	binary	I/O counts for 2 cylinders.
28	1C	R84IO3CY	4	binary	I/O counts for 3 cylinders.
32	20	R84IO4CY	4	binary	I/O counts for 4 cylinders.
36	24	R84IO5CY	4	binary	I/O counts for 5 cylinders.
40	28	R84IO6CY	4	binary	I/O counts for 6 cylinders.
44	2C	R84IO7CY	4	binary	I/O counts for 7 cylinders.
48	30	R84IO8CY	4	binary	I/O counts for 8 cylinders.
52	34	R84IO9CY	4	binary	I/O counts for 9 cylinders.
56	38	R84IOHIC	4	binary	I/O counts for high number cylinders.

Buffers chaining by spool data set section

Offsets		Name	Length	Format	Description
0	0	R84BCDSN	2	binary	Data set number.
2	2		2		Reserved.
4	4	R84BCTOT	4	binary	Total number of I/O buffers.
8	8	R84BC1B	4	binary	Count for one chained buffer.
12	C	R84BC2B	4	binary	Count for two chained buffers.
16	10	R84BC3B	4	binary	Count for three chained buffers.
20	14	R84BC4B	4	binary	Count for four chained buffers.
24	18	R84BC5B	4	binary	Count for five chained buffers.
28	1C	R84BC6B	4	binary	Count for six chained buffers.
32	20	R84BC7B	4	binary	Count for seven chained buffers.
36	24	R84BC8B	4	binary	Count for eight chained buffers.
40	28	R84BC9B	4	binary	Count for nine chained buffers.
44	2C	R84BC10B	4	binary	Count for ten chained buffers.
48	40	R84BC11B	4	binary	Count for eleven or more chained buffers.

Minimal/Marginal Track Condition Section

Offsets		Name	Length	Format	Description
0	0	R84MMPRT	8	EBCDIC	Name of partition.
8	8	R84MMMIN	4	binary	Count of samples partition in minimal track condition.
12	C	R84MMMRG	4	binary	Count of samples partition in marginal track condition.

Subtype 4 — Resqueue Cellpool and Control Block Utilization

This subtype has three sections:

1. Resqueue cell pool statistics section
2. JCT access methods statistics section
3. JES3 control block utilization section.

Resqueue Cell Pool Statistics Section

Offsets		Name	Length	Format	Description
0	0	R84JCOFF	4	binary	Offset to JCT access method section.
4	4	R84CBOFF	4	binary	Offset to JES3 control block utilization section.
8	8	R84CIEXT	2	binary	Total number of CI secondary extents in pool.
10	A		2		Reserved.
12	C	R84CICEL	4	binary	Total number of CI resqueues in pool.
16	10	R84CIUSE	4	binary	Total number of CI resqueues used in pool.
20	14	R84CIRQP	4	binary	Number of CI resqueues in primary extent.
20	14	R84NCISX	4	binary	Total number of CI resqueue secondary extent entries.
28	1C	R84CISXO	4	binary	Offset to first CI resqueue secondary extent entry.
32	20	R84MNEXT	2	binary	Total number of MAIN secondary extents in pool.

Offsets		Name	Length	Format	Description
34	22		2		Reserved.
36	24	R84MNCEL	4	binary	Total number of MAIN resqueues in pool.
40	28	R84MNUSE	4	binary	Total number of MAIN resqueues used in pool.
44	2C	R84MNRQP	4	binary	Total number of MAIN resqueues in primary extent.
48	30	R84NMNSX	4	binary	Total number of MAIN resqueue secondary extent entries.
52	34	R84MNSXO	4	binary	Offset to first MAIN resqueue secondary extent.
56	38	R84OSEXT	2	binary	Total number of OUTSERV secondary extents in pool.
58	3A		2		Reserved.
60	3C	R84OSCEL	4	binary	Total number of OUTSERV resqueues in pool.
64	40	R84OSUSE	4	binary	Total number of OUTSERV resqueues used in pool.
68	44	R84OSRQP	4	binary	Number of OUTSERV resqueues in primary extent.
72	48	R84NOSSX	4	binary	Total number of OUTSERV resqueue secondary extent entries.
76	4C	R84OSSXO	4	binary	Offset to first OUTSERV resqueue secondary extent.
80	50	R84CMEXT	2	binary	Total number of COMMON secondary extents in pool.
82	52		2		Reserved.
84	54	R84CMCEL	4	binary	Total number of COMMON resqueues in pool.
88	58	R84CMUSE	4	binary	Total number of COMMON resqueues used in pool.
92	5C	R84CMRQP	4	binary	Total number of COMMON resqueues in primary extent.
96	60	R84NCMSX	4	binary	Total number of COMMON resqueue secondary extent entries.
100	64	R84CMSXO	4	binary	Offset to first COMMON resqueue secondary extent.

Resqueue Secondary Extent Entry

Offsets		Name	Length	Format	Description
0	0	R84RQSXT	4	binary	Number of resqueues for secondary extent.

JCT Access Method Statistics Section

This section contains JCT data set information.

Offsets		Name	Length	Format	Description
0	0	R84SZJCT	4	binary	Size of a JCT (in bytes).
4	4	R84REDIO	4	binary	Number of JCT read I/Os.
8	8	R84WRTIO	4	binary	Number of JCT write I/Os.
12	C	R84JBADD	4	binary	Number of jobs added to the job queue.
16	10	R84JBDEL	4	binary	Number of jobs deleted from the job queue.
JCT data space information:					
20	14	R84DSPFL	1	binary	JCT data space flag one **Value** **Meaning when set** **X'80'** The JCT data space was disabled during some portion of the interval. The remainder of the JCT data space information is zero.
21	15		3		Reserved.

Offsets		Name	Length	Format	Description
24	18	R84DSPSZ	4	binary	Maximum size of JCT data space, in hundredths of a megabyte.
JCT data space page fault information:					
28	1C	R84RDINS	4	binary	Number of JCT read requests where the corresponding JCT data space page(s) were in central storage.
32	20	R84PRINS	4	binary	Percent of JCT read requests where the corresponding JCT data space page(s) were in central storage, in hundredths of a percent.
36	24	R84RDNIS	4	binary	Number of JCT read requests where the corresponding JCT data space page(s) were not in central storage.
40	28	R84PRNIS	4	binary	Percent of JCT read requests where the corresponding JCT data space page(s) were not in central storage.
44	2C	R84WTINS	4	binary	Number of JCT write requests where the corresponding JCT data space page(s) were in central storage.
48	30	R84PWINS	4	binary	Percent of JCT write requests where the corresponding JCT data space pages were in central storage, in hundredths of a percent.
52	34	R84WTNIS	4	binary	Number of JCT write requests where the corresponding data space page(s) were not in central storage.
56	38	R84PWNIS	4	binary	Percent of JCT write requests where the corresponding JCT data space page(s) were not in central storage, in hundredths of a percent.
JCT data space page usage information:					
60	3C	R84DUSMN	4	binary	Minimum number of JCT data space pages in use.
64	40	R84DUSAV	4	binary	Average number of JCT data space pages in use.
68	44	R84DUSMX	4	binary	Maximum number of JCT data space pages in use.
JCT data space page utilization:					
72	48	R84DUTMN	4	binary	Minimum use of JCT data space pages. This value shows the percentage of the total JCT data space pages that contain allocated JCTs. It is measured in hundredths of a percent.
76	4C	R84DUTAV	4	binary	Average percentage of use of JCT data space pages. This value shows the percentage of the total JCT data space pages that contain allocated JCTs. It is measured in hundredths of a percent.
80	50	R84DUTMX	4	binary	Maximum percentage of use of JCT data space pages. This value shows the percentage of the total JCT data space pages that contain allocated JCTs. It is measured in hundredths of a percent.
84	54	R84PGSRL	4	binary	Number of JCT data space pages released.
Job queue element (JQE) information:					
88	58	R84JQ0SZ	4	binary	JQE0 table size, in hundredths of a kilobyte.
92	5C	R84JQ1SZ	4	binary	JQE1 table size, in hundredths of a kilobyte.
96	60	R84JQ2SZ	4	binary	JQE2 table size in, hundredths of a kilobyte.
100	64	R84JQ3SZ	4	binary	JQE3 table size, in hundredths of a kilobyte.
104	68	R84JQ4SZ	4	binary	JQE4 table size, in hundredths of a kilobyte.
JQE4 storage use information:					
108	6C	R84JUSMN	4	binary	Minimum number of JQE4s in use during interval.
112	70	R84JUSAV	4	binary	Average number of JQE4s in use during interval.
116	74	R84JUSMX	4	binary	Maximum number of JQE4s in use during interval.

Offsets		Name	Length	Format	Description
120	78	R84JUTMN	4	binary	Minimum percentage of total JQE4 pages that contained allocated JQE4s during this interval, in hundredths of a percent.
124	7C	R84JUTAV	4	binary	Average percentage of total JQE4 pages that contained allocated JQE4s during this interval, in hundredths of a percent.
128	80	R84JUTMX	4	binary	Maximum percentage of total JQE4 pages that contained allocated JQE4s during this interval, in hundredths of a percent.

JES3 Control Block Utilization Section

This section contains FCT entry use.

Offsets		Name	Length	Format	Description
0	0	R84FCTPR	4	binary	Total number of preallocated FCTs.
4	4	R84FCTPM	4	binary	Total number of permanent FCTs.
8	8	R84FCTMN	4	binary	Minimum number of FCT entries used.
12	C	R84FCTMX	4	binary	Maximum number of FCT entries used.
16	10	R84FCTAV	4	binary	Average number of FCT entries used.
20	14	R84PCNBF	4	binary	Total number of preallocated console buffers.
24	18	R84PCBPT	4	binary	JES3 521 - Reserved JES3 511 or prior releases Total number of preallocated console buffer pointers.
28	1C	R84PDDBL	4	binary	JES3 521 - Reserved JES3 511 or prior releases Total number of preallocated DOM data blocks.
32	20	R84MNCBU	4	binary	Minimum number of console buffers used.
36	24	R84MNBPU	4	binary	Minimum number of console buffer pointers used.
40	28	R84MNDBU	4	binary	JES3 521 - Reserved JES3 511 or prior releases Minimum number of DOM data blocks used.
44	2C	R84MXCBU	4	binary	Maximum number of console buffers used.
48	30	R84MXBPU	4	binary	JES3 521 - Reserved JES3 511 or prior releases Maximum number of console buffer pointers used.
52	34	R84MXDBU	4	binary	JES3 521 - Reserved JES3 511 or prior releases Maximum number of DOM data blocks used.
56	38	R84AVCBU	4	binary	Average number of console buffers used.
60	3C	R84AVBPU	4	binary	JES3 521 - Reserved JES3 511 or prior releases Average number of console buffer pointers used.
64	40	R84AVDBU	4	binary	JES3 521 - Reserved JES3 511 or prior releases Average number of DOM data blocks used.
68	44	R84SZCPE	4	binary	Size of console buffer primary extent.
72	48	R84SCBSE	4	binary	Size of console buffer secondary extent.

Offsets		Name	Length	Format	Description
76	4C	R84CBSEL	2	binary	Size of console buffer secondary extent limit.
78	4E		2		Reserved.
80	50	R84TNRCB	4	binary	Total number of reserved console buffers.
84	54	R84CBSEU	2	binary	JES3 521 - Reserved JES3 511 or prior releases Number of console buffer secondary extents in use.
86	56	R84BPSEU	2	binary	JES3 521 - Reserved JES3 511 or prior releases Number of buffer pointer secondary extents in use.
88	58	R84DBSEU	2	binary	JES3 521 - Reserved JES3 511 or prior releases Number of DOM data block secondary extents in use.
90	5A	R84SEMAX	2	binary	Maximum number of secondary extents ever used.
92	5C	R84RBMAX	4	binary	Maximum number of reserved buffers ever used.
96	60	R84SCBEE	4	binary	Number of secondary console buffer extents exceeded.
100	64	R84SCBPE	4	binary	Count of secondary console buffer pointer extents exceeded.
104	68	R84SAQPE	4	binary	JES3 521 - Reserved JES3 511 or prior releases Count of secondary action queue pointer extents exceeded.
JSAM buffer use:					
108	6C	R84TOTJB	2	binary	Total defined JSAM buffers.
110	6E		2		Reserved.
112	70	R84MNJBU	4	binary	Minimum JSAM buffers used.
116	74	R84MXJBU	4	binary	Maximum JSAM buffers used.
120	78	R84AVJBU	4	binary	Average JSAM buffers used.
User spool access method (USAM) (protected) buffer use:					
124	7C	R84TOTUB	2	binary	Total defined user spool access method (USAM) buffers.
126	7E		2		Reserved.
128	80	R84MNUBU	4	binary	Minimum user spool access method (USAM) buffers used.
132	84	R84MXUBU	4	binary	Maximum user spool access method (USAM) buffers used.
136	88	R84AVUBU	4	binary	Average user spool access method (USAM) buffers used.
Staging area use:					
140	8C	R84SSAPE	2	binary	JES3 SP511 - Reserved JES3 SP421 or prior releases Size of staging area primary extent, in thousands of bytes
142	8E		2		Reserved.
144	90	R84TNPSA	4	binary	JES3 SP511 - Reserved JES3 SP421 or prior releases Total number of primary staging areas.

Offsets		Name	Length	Format	Description
148	94	R84SSASE	2	binary	JES3 SP511 - Reserved JES3 SP421 or prior releases Size of staging area secondary extent, in thousands of bytes.
150	96		2		Reserved.
152	98	R84TNSSA	4	binary	JES3 SP511 - Reserved JES3 SP421 or prior releases Total number of secondary staging areas.
156	9C	R84SASEL	2	binary	JES3 SP511 - Reserved JES3 SP421 or prior releases Staging area secondary extent limit.
158	9E	R84MNSAL	2	binary	JES3 SP511 - Reserved JES3 SP421 or prior releases Minimum staging area limit.
160	A0	R84SASIZ	4	binary	JES3 SP511 - Reserved JES3 SP421 or prior releases Size of staging area.
164	A4	R84TNSAD	4	binary	JES3 SP511 - Reserved JES3 SP421 or prior releases Total number of staging areas defined.
168	A8	R84MCSAI	4		JES3 SP511 - Reserved JES3 SP421 or prior releases Maximum common service area staging areas for interval.
172	A8	R84MASAI	4		JES3 SP511 - Reserved JES3 SP421 or prior releases Maximum auxiliary staging areas during this interval.
176	B0	R84ASACS	4	binary	Number of active staging areas from SVT.
180	B4	R84ACSCS	4	binary	JES3 SP511 - Reserved JES3 SP421 or prior releases Number of active common service area staging areas from SVT.
184	B8	R84AASCS	4	binary	JES3 SP511 - Reserved JES3 SP421 or prior releases Number of active auxiliary staging areas from SVT.
188	BC	R84MCSAU	4	binary	Maximum number of staging areas ever used.
192	C0	R84MASAU	4	binary	JES3 SP511 - Reserved JES3 SP421 or prior releases Maximum number of auxiliary staging areas ever used.
196	C4	R84PUSAE	4	binary	JES3 SP511 - Reserved JES3 SP421 or prior releases Number of times user memory staging area limit exceeded.

Offsets		Name	Length	Format	Description
200	C8	R84PMSAE	4	binary	JES3 SP511 - Reserved JES3 SP421 or prior releases Number of times minimal staging area limit was exceeded.
Total active staging areas:					
204	CC	R84MNTSA	4	binary	Minimum number of total active staging areas.
208	D0	R84MXTSA	4	binary	Maximum number of total active staging areas.
212	D4	R84AVTSA	4	binary	Average number of total active staging areas.
216	D8	R84MNCSA	4	binary	JES3 SP511 - Reserved JES3 SP421 or prior releases Minimum number of active common service area staging areas.
220	DC	R84MXCSA	4	binary	JES3 SP511 - Reserved JES3 SP421 or prior releases Maximum number of active common service area staging areas.
224	E0	R84AVCSA	4	binary	JES3 SP511 - Reserved JES3 SP421 or prior releases Average number of active common service area staging areas.
228	E4	R84MNASA	4	binary	JES3 SP511 - Reserved JES3 SP421 or prior releases Minimum number of active auxiliary staging areas.
232	E8	R84MXASA	4	binary	JES3 SP511 - Reserved JES3 SP421 or prior releases Maximum number of active auxiliary staging areas.
236	EC	R84AVASA	4	binary	JES3 SP511 - Reserved JES3 SP421 or prior releases Average number of active auxiliary staging areas.
JSAM Buffer Extent Areas:					
240	F0	R84JBPSZ	4	binary	Size of primary extent.
244	F4	R84JBSSZ	4	binary	Size of secondary extent.
248	F48	R84JBLIM	4	binary	The number of secondary extents allowed.

Subtype 5 — Job Analysis

This subtype consists of a header followed by four sections:

1. JES3 work-to-do section
2. Job analysis section
3. JES3 function summary section
4. Plot sections.

Subtype Header

Offsets		Name	Length	Format	Description
0	0	R84JBLNG	4	binary	Length of the JES3 Job Analysis section.

Offsets		Name	Length	Format	Description
4	4	R84JBNUM	4	binary	Total number of JES3 job analysis entries.
8	8	R84WTDO	4	binary	Offset to the work-to-do analysis section.
12	C	R84JBOF	4	binary	Offset to the Job Analysis section.
16	10	R84FSUMO	4	binary	Offset to the JES3 Function Summary section.
20	14	R84PLOTO	4	binary	Offset to the Plot section.
24	18	R84S5FLG	1	binary	Job entry header flag **Bit** **Meaning** **X'80'** There is a job analysis segment **X'40'** There is a function summary segment **X'20'** There is an initiator plot section **X'10'** There is an rqindex plot section segment **X'08'** There is a device class plot section segment **X'04'** There is a setname plot section segment **X'02'** There is a job class plot section segment.
25	19		3		Reserved.

JES3 Work-To-Do Section

Offsets		Name	Length	Format	Description
0	0	R84WKLNG	4	binary	Length of the JSS work-to-do queue section.
4	4	R84RDYMN	4	binary	Minimum length for the JSS ready queue.
8	8	R84RDYMX	4	binary	Maximum length for the JSS ready queue.
12	C	R84RDYAV	4	binary	Average length for the JSS ready queue.
16	10	R84CATMN	4	binary	Minimum length for the CATLG wait queue.
20	14	R84CATMX	4	binary	Maximum length for the CATLG wait queue.
24	18	R84CATAV	4	binary	Average length for the CATLG wait queue.
28	1C	R84RSQMN	4	binary	Minimum length for the RQ wait queue.
32	20	R84RSQMX	4	binary	Maximum length for the RQ wait queue.
36	24	R84RSQAV	4	binary	Average length for the RQ wait queue.
40	28	R84PLBMN	4	binary	Minimum length for the proclib wait queue.
44	2C	R84PLBMX	4	binary	Maximum length for the proclib wait queue.
48	30	R84PLBAV	4	binary	Average length for the proclib wait queue.
52	34	R84MCGMN	4	binary	Minimum length for the main wait queue.
56	38	R84MCGMX	4	binary	Maximum length for the main wait queue.
60	3C	R84MCGAV	4	binary	Average queue length for the main wait queue.
64	40	R84DSPMN	4	binary	Minimum length for the DSP wait queue.
68	44	R84DSPMX	4	binary	Maximum length for the DSP wait queue.
72	48	R84DSPAV	4	binary	Average queue length for ISP wait queue.

Offsets		Name	Length	Format	Description
76	4C	R84MPLMN	4	binary	Minimum length for the MPLOC wait queue.
80	50	R84MPLMX	4	binary	Maximum length for the MPLOC wait queue.
84	54	R84MPLAV	4	binary	Average length for the MPLOC wait queue.
88	58	R84DUPMN	4	binary	Minimum length for duplicate jobname wait queue.
92	5C	R84DUPMX	4	binary	Maximum length for the duplicate jobname wait queue.
96	60	R84DUPAV	4	binary	Average length for the duplicate jobname wait queue.
100	64	R84CIJMN	4	binary	Minimum queue length for C/I JSAM buffer queue.
104	68	R84CIJMX	4	binary	Maximum queue length for C/I JSAM buffer queue.
108	6C	R84CIJAV	4	binary	Average QUEUE length for C/I JSAM buffer queue.

Job Analysis Section

Offsets		Name	Length	Format	Description
0	0	R84JBNAM	8	EBCDIC	Job name. The job name, time, and date that the reader recognized the JOB card (for this job) constitute the job log identification, or transaction name (for APPC output).
8	8	R84JBID	8	EBCDIC	Job ID.
16	10		3		Reserved.
19	13	R84JBRQP	1	binary	Job resqueue priority.
20	14	R84JBCLS	8	EBCDIC	Job class.
28	1C	R84JSGRP	8	EBCDIC	Group name.
36	24	R84NXTJB	4	binary	Offset to next job analysis entry.
40	28	R84JSTAT	4	binary	Total number of JOBSTAT entries.
44	2C	R84JSTOF	4	binary	Offset to the first JOBSTAT entry.
48	30	R84JBGMS	4	binary	Total number of GMS/MDS entries.
52	34	R84JBGOF	4	binary	Offset to the first GMS/MDS entry.

Job Status Entry and GMS/MDS Entry

The format for each job status entry and each GMS/MDS entry follows:

Offsets		Name	Length	Format	Description
0	0	R84JBFNM	33	EBCDIC	Active function, DSP, or procedure name.
33	21		3		Reserved.
36	24	R84JBJSR	1	binary	JSTAT reason code (used for MDS/GMS only).
37	25		3		Reserved.
40	28	R84JBFTM	4	binary	Active function time, in seconds.

JES3 Function Summary Section

Offsets		Name	Length	Format	Description
0	0	R84JSLNG	4	binary	Length of the JES3 function summary section.
4	4	R84JSNUM	4	binary	Total number of JES3 function summary entries.
8	8	R84JSOF	4	binary	Offset to the first JES3 function summary entry.

Offsets		Name	Length	Format	Description
12	C	R84GSNUM	4	binary	Total number of GMS/MDS summary entries.
16	10	R84GSOF	4	binary	Offset to the first GMS/MDS summary entry.
MDS and GMS scheduling analysis summary information:					
20	14	R84ALRET	4	binary	Number of allocation retries during JMF interval.
24	18	R84ARLSK	4	binary	Number of allocation attempts rejected without reading the job summary table (JST) during the JMF interval.
28	1C	R84ATMPT	4	binary	Number of allocation attempts allowed to read the JST during the JMF interval.
32	20	R84ARLF	4	binary	Number of allocation attempts rejected after reading the JST during the JMF interval.
36	24	R84SUCCS	4	binary	Successful allocations during JMF interval.

JES3 Function Summary Entry

This section contains one per JES3 function or DSP.

Offsets		Name	Length	Format	Description
0	0	R84JSNAM	33	EBCDIC	JES3 function name or DSP name.
33	21		3		Reserved.

Offsets		Name	Length	Format	Description
36	24	R84JSJSR	1	binary	Scheduling bypass code **Code** **Meaning** **X'01'** Insufficient storage **X'02'** Tlimit exceeded **X'03'** I/O rate inappropriate **X'04'** No match on RQMAINS **X'05'** Choice inappropriate **X'06'** No match on control program type **X'07'** Job class not enabled **X'08'** LSTOR update pending **X'09'** Class can't run on this main **X'0A'** Mix inappropriate (1) **X'0B'** Fit inappropriate (1) **X'0C'** Fit inappropriate (2) **X'0D'** Mix inappropriate (2) **X'0E'** Job in hold or active **X'0F'** RQINDEX not in select **X'10'** Job is in DJC hold **X'11'** Minpart not available **X'12'** Group disabled on this main **X'13'** Main is offline **X'14'** TDEPTH exceeded

Offsets		Name	Length	Format	Description
					X'7E' No group initiators started **X'7F'** All group initiators in use **X'80'** Resource update only **X'81'** Job hold status **X'82'** Max region size exceeded **X'83'** Restart job pass only **X'84'** Eligible main not online or IPLed **X'85'** Incorrect control program type **X'86'** GMS group or class not enabled **X'87'** Required resource not available **X'88'** Device pool fence not built **X'89'** Main setup depth exceeded **X'8A'** Job class setup depth exceeded **X'8B'** Failed preallocation scan **X'FF'** Job selected for a main.
37	25		3		Reserved.
40	28	R84JSAV	4	binary	Average function time, in seconds.
44	2C	R84JSCNT	4	binary	Active job count.
48	30	R84JSMIN	4	binary	Minimum function time, in seconds.
52	34	R84JSMAX	4	binary	Maximum function time, in seconds.
56	38	R84JSMNJ	8	EBCDIC	ID of job using minimum function time.
64	40	R84JSMXJ	8	EBCDIC	ID of job using maximum function time.

Plot Section

Each plot counter entry contains two fields: scale and count. The scale field refers to the value along the vertical line on the JMF report. The count field can be used to calculate the points on the horizontal line.

Offsets		Name	Length	Format	Description
0	0	R84PLTLN	4	binary	Length of Plot section.
4	4	R84JOBCG	4	binary	Number of job sample counts.
8	8	R84INITN	4	binary	Number of plots for “jobs being processed by main processor”.
12	C	R84INITO	4	binary	Offset to the first entry of “jobs being processed by main processor”.
16	10	R84RQNXN	4	binary	Number of plots for “job queue length by JES3 function”.
20	14	R84RQNXO	4	binary	Offset to first entry of “job queue length by JES3 function”.
24	18	R84DCLSN	4	binary	Number of plots for “Allocated JES3 devices by device class”.

Offsets		Name	Length	Format	Description
28	1C	R84DCLSO	4	binary	Offset to first entry of “Allocated JES3 devices by device class”.
32	20	R84SETNN	4	binary	Number of plots for “Allocated JES3 devices by setname”.
36	24	R84SETNO	4	binary	Offset to the first entry of “Allocated JES3 devices by setname”.
40	28	R84JCLSN	4	binary	Number of plots for “Jobs being processed by job class group”.
44	2C	R84JCLSO	4	binary	Offset to the first entry of “Jobs being processed by job class group”.

Jobs Being Processed by Main Processor (Initiator Plot)

Offsets		Name	Length	Format	Description
0	0	R84INEXT	4	binary	Offset to next initiator plot entry.
4	4	R84INAME	8	EBCDIC	Processor name.
12	C	R84IFLG	1	binary	Flag 1 **Value** **Meaning when set** **X'80'** JES3 Global **X'40'** JES3 Local.
13	D		3		Reserved.
16	10	R84IINIT	4	binary	Count for started initiators.
20	14	R84IPLLO	4	binary	Smallest scale for initiator plot.
24	18	R84IPLHI	4	binary	Largest scale for initiator plot.
28	1C	R84IPLIN	4	binary	Increment for plotting initiator plot.
32	20	R84IPTMN	4	binary	Minimum plot value for initiator plot.
36	24	R84IPTMX	4	binary	Maximum plot value for initiator plot.
40	28	R84IPTAV	4	binary	Average plot value for initiator plot.
44	2C	R84IPTN	4	binary	Number of initiator plot counter entries.
48	30	R84IPTO	4	binary	Offset to first initiator plot counter entry.
Initiator plot counter entry:					
0	0	R84IPTS	4	binary	Initiator plot scale.
4	4	R84IPTC	4	binary	Count for initiator plot scale.

Jobs Being Processed by Job Class Group Entry (Job Class Plot)

Offsets		Name	Length	Format	Description
0	0	R84JNEXT	4	binary	Offset to next entry for “jobs being processed by job class group”.
4	4	R84JNAME	8	EBCDIC	Processor name.
12	C	R84JCGRP	8	EBCDIC	Job class group name.
20	14	R84JCSIN	4	binary	Count for started initiators.
24	18	R84JPLLO	4	binary	Smallest scale for job class plot.
28	1C	R84JPLHI	4	binary	Largest scale for job class plot.
32	20	R84JPLIN	4	binary	Increment for plotting job class plot.
36	24	R84JPTMN	4	binary	Minimum plot value for job class plot.

Offsets		Name	Length	Format	Description
40	28	R84JPTMX	4	binary	Maximum plot value for job class plot.
44	2C	R84JPTAV	4	binary	Average plot value for job class plot.
48	30	R84JPTN	4	binary	Number of plot counter entries for job class plot.
52	34	R84JPTO	4	binary	Offset to first plot counter entry for job class plot.

Job Class Group Plot Counter Entry

Offsets		Name	Length	Format	Description
0	0	R84JPTS	4	binary	Job class group plot scale.
4	4	R84JPTC	4	binary	Count for job class group plot scale.

Allocated JES3 devices by device class (device plot) entry

Offsets		Name	Length	Format	Description
0	0	R84DNEXT	4	binary	Offset to next device plot.
4	4	R84DFLG	1	binary	Flag **Value** **Meaning when set** **X'80'** Tape device **X'40'** Direct access device **X'20'** Unit record device **X'10'** Graphics device.
5	5		1		Reserved.
6	6	R84DNAME	2	EBCDIC	Device name.
8	8	R84DCNT	4	binary	Total number of devices.
12	C	R84DPLLO	4	binary	Smallest scale for device plot.
16	10	R84DPLHI	4	binary	Largest scale for device plot.
20	14	R84DPLIN	4	binary	Increment for plotting device plot.
24	18	R84DPTMN	4	binary	Minimum plot value for device plot.
28	1C	R84DPTMX	4	binary	Maximum plot value for device plot.
32	20	R84DPTAV	4	binary	Average plot value for device plot.
36	24	R84DPTN	4	binary	Number of plot counter entries for device plot.
40	28	R84DPTO	4	binary	Offset to first plot counter entry for device plot.
Device plot counter entry:					
0	0	R84DPTS	4	binary	Device plot scale.
4	4	R84DPTC	4	binary	Count for device plot scale.

Allocated JES3 devices by Setname (Setname plot) entry

There is a common section (decimal offsets 0-40) followed by a section for Setname or J, M and X type devices.

Offsets		Name	Length	Format	Description
0	0	R84SNEXT	4	binary	Offset to next setname plot.

Offsets		Name	Length	Format	Description
4	4	R84SMPCN	8	EBCDIC	Processor name.
12	C	R84SFLG	1		Flag byte **Value** **Meaning when set** **X'80'** JES3 global **X'40'** JES3 local.
13	D		3		Reserved.
16	10	R84SXTYP	8	EBCDIC	Setname device name.
24	18	R84SXTOT	4	binary	Total number of setname devices.
28	1C	R84SPLLO	4	binary	Smallest scale for setname plot.
32	20	R84SPLHI	4	binary	Largest scale for setname plot.
36	24	R84SPLIN	4	binary	Increment for plotting setname plot.
40	28	R84SPTMN	4	binary	Minimum plot value for setname plot.
44	2C	R84SPTMX	4	binary	Maximum plot value for setname plot.
48	30	R84SPTAV	4	binary	Average plot value for setname plot.
52	34	R84SPTN	4	binary	Number of setname plot counter entries.
56	38	R84SPTO	4	binary	Offset to first setname plot counter entries.
J type device information:					
40	28	R84XJMIN	4	binary	Minimum plot value for J type devices. J type devices are setup devices allocated by JES3.
44	2C	R84XJMAX	4	binary	Maximum plot value for J type devices.
48	30	R84XJAVG	4	binary	Average plot value for J type devices.
52	34	R84XJPTN	4	binary	Number of plot counter entries for J type devices.
56	38	R84XJPTO	4	binary	Offset to first plot counter entry for J type devices.
X type device information:					
60	3C	R84XXMIN	4	binary	Minimum plot value for X type devices. X type devices are setup devices that are being processed on main (Class 1 devices only).
64	40	R84XXMAX	4	binary	Maximum plot value for X type devices.
68	44	R84XXAVG	4	binary	Average plot value for X type devices.
72	48	R84XXPTN	4	binary	Number of plot counter entries for X type devices.
76	4C	R84XXPTO	4	binary	Offset to first plot counter entry for x type devices.
M type device information:					
80	50	R84XMMIN	4	binary	Minimum plot value for M type devices. M type devices are setup that are allocated by MVS.
84	54	R84XMMAX	4	binary	Maximum plot value for M type devices.
88	58	R84XMAVG	4	binary	Average plot value for M type devices.
92	5C	R84XMPTN	4	binary	Number of plot counter entries for M type devices.
96	60	R84XMPTO	4	binary	Offset to first plot counter entry for M type devices.

Entry for each J Type, X Type, and M Type Plot Counter

Offsets		Name	Length	Format	Description
0	0	R84XPTS	4	binary	XTYPE plot scale.
4	4	R84XPTC	4	binary	Count for XTYPE plot scale.

JES3 Queue Length by JES3 Function (RQINDEX Plot) Entry

Offsets		Name	Length	Format	Description
0	0	R84RNEXT	4	binary	Offset to next RQINDEX plot.
4	4	R84RQNAM	33	EBCDIC	Name of RQINDEX.
37	25		3		Reserved.
40	28	R84RPLLO	4	binary	Smallest scale for RQINDEX plot.
44	2C	R84RPLHI	4	binary	Largest scale for RQINDEX plot.
48	30	R84RPLIN	4	binary	Increment for plotting RQINDEX plot.
52	34	R84RPTMN	4	binary	Minimum plot value for RQINDEX plot
56	38	R84RPTMX	4	binary	Maximum plot value for RQINDEX plot.
60	3C	R84RPTAV	4	binary	Average plot value for RQINDEX plot.
64	40	R84RPTN	4	binary	Number of plot counter entries for RQINDEX plot.
68	44	R84RPTO	4	binary	Offset to first plot counter entry for RQINDEX plot.

RQINDEX Plot Counter Entry

Offsets		Name	Length	Format	Description
0	0	R84RQPTS	4	binary	RQINDEX plot scale.
4	4	R84RQPTC	4	binary	Count for RQINDEX plot scale.

Subtype 6 — JES3 Hot Spot Analysis

This subtype has one section.

Offsets		Name	Length	Format	Description
0	0	R84SPLNG	4	binary	Length of the JES3 hot spot analysis section.
4	4	R84SPNUM	4	binary	Total number of hot spot entries.
8	8	R84SPOF	4	binary	Offset to the first hot spot entry.
12	C	R84SPOT	8	EBCDIC	SPOT = *value*.
20	14	R84WIDTH	8	EBCDIC	WIDTH = *value*.
28	1C	R84NAME	8	EBCDIC	NAME = *value*.
36	24	R84HFCT	8	EBCDIC	HFCT = *value*.
44	2C	R84HSPFL	1	binary	Hot spot flag **Bit** **Meaning when set** **X'80'** Hot spot table exceeded flag.
45	2D		3		Reserved.

Hot Spot Entry

Offsets		Name	Length	Format	Description
0	0	R84SCSCT	8	EBCDIC	CSECT name (if there is one).
8	8	R84STYPE	2	EBCDIC	CSECT type **Value** **Meaning** **C** CSA **J** JES3 private **L** Modified link pack area (MLPA) **P** Pageable link pack area (PLPA) **M** MVS nucleus **N** JES3 nucleus **R** IATRJMN **EC** Extended CSA **EJ** Extended JES3 private **EL** Extended modified link pack area (MLPA) **EP** Extended pageable link pack area (PLPA).
10	A		2		Reserved.
12	C	R84SSTRT	4	binary	Starting address or displacement.
16	10	R84SEND	4	binary	Ending address or displacement.
20	14	R84SPCNT	4	binary	CSECT reference count.
24	18	R84SPNRF	4	binary	CSECT reference count in JES3 nucleus task.
28	1C	R84SPARF	4	binary	CSECT reference count in JES3 auxiliary task.

Subtype 7 — JES3 Internal Reader DSP Analysis

This subtype has one section.

Offsets		Name	Length	Format	Description
0	0	R84IRLNG	4	binary	Length of JES3 internal reader DSP analysis data section.
4	4	R84IRMN	4	binary	Minimum number of active internal reader DSPs.
8	8	R84IRMX	4	binary	Maximum number of active internal reader DSPs.
12	C	R84IRAV	4	binary	Average number of active internal reader DSPs.
16	10	R84IRIR	4	binary	Average number of idle internal reader DSPs.
20	14	R84IRHWM	4	binary	Internal reader DSP high water mark.
24	18	R84IRATM	4	binary	Active INTRDR-At-Max count.
28	1C	R84IRAT0	4	binary	No-INTRDR-Active count.
32	20	R84IRAVL	4	binary	Average length of the INTRDR queue.

Offsets		Name	Length	Format	Description
36	24	R84IRMXA	4	binary	Maximum internal reader DSPs allowed; if it is 0000FFFF, there is no limit on the number of INTRDR DSPs allowed.

Subtype 8 — JES3 Subsystem Interface (SSI) Response Time Analysis

This subtype has one section.

Offsets		Name	Length	Format	Description
0	0	R84SILNG	4	binary	Length of the SSI response time section.
4	4	R84SSIN	4	binary	Total number of SSI entries.
8	8	R84SSIO	4	binary	Offset to the first SSI entry.

SSI Entry

Offsets		Name	Length	Format	Description
0	0	R84SIFN	12	EBCDIC	SSI function code name.
12	C	R84SIREQ	4	binary	Number of requests received.
16	10	R84SIRSP	4	binary	Number of responses received.
20	14	R84SIMIN	4	binary	Minimum response time, in microseconds.
24	18	R84SIMAX	4	binary	Maximum response time, in microseconds.
28	1C	R84SIAVG	4	binary	Average response time, in microseconds.

Subtype 9 — JES3 Subsystem Interface (SSI) Destination Queue Analysis

This subtype has one section.

Offsets		Name	Length	Format	Description
0	0	R84DQLNG	4	binary	Length of the SSI destination queue data section.
4	4	R84DQNUM	4	binary	Total number of SSI destination entries.
8	8	R84DQOF	4	binary	Offset to the first SSI destination queue entry.

SSI Destination Entry

Offsets		Name	Length	Format	Description
0	0	R84DQNAM	30	EBCDIC	SSI destination queue name.
30	1E	R84MPCNM	8	EBCDIC	Name of main processor.
38	26	R84DQFLG	1	binary	Dynamic destination queue flag byte **Value** **Meaning when set** **X'80'** Dynamic destination queue / Global / FSS (Functional Subsystem) entry **X'40'** Dynamic destination queue / Global / FSS/FSA (Functional Subsystem Application) entry **X'20'** Dynamic destination queue / Local / FSS only entry **X'10'** Dynamic destination queue / Local / FSS/FSA entry.
39	27		1		Reserved.

Offsets		Name	Length	Format	Description
40	28	R84FSSNM	8	EBCDIC	FSS Name (Global/Dynamic Destination Queue).
48	30	R84FSSID	2	binary	FSS ID (Local/Dynamic Destination Queue).
50	32	R84FSANM	8	EBCDIC	FSA Name (Global/Dynamic Destination Queue and FSS/FSA entry).
58	3A	R84FSAID	2	binary	FSA ID (Local/Dynamic Destination Queue).
60	3C	R84DQMAX	4	binary	Maximum destination queue length.
64	40	R84DQMIN	4	binary	Minimum destination queue length.
68	44	R84DQAVG	4	binary	Average destination queue length.

Subtype 10 — Workload Manager Analysis

The Workload Manager (WLM) analysis section consists of the following data sections:

- WLM general section contains offsets to the other sections.
- Service class section - information is collected for each service class that had activity during the sampling interval. The following sections are created for each service class:
  - Service class fixed section contains the service class name and offsets to the other sections.
  - Service class non-system information contains non-system related information such as the number of jobs in MDS, GMS etc.
  - Service class system information - one entry for every system that had activity during the sampling interval.

Offsets		Name	Length	Format	Description
WLM General Section:					
0	0	R84WLMLN	4	binary	Length of the WLM general section.
4	4	R84SRVOF	4	binary	Offset from this section to the first service class section or zero.
8	8	R84WLMGR	80	binary	Reserved.
Service Class Fixed Section:					
0	0	R84 _SRVCLEN	4	binary	Length of this section.
4	4	R84 _SRVCNAME	8	EBCDIC	Service class name.
12	C	R84 _SRVCSMPC	4	binary	Number of samples this service class was found.
16	10	R84 _SRVCNXOF	4	binary	Offset from this section to the next service class fixed section in this buffer.
20	14	R84 _SRVNSYOF	4	binary	Offset from this section to the non-system specific information for this service class. This will be zero if this is a continuation buffer for system specific information.
24	18	R84 _SRVSYSOF	4	binary	Offset from this section to the system specific information for this service class in this buffer.
28	1C	R84 _SRVCRSV1	16	binary	Reserved.
Service Class Non-System Specific Section:					
0	0	R84 _NSYSLEN	4	binary	Length of this section.
4	4	R84 _MAINWMIN	4	binary	Main service wait minimum count.
8	8	R84 _MAINWMAX	4	binary	Main service wait maximum count.
12	C	R84 _MAINWAVG	4	binary	Main service wait average count.
16	10	R84 _MDSMIN	4	binary	MDS minimum count.
20	14	R84 _MDSMAX	4	binary	MDS maximum count.

Offsets		Name	Length	Format	Description
24	18	R84 _MDSAVG	4	binary	MDS average count.
28	1C	R84 _GMSMIN	4	binary	GMS minimum count.
32	20	R84 _GMSMAX	4	binary	GMS maximum count.
36	24	R84 _GMSAVG	4	binary	GMS average count.
40	28	R84 _MOFNCMIN	4	binary	Main offline/not connected minimum count.
44	2C	R84 _MOFNCMAX	4	binary	Main offline/not connected maximum count.
48	30	R84 _MOFNCAVG	4	binary	Main offline/not connected average count.
52	34	R84 _GRPDSMIN	4	binary	Group disabled minimum count.
56	38	R84 _GRPDSMAX	4	binary	Group disabled maximum count.
60	3C	R84 _GRPDSAVG	4	binary	Group disabled average count.
64	40	R84 _JBHLDMIN	4	binary	Job held minimum count.
68	44	R84 _JBHLDMAX	4	binary	Job held maximum count.
72	48	R84 _JBHLDAVG	4	binary	Job held average count.
76	4C	R84 _CLSDSMIN	4	binary	Class disabled minimum count.
80	50	R84 _CLSDSMAX	4	binary	Class disabled maximum count.
84	54	R84 _CLSDSAVG	4	binary	Class disabled average count.
88	58	R84 _SCHENMIN	4	binary	Scheduling environment not available minimum count.
92	5C	R84 _SCHENMAX	4	binary	Scheduling environment not available maximum count.
96	60	R84 _SCHENAVG	4	binary	Scheduling environment not available average count.
100	64	R84 _SPOOLMIN	4	binary	Spool space shortage minimum count.
104	68	R84 _SPOOLMAX	4	binary	Spool space shortage maximum count.
108	6C	R84 _SPOOLAVG	4	binary	Spool space shortage average count.
112	70	R84 _TDEPTMIN	4	binary	TDEPTH reached minimum count.
116	74	R84 _TDEPTMAX	4	binary	TDEPTH reached maximum count.
120	78	R84 _TDEPTAVG	4	binary	TDEPTH reached average count.
124	7C	R84 _TLIMTMIN	4	binary	TLIMIT exceeded minimum count.
128	80	R84 _TLIMTMAX	4	binary	TLIMIT exceeded maximum count.
132	84	R84 _TLIMTAVG	4	binary	TLIMIT exceeded average count.
136	88	R84 _MDEPTMIN	4	binary	MDEPTH reached minimum count.
140	8C	R84 _MDEPTMAX	4	binary	MDEPTH reached maximum count.
144	90	R84 _MDEPTAVG	4	binary	MDEPTH reached average count.
148	94	R84 _MLIMTMIN	4	binary	MLIMIT exceeded minimum count.
152	98	R84 _MLIMTMAX	4	binary	MLIMIT exceeded maximum count.
156	9C	R84 _MLIMTAVG	4	binary	MLIMIT exceeded average count.
160	A0	R84 _PLELGMIN	4	binary	Number of jobs eligible to run anywhere in the SYSPLEX - minimum count.
164	A4	R84 _PLELGMAX	4	binary	Number of jobs eligible to run anywhere in the SYSPLEX - maximum count.
168	A8	R84 _PLELGAVG	4	binary	Number of jobs eligible to run anywhere in the SYSPLEX - average count.
172	AC	R84 _PLINEMIN	4	binary	Number of jobs ineligible to run anywhere in the SYSPLEX for reasons other than class limits - minimum count.

Offsets		Name	Length	Format	Description
176	B0	R84 _PLINEMAX	4	binary	Number of jobs ineligible to run anywhere in the SYSPLEX for reasons other than class limits - maximum count.
180	B4	R84 _PLINEAVG	4	binary	Number of jobs ineligible to run anywhere in the SYSPLEX for reasons other than class limits - average count.
184	B8	R84 _PLLMTMIN	4	binary	Number of jobs ineligible to run anywhere in the SYSPLEX because of class limits - minimum count.
188	BC	R84 _PLLMTMAX	4	binary	Number of jobs ineligible to run anywhere in the SYSPLEX because of class limits - maximum count.
192	C0	R84 _PLLMTAVG	4	binary	Number of jobs ineligible to run anywhere in the SYSPLEX because of class limits - average count.
196	C4	R84 _PLEXEMIN	4	binary	Number of jobs in execution - minimum count.
200	C8	R84 _PLEXEMAX	4	binary	Number of jobs in execution - maximum count.
204	CC	R84 _PLEXEAVG	4	binary	Number of jobs in execution - average count.
208	D0	R84 _NSYSRSV1	24	binary	Reserved.
Service Class System Specific Section:					
0	0	R84 _SYSLEN	4	binary	Length of this section.
4	4	R84 _SYSNXOF	4	binary	Offset of next system specific information for this service class in this buffer.
8	8	R84 _SYSNAME	8	EBCDIC	System name.
16	10	R84 _SYELGMIN	4	binary	Number of jobs eligible to run on this system - minimum count.
20	14	R84 _SYELGMAX	4	binary	Number of jobs eligible to run on this system - maximum count.
24	18	R84 _SYELGAVG	4	binary	Number of jobs eligible to run on this system - average count.
28	1C	R84 _SYINEMIN	4	binary	Number of jobs ineligible to run on this system - minimum count.
32	20	R84 _SYINEMAX	4	binary	Number of jobs ineligible to run on this system - maximum count.
36	24	R84 _SYINEAVG	4	binary	Number of jobs ineligible to run on this system - average count.
40	28	R84 _SYEXEMIN	4	binary	Number of jobs in execution on this system - minimum count.
44	2C	R84 _SYEXEMAX	4	binary	Number of jobs in execution on this system - maximum count.
48	30	R84 _SYEXEAVG	4	binary	Number of jobs in execution on this system - average count.
52	34	R84 _SYSCONMIN	4	binary	Number of jobs that can execute on this system only – minimum count.
56	38	R84 _SYSCONMAX	4	binary	Number of jobs that can execute on this system only – maximum count.
60	3C	R84 _SYSCONAVG	4	binary	Number of jobs that can execute on this system only – average count.
64	40	R84 _SYSRSVD1	12	binary	Reserved.

Subtype 21 — JES2 Resource Usage Section

This subtype contains data that relates to JES2 memory and resource usage.

There are two subsections described by triplets at the start of this section:

- Memory usage subsection, which contain entries (mapped by R84MEMJ2) providing information on each memory section in the JES2 address space. Each entry contains the size of the area and the low, high, and average usage in the interval. Entries that are returned represents low and high 24 bit private, low, and high 31 bit private, and 64 bit private.

- Resource usage subsection, which contain entries (mapped by R84RSUJ2) providing information on various resources JES2 manages. Each entry contains the resource name, the limit, the low, high, and average usage, the warn level, and a count of how often the warn level was reached. Resources include checkpoint-managed limits such as JQE, JOEs, BERT, and memory-resident areas such as buffers, CMB, and ICEs.

Subtype Header Section

The Offsets column heading spans two columns.

Table 16. Subtype 21 JES2 usage table

Offsets		Name	Length	Format	Description
JES2 resource usage section (SMF84JRU DSECT):					
0	0	R84J2RUL	4	Binary	Length of the JES2 resource usage section.
4	4		24	Binary	Reserved.
30	1E	R84J2RTR	2	Binary	Number of triplets.
32	20	R84J2RMO	4	Binary	Offset to first JES2 memory area usage subsection entry (R84MEMJ2) from SMF84JRU.
36	24	R84J2RML	2	Binary	Length of each memory data entry.
38	26	R84J2RMN	2	Binary	Number of memory data entries.
40	28	R84J2RRO	4	Binary	Offset to first JES2 resource usage subsection entry (R84RSUJ2) from SMF84JRU.
44	2C	R84J2RRL	2	Binary	Length of a R84RSUJ2 entry.
46	2E	R84J2RRN	2	Binary	Number of R84RSUJ2 entries.
JES2 memory area usage subsection entry (R84MEMJ2):					
0	0	R84MEM_NAME	12	EBCDIC	Storage area name.
12	C		4	Binary	Reserved.
16	10	R84MEM_REGION	8	Binary	Region size in bytes.
24	18	R84MEM_USE	8	Binary	Current area usage in bytes.
32	20	R84MEM_LOW	8	Binary	Low usage value in bytes.
40	28	R84MEM_HIGH	8	Binary	High usage value in bytes.
48	30	R84MEM_AVERAGE	8	Binary	Average in use in bytes.
JES2 resource usage subsection entry (R84RSUJ2):					
0	0	R84RSU_NAME	8	EBCDIC	Resource name.
8	8	R84RSU_LIMIT	4	Binary	Current upper limit.
12	C	R84RSU_INUSE	4	Binary	Current number in use.
16	10	R84RSU_LOW	4	Binary	Low usage value.
20	14	R84RSU_HIGH	4	Binary	High usage value.
24	18	R84RSU_WARN	2	Binary	WARN= value for resource (zero if none).
26	1A	R84RSU_FLG1	1	Binary	Flag byte. **Bit** **Meaning when set** **X'80' R84RSU_F1OVER** Usage over warn level at time of SMF record.
27	1B		1	Binary	Reserved.
28	1C	R84RSU_OVER	4	Binary	Count of samples over warn level (HASP050 needed).

Table 16. Subtype 21 JES2 usage table (continued)

Offsets		Name	Length	Format	Description
32	20	R84RSU_AVERAGE	4	Binary	Average in use value.

Record type 85 (X'55') — Measuring OAM Transaction Performance Using SMF

OAM writes record type 85 to account for OAM activity. For more information about record type 85, see *z/OS DFSMS OAM Planning, Installation, and Storage Administration Guide for Object Support* .

Record type 86 (X'56') — CIM server audit

Reference information:

For additional information on the CIM server, see *z/OS Common Information Model User's Guide*.

Record type 86 presents data for user authorization to the CIM server, the change of data, and the modification of CIM server configuration. The SMF type 86 records are generated if the audit logging is enabled on the CIM server, and the type is with in the SMFPRMXX configuration.

Security notice

To write SMF records, the CIM server needs at least READ access to the BPX.SMF profile of the FACILITY class at your SAF product.

The following is an example for RACF:

```
RDEFINE FACILITY BPX.SMF UACC(NONE)
PERMIT BPX.SMF CL(FACILITY) ACCESS(READ) ID(CFZADM)
SETROPTS RACLIST(FACILITY) REFRESH
```

Subtype Description

Subtype 1 - Authentication

This subtype contains the records of the user authenticated to the CIM server.

Subtype 2 - Configuration

This subtype contains the CIM server configuration and the configure changes made.

Subtype 3 - Provider Status

This subtype contains the state of the provider registered and loaded into the CIM server and the provider state changes.

Subtype 4 - CIM Operations

This subtype contains the CIM operations performed on CIM classes and instances.

Record mapping

The SMF record mappings are shown as two sections, a Common Section that appears on all subtypes and a Unique Section for all subtypes.

Common Section

The Common Section is divided into the Header Section and the Product Section. They appear on each of the Record Type 86 subtype and are included in the documentation once.

Header Section

This section contains the common SMF record header fields and the triplet fields (offset/length/number), if applicable, that locate the other sections on the record.

This triplet information should be checked before accessing a section of the record. All three filed being non-zero mean that the section does not exist on the record. The 'number' triplet filed is the primary indication of the existence of the field.

Offsets		Name	Length	Format	Description
00	00	SMF86LEN	2	binary	Record length. This field and the next field (total of four bytes) form the RDW (record descriptor word).
02	02	SMF86SEG	2	binary	Segment description (see record length field).
04	04	SMF86FLG	1	binary	System indicator: **Bit** **Meaning when set** **0** Reserved **1** Subtypes used **2** Reserved **3-6** Version indicators* **7** Reserved *See "Standard and Extended SMF record headers" on page 162 for a detailed description.
05	05	SMF86RTY	1	binary	Record type 108 (X'56').
06	06	SMF86TME	4	binary	Time since midnight, in hundredths of a second, that the record was moved into the SMF buffer.
10	0A	SMF86DTE	4	packed	Date when the record was moved into the SMF buffer, in the form 0*cyydddF*.
14	0E	SMF86SID	4	EBCDIC	System identification (from the SID parameter).
18	12	SMF86SSI	4	EBCDIC	Subsystem identification ('CFZ').
22	16	SMF86STY	2	binary	Record Subtype **Subtype** **Description** **1** Authentication **2** Configuration **3** Provider Status **4** CIM Operations
24	18	SMF86TRN	2	binary	Number of triplets in this record (including the Product Section). A triplet is a set of three MSF fields (offset/length/number values) that defines a section of the record. The offset it the offset from the RDW.
28	1C	SMF86PRO	4	binary	Offset to product section from RDW.

Offsets		Name	Length	Format	Description
32	20	SMF86PRL	2	binary	Length of product section.
32	22	SMF86PRN	2	binary	Number of product sections.
Individual header extension for subtype 1:					
36	24	SMF86AUTHO	4	binary	Offset to authentication section from RDW.
40	28	SMF86AUTHL	2	binary	Length of authentication section.
42	2A	SMF86AUTHN	2	binary	Number of authentication sections.
Individual header extension for subtype 2:					
36	24	SMF86CONFO	4	binary	Offset to configuration section from RDW.
40	28	SMF86CONFL	2	binary	Length of configuration section.
42	2A	SMF86CONFN	2	binary	Number of configuration sections.
Individual header extension for subtype 3:					
36	24	SMF86PROVO	4	binary	Offset to provider section from RDW.
40	28	SMF86PROVL	2	binary	Length of provider section.
42	2A	SMF86PROVN	2	binary	Number of provider sections.
Individual header extension for subtype 4:					
36	24	SMF86CIMOO	4	binary	Offset to CIM operation section from RDW.
40	28	SMF86CIMOL	2	binary	Length of CIM operation section.
42	2A	SMF86CIMON	2	binary	Number of CIM operation sections.

Product Section

This section contains the general information about the server and the system that it is running. The triplet SMF86PRO, SMF86PRL and SMF86PRN of the header identify this section.

Offsets		Name	Length	Format	Description
00	00	SMF86PRRVN	4	binary	SMF Record version number. Set to 1 for CIM SMF for z/OS 1.10.
04	04	SMF86SSI	4	EBCDIC	Subsystem identification (‘CFZ’).
08	08	SMF86VRM	8	EBCDIC	The CIM Product software level. (version, release, and modification level numbers) For example: 02.06.01
16	10	SMF86OSL	8	EBCDIC	MVS software level. (consists of an acronym and the version, release, and modification level numbers)
24	18	SMF86SYN	8	EBCDIC	System name (from the SYSNAME parameter in the IEASYSxx parmlib member).
32	20	SMF86SYP	8	EBCDIC	Sysplex name (from the SYSPLEX parameter in the COUPLExx parmlib member).
40	28	SMF86OPI	4	binary	z/OS UNIX System Services process ID. Same format as SMF record 30, to be able to correlate records.
44	2B	SMF86THID	22	EBCDIC	The char representation of the thread ID. The thread ID ends with the null character X'00'. Same format as used in CIM Trace, to be able to correlate records.
66	42		2		Reserved.

Subtype section

Subtype 1 - Authentication

The authentication record is written when you are authenticating yourself trough the CIM Server. There are three different authentication mechanisms within CIM server on z/OS:

- Basic: UserID/Password (Passticket)
- Local: UNIX Domain Socket
- ATTLS: Certificate validation with UserID mapping

All successful and unsuccessful requests are logged. For Basic and ATTLS additionally, the IP of the client application is recorded. The triplet SMF86AUTHO, SMF86AUTHL and SMF86AUTHN of the header identify this section.

Offsets		Name	Length	Format	Description
00	00	AuthMode	2	binary	The authentication mode: **AuthMode** **Description** **0** Local **1** Basic **2** ATTLS
02	02	UserID	8	EBCDIC	The UserID to authentication.
10	0A	AuthResult	2	binary	The authentication result: **AuthResult** **Description** **0** Successful authenticated. **1** Authentication failed.
12	0C	ClientIP	42	EBCDIC	The TCPI/IP address of the client requesting the authentication. If AuthMode is set to 0 (local authentication), the ClientIP is set to “localhost”.
54	36		2		Reserved.

Subtype 2 - Configuration

In the Subtype 2, configuration of the CIM Server is monitored. As enabling the audit logging at the CIM server, the current configuration is recorded this SMF record. Each configuration property is written into an extra record. After that, all changes to the configuration are monitored. The triplet SMF86CONFO, SMF86CONFL and SMF86CONFN of the header identify this section.

Offsets		Name	Length	Format	Description
00	00	UserID	8	EBCDIC	The user ID updating the configuration property. The user ID is empty, if configuration is listed.
08	08	PropChange	2	binary	Mode of the property change: **PropChange** **Comment** **0** List Configuration **1** Current Configuration **2** Planed Configuration
10	0A		2		Reserved.
12	0C	NameOf	4	binary	Offset to property name from section start.
16	10	NameLen	2	binary	Length of property name including the trailing null character X'00'.

Offsets		Name	Length	Format	Description
18	12	NameNo	2	binary	Number of property names. (=1)
20	14	ValueOf	4	binary	Offset to property value from section start.
24	18	ValueLen	2	binary	Length of property value including trailing null character X'00'.
26	1A	ValueNo	2	binary	Number of property values. (=1)
28	1C	NewValueOf	4	binary	Offset to new property value from section start. This value is set to 0, if configuration is listed.
32	20	NewValueLen	2	binary	Length of new property value including trailing null character X'00'. This value is set to 0, if configuration is listed.
34	22	NewValueNo	2	binary	Number of new property values. This value is set to 0, if configuration is listed.
To determine the value of NVAL, use the value of NameOf.					
NVAL		Name	Var	EBCDIC	The property name including a trailing null character X'00'.
To determine the value of PVAL, use the value of ValueOf.					
PVAL		Value	Var	EBCDIC	The property value including a trailing null character X'00'.
To determine the value of PNVAL, use the value of NewValueOf.					
PNVAL		NewValue	Var	EBCDIC	The new property value including a trailing null character X'00'. This value is not set, if configuration is listed.

Subtype 3 - Provider Status

In the Subtype 3, the CIM server registered providers modules are monitored. As enabling the audit logging at the CIM server, the current configuration is recorded this SMF record. Each provider status is written into an extra record. After that, all changes to the provider status are monitored.

A registered provider module can have or change into one or more status. The triplet SMF86PROVO, SMF86PROVL and SMF86PROVN of the header identify this section.

Offsets		Name	Length	Format	Description
00	00	CurrentStatus	4	binary	The current status of the provider reflected in a bit field. If the field is set to 0, the current status is undefined. **CurrentStatus** **Comment** **0x0001** "Unknown" **0x0002** "Other" **0x0004** "OK" **0x0008** "Degraded" **0x0010** "Stressed" **0x0020** "Predictive Failure" **0x0040** "Error" **0x0080** "Non-Recoverable Error" **0x0100** "Starting" **0x0200** "Stopping" **0x0400** "Stopped **0x0800** "In Service" **0x1000** "No Contact" **0x2000** "Lost Communication"
04	04	IsChanging	2	binary	If set to 1, the provider is changing the state and the NewStatus value is valid.
06	06		2		Reserved.

Offsets		Name	Length	Format	Description
08	08	NewStatus	4	binary	The new status of the provider reflected in a bit field. If the field is set to 0 the new status is undefined. **NewStatus** **Comment** **0x0001** "Unknown" **0x0002** "Other" **0x0004** "OK" **0x0008** "Degraded" **0x0010** "Stressed" **0x0020** "Predictive Failure" **0x0040** "Error" **0x0080** "Non-Recoverable Error" **0x0100** "Starting" **0x0200** "Stopping" **0x0400** "Stopped **0x0800** "In Service" **0x1000** "No Contact" **0x2000** "Lost Communication"
12	0C	ProvNameOf	4	binary	Offset to provider name from section start.
14	0E	ProvNameLen	2	binary	Length of provider name.
16	10	ProvNameNo	2	binary	Number of provider name.
To determine the value of PNAM, use the value of ProvNameOf.					
PNAM		ProviderName	Var	EBCDIC	The name of the provider involved in the operation including trailing null character X'00'.

Subtype 4 - CIM Operation

In the Subtype 4, CIM Operations are monitored. The triplet SMF86CIMOO, SMF86CIMOL and SMF86CIMON of the header identify this section.

Offsets		Name	Length	Format	Description
00	00	CIMOpType	2	binary	The CIM Operation type that was executed. **CIMOpType** **Comment** **0** Class Operations **1** Qualifier Operations **2** Instance Operations **3** Invoke Method
02	02	UserID	8	EBCDIC	The UserID requesting the operation.
10	0A	CIMStatusCode	2	binary	The result status of the operation: **CIMStatusCode** **Comment** **0** Success **1** Failed **2** Access denied **3** Invalid Namespace **4** Invalid Parameter **5** Invalid Class **6** Not found **7** Not supported **8** Class has children **9** Class has instances **10** Invalid Superclass **11** Already exists **12** No such property **13** Type mismatch **14** Query lang. not supported **15** Invalid query **16** Method not available **17** Method not found **Any other value** Unknown
12	0C	ClientIP	42	EBCDIC	The TCPI/IP address of the client requesting the operation.
54	36		2		Reserved.

Offsets		Name	Length	Format	Description
56	38	OperNameOf	4	binary	Offset to operation name from section start.
60	3C	OperNameLen	2	binary	Length of operation name including trailing null character X'00'.
62	3E	OperNameNo	2	binary	Number of operation names.
64	40	ObjPathOf	4	binary	Offset to object path from section start.
68	44	ObjPathLen	2	binary	Length of object path including trailing null character X'00'.
70	46	ObjPathNo	2	binary	Number of object paths.
72	48	NameSpaceOf	4	binary	Offset to name space from section start.
76	4C	NameSpaceLen	2	binary	Length of name space including trailing null character X'00'.
78	4E	NameSpaceNo	2	binary	Number of name spaces.
80	50	ProvNameOf	4	binary	Offset to provider name from section start.
84	54	ProvNameLen	2	binary	Length of provider name including trailing null character X'00'.
86	56	ProvNameNo	2	binary	Number of provider names. If it is set to 0, no provider name is provided.
88	58	ProvModNameOf	4	binary	Offset to provider module name from section start.
92	5C	ProvModNameLen	2	binary	Length of provider module name including trailing null character X'00'.
94	5E	ProvModNameNo	2	binary	Number of provider module names. If it is set to 0, no provider name is provided.
To determine the value of OPRN, use the value of OperNameOf.					
OPRN		OperName	Var	EBCDIC	The operation name including trailing null character X'00'.
To determine the value of OBJP, use the value of ObjPathOf.					
OBJP		ObjPath	Var	EBCDIC	The object path at Instance Operations and Invoke Method or the class name at Class and Qualifier Operations including trailing null character X'00'.
To determine the value of NAMS, use the value of NameSpaceOf.					
NAMS		NameSpace	Var	EBCDIC	The name space of the operation including trailing null character X'00'.
To determine the value of PNAM, use the value of ProvNameOf.					
PNAM		ProviderName	Var	EBCDIC	The name of the provider involved in the operation including trailing null character X'00'.
To determine the value of PMOD, use the value of ProvModNameOf.					
PMOD		ProvModName	Var	EBCDIC	The name of the provider module involved in the operation including trailing null character X'00'.

Record type 87 (X'57') - GRS Monitoring

GRS Monitoring writes record type 87 to monitor functions. For more information about record type 87, see Diagnosing global resource serialization in *z/OS MVS Planning: Global Resource Serialization*.

Record type 88 (X'58') — System Logger Data

Record type 88 is produced in response to ENF signal 37, which indicates that the SMF global recording interval has ended. Each record reports system logger activity for one log stream or structure. Record values from multiple systems can be summed to give the sysplex view of system logger activity.

Record type 88 has the following subtypes; each contains a header and product section and sections unique for each record:

- **Subtype 1** - Records log stream activity.

You can use system logger activity data to identify high or low users of system logger services. System logger event data indicates conditions that cause system logger services to be unavailable, such as the STRUCTURE FULL condition for a coupling facility log stream. You can also use system logger activity data to perform capacity planning or configuration analysis.

The structure-related data in subtype 1 allows you to analyze input/output to interim storage for a log stream in terms of one input stream and two output streams. The input is the count of bytes written to interim storage (SMF88SWB). The two outputs are the count of the number of bytes deleted from interim storage under two scenarios:

– Bytes deleted before the data was offloaded to DASD log data sets. (SMF88SIB).

– Bytes deleted after data was offloaded to DASD log data sets (SMF88SAB).

If the first output count is high and the second is low, system logger is successfully using interim storage to avoid the I/O incurred by offloading to DASD log data sets.

- **Subtype 11** - Records coupling facility structure alter activity, which is the changes to the entry-to-element ratio made by system logger for coupling facility structures associated with coupling facility log streams. This information allows you to monitor how system logger is managing the entry-to-element ratio for coupling facility structures.

Macro to Symbolically Address Record Type 88: The SMF record mapping macro to symbolically address record type 88 is IXGSMF88. The macro is suppled in SYS1.MACLIB.

For additional information about system logger see Chapter 9, “System Logger accounting,” on page 115.

Record mapping

Header/Self-defining Section

This section contains the common SMF record headers fields and the triplet fields (offset/length/number) that locate the other sections on the record.

This triplet information should be checked prior to accessing a section of the record. All three fields being non-zero mean that the section exists on the record; conversely any of the fields being zero indicates that the section does not exist on the record. The ‘number’ triplet field is the primary indication of the existence of the field.

Offsets		Name	Length	Format	Description
0	0	SMF88LEN	2	binary	Record length. This field and the next field (total of four bytes) form the RDW (record descriptor word). See “Standard and Extended SMF record headers” on page 162 for a detailed description.
2	2	SMF88SEG	2	binary	Segment descriptor (see record length field)
4	4	SMF88FLG	1	binary	System indicator: **Bit** **Meaning when set** **0-2** Reserved **3-6** Version indicators* **7** Reserved. *See “Standard and Extended SMF record headers” on page 162 for a detailed description.
5	5	SMF88RTY	1	binary	Record Type 88 (X'58')
6	6	SMF88TME	4	binary	Time since midnight, in hundredths of a second, that the record was built into the SMF buffer.

Offsets		Name	Length	Format	Description
10	A	SMF88DTE	4	packed	Date when the record was moved into the SMF buffer, in the form 0*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for a detailed description.
14	E	SMF88SID	4	EBCDIC	System Identification (from SMFPRMxx SID parameter).
18	12	SMF88WID	4	EBCDIC	Subsystem identifier (STC)
22	16	SMF88STP	2	binary	Record subtype
24	18	SMF88SDL	4	binary	Length of Self-defining Section
28	1C	SMF88POF	4	binary	Offset to Product Section from start of record, including the record descriptor word (RDW).
32	20	SMF88PLN	2	binary	Length of Product Section.
34	22	SMF88PON	2	binary	Number of Product Sections in this record.
36	24	SMF88LOF	4	binary	Offset to Log Stream Section from start of record, including the record descriptor word (RDW).
40	28	SMF88LLN	2	binary	Length of Log Stream Section.
42	2A	SMF88LON	2	binary	Number of Log Stream Sections in this record.
44	2C	SMF88EOF	4	binary	Offset to Event Section from start of record, including the record descriptor word (RDW).
48	30	SMF88ELN	2	binary	Length of Event Section.
50	32	SMF88EON	2	binary	Number of Event Sections in this record.
52	34	SMF88SOF	4	binary	Offset to Structure (Interim Storage) Section from start of record, including the record descriptor word (RDW).
56	38	SMF88SLN	2	binary	Length of Structure (Interim Storage) Section.
58	3A	SMF88SON	2	binary	Number of Structure (Interim Storage) Sections in this record.
60	3C	SMF88AOF	4	binary	Offset to Structure Alter Section from start of record, including the record descriptor word (RDW).
64	40	SMF88ALN	2	binary	Length of Structure Alter Section.
66	42	SMF88AON	2	binary	Number of Structure Alter Sections in this record.

Product Section

This section contains general information about system logger and the system at the time the record was generated.

Triplet Information

This section is located on the record using the following triplet fields, which are located in the 'Header/self-defining' section:

Offset
SMF88POF

Length
SMF88PLN

Number
SMF88PON

Offsets		Name	Length	Format	Description
0	0	SMF88TYP	2	binary	Record Subtype • 1—Log stream update
2	2	SMF88RVN	2	EBCDIC	Record version number — 01.

Offsets		Name	Length	Format	Description
4	4	SMF88PNM	8	EBCDIC	Product name — SCLOG.
12	C	SMF88OSL	8	EBCDIC	MVS operating system name.
20	14	SNF88SYN	8	EBCDIC	System name (from SYSNAME parameter in the IEASYSxx parmlib member)

Subtype 1

Log Stream Section

This section identifies the log stream that generated the record and provides general log stream usage statistics.

Also refer to the SMF88LSD DSECT Section in macro IXGSMF88 in SYS1.MACLIB.

Triplet Information

This section is located on the record using the following triplet fields, which are located in the 'Header/self-defining' section:

Offset
SMF88LOF

Length
SMF88LLN

Number
SMF88LON

Offsets		Name	Length	Format	Description
0	0	SMF88LIT	8	EBCDIC	SMF-counter instance token identifies a connection to a log stream. It ties together SMF records for a given instance of a connection to a log stream.
8	8	SMF88LSN	26	EBCDIC	Log stream name.
34	22	SMF88LFL	2	EBCDIC	Log stream flags: **Bit** **Meaning when set** **0** Reserved **1** This log stream used staging data sets during the expiring SMF interval. **2** When ON, the SMF record has been generated when the log stream disconnected from the system. **3** When ON, the log stream has ZAI (YES) specified and log data has been sent to the IBM zAware server. **4-15** Reserved.
36	24	SMF88LTD	8	EBCDIC	TOD-time when SMF global interval expired (from parameter list of ENF event 37, which requested this SMF record from logger). Time is reported in GMT.
44	2C	SMF88LWI	4	binary	IXGWRITE macro invocations for this log stream issued during the expiring SMF interval.
48	30	SMF88LIB	4	binary	Minimum BLOCKLEN value of IXGWRITE seen during the expiring SMF interval. Initialized to X'7FFFFFFF' if no SMF activity occurs within an SMF interval.

Offsets		Name	Length	Format	Description
52	34	SMF88LAB	4	binary	Maximum BLOCKLEN value of IXGWRITE seen by this log stream during the expiring SMF interval. Initialized to zero if no SMF activity occurs within an SMF interval.
56	38	SMF88LWB	8	EBCDIC	Bytes requested by user application(s) on IXGWRITE macro invocations for this log stream during the expiring SMF interval (FORMAT=LONG FLOATING POINT).
64	40	SMF88LDB	8	EBCDIC	Bytes written to DASD for this log stream during the expiring SMF interval (FORMAT=LONG FLOATING POINT).
72	48	SMF88LIO	4	binary	Number of times a request was made by system logger to write log stream data to DASD during the expiring SMF interval.
76	52	SMF88LIS	4	binary	Number of times system logger had to suspend before writing log stream data to DASD because a previously-initiated write to DASD had not yet completed during the expiring SMF interval.
80	50	SMF88GRP	8	EBCDIC	GROUP value for the log stream. Either PROD (production) or TEST.

Events Section

This section contains flags and counters used for unusual events.

Also, see the SMF88ESD DSECT Section in macro IXGSMF88 in SYS1.MACLIB.

Triplet Information

This section is located on the record using the following triplet fields, which are located in the 'Header/ self-defining' section:

Offset
SMF88EOF

Length
SMF88ELN

Number
SMF88EON

Offsets		Name	Length	Format	Description
0	0	SMF88EDS	4	binary	Number of log stream DASD shifts initiated by this system during the expiring SMF interval. (FORMAT=32 bits)
4	4	SMF88ERI	4	binary	Number of structure rebuild events initiated for this log stream, as seen by this system. Cumulative from the creation of this SMF-counter instance. (FORMAT=32 bits)
8	8	SMF88ERC	4	binary	Number of structure rebuild events completed for this log stream, as seen by this system. Cumulative from the creation of this SMF-counter instance. (FORMAT=32 bits)
12	C	SMF88ESF	4	binary	Number of times Logger detected structure full conditions for this Logstream on this system during the expiring SMF interval. (FORMAT=32 bits)
16	10	SMF88ETT	4	binary	Number of times system logger detected a Staging Data Set Threshold Hit condition for this log stream on this system during the expiring SMF interval. (FORMAT=32 bits)
20	14	SMF88ETF	4	binary	Number of times system logger detected a Staging Data Set Full condition for this log stream on this system during the expiring SMF interval. (FORMAT=32 bits)
24	18	SMF88EO	4	binary	Number of successful offloads (greater than one byte of data) performed for this log stream on this system during the expiring interval. (FORMAT=32 bits)

Offsets		Name	Length	Format	Description
28	1C	SMF88EFS	4	binary	Number of times IXGLOGR initiated an offload for all the log streams connected on this system to the structure due to the structure's total in-use list entries reaching 90% of the total available entries for the structure. This count is the number of occurrences of this condition for the expiring interval. (FORMAT=32 bits)
32	20	SMF88EDO	4	binary	Number of times an offload was requested from the IXGOFFLD service during the expiring SMF interval. (FORMAT=32 bits)
36	24	SMF88EAF	4	binary	Number of times IXGLOGR detected 'Staging-Dataset-Async-Buffer_Full' condition for this logstream on this system during the expiring SMF interval. (FORMAT=32 bits)
40	28		16	EBCDIC	Reserved.

Structure (Interim Storage) Section

This section contains information related to the interim storage for a log stream. For a coupling facility log stream, interim storage is coupling facility structure space allocated to the log stream. For a dasd only log stream, interim storage is staging data set space.

Also refer to the SMF88SSD DSECT Section in macro IXGSMF88 in SYS1.MACLIB.

Triplet Information

This section is located on the record using the following triplet fields, which are located in the ‘Header/self-defining’ section:

Offset
SMF88SOF

Length
SMF88SLN

Number
SMF88SON

Offsets		Name	Length	Format	Description
0	0	SMF88STN	16	EBCDIC	Name of the structure used for this log stream. For a dasd only log stream, this field will show *DASDONLY*.
16	10	SMF88SWB	8	EBCDIC	Current written bytes count. Count of bytes written to interim storage during this interval (FORMAT= LONG FLOATING POINT).
24	18	SMF88SIB	8	EBCDIC	Current instead bytes count. Count of bytes deleted from interim storage during this interval, instead of being offloaded (FORMAT=LONG FLOATING POINT). This field is incremented due to either a user invocation of IXGDELET where the data had not been offloaded or system logger internal management of interim storage.
32	20	SMF88SAB	8	EBCDIC	Current after bytes count. Count of bytes deleted from interim storage during this interval, after being offloaded (FORMAT=LONG FLOATING POINT). This field is incremented by system logger's internal management of interim storage.
40	28		4	EBCDIC	Reserved.
44	2C	SMF88SII	4	binary	Current instead invocation count. Count of times a deletion from interim storage for this log stream was performed during this interval, where the data was not first offloaded.
48	30	SMF88SAI	4	binary	Current after invocation count. Count of times a deletion from interim storage was performed during this interval, after being offloaded (occurs due to system logger management of interim storage).

Offsets		Name	Length	Format	Description
52	34	SMF88SC1	4	binary	The count of type-1 completions during the expired SMF interval. The Logstream contents can remain in the primary storage. No need to move data from primary storage to DASD. This field is valid for both coupling facility and DASDONLY Logstreams.
56	38	SMF88SC2	4	binary	The count of type-2 completions during the expired SMF interval. Logstream is filling the primary storage but space is not critical. System Logger begins asynchronous offloading of Logstream data from the primary storage to DASD. This field is valid for both coupling facility and DASDONLY Logstreams.
60	3C	SMF88SC3	4	binary	The count of type-3 completions during the expired SMF interval. Space used in the structure (by this Logstream) is critical but does not exceed 100 percent. This field is only valid for coupling facility based Logstreams.
64	40		4		Reserved

Subtype 11

Structure Alter Section

This section identifies a structure and provides statistics on system logger's management of the structures entry to element ratio.

Triplet Information

This section is located on the record using the following triplet fields, which are located in the ‘Header/self-defining’ section:

Offset
SMF88AOF

Length
SMF88ALN

Number
SMF88AON

Offsets		Name	Length	Format	Description
0	0	SMF88ANM	16	EBCDIC	Structure Name
16	10	SMF88ATK	8	binary	Alter Token, which is a STCK timestamp, showing last time the element to entry ratio was altered to accommodate the average buffer size being written to the structure.
24	18	SMF88AIT	8	binary	SMF-counter instance token identifies a connection to structure. It ties together SMF records for a given instance of a connection to the structure.
32	20	SMF88AWB	8	binary	Current written bytes count. Count of bytes written to the structure from this system and associated with this alter token, for this interval.
40	28	SMF88AO	4	binary	The number of offloads that occurred on this system associated with this alter token, for this interval.
44	2C	SMF88ACB	4	binary	Current allocated average buffer size, which system logger uses to calculate entry-to-element ratio for the structure.
48	30	SMF88ATB	4	binary	Targeted average buffer size that system logger tried to achieve by altering the element to entry ratio.
52	34	SMF88ASZ	4	binary	Structure size in 4K blocks.
56	38	SMF88ATW	4	binary	Total number of log writes to the structure during the interval.
60	3C	SMF88ALS	4	binary	Total number of log streams connected to the structure on this system at the recording.

Offsets		Name	Length	Format	Description
64	40	SMF88AFG	1	binary	Alter Flags **Bit** **Meaning when set** **0** When ON, record was generated to report a change in the average buffer size being written to the structure. **1** When ON, record was generated due to the last log stream disconnecting which resulted in the structure being disconnected. **2-7** Reserved.

Record type 89 (X'59') — Usage Data

The type 89 record provides information about product usage on a particular MVS system. The usage reporting program analyzes the data collected in the type 89 record. For more information see *z/OS MVS Product Management*. The record is generated on a scheduled interval (1 hour maximum).

Record type 89 has two subtypes:

- Subtype 1 — Usage data

  Contains, for the scheduled interval, summary usage data for all products across the system that have registered to request usage recording. These products must issue the IFAUSAGE macro to specify:

  – Registration information.

  – Level and scope of data collection (task or address space level).

  – Start and end of collection period.

  For more information on the IFAUSAGE macro, see Chapter 12, “IFAUSAGE — Collecting usage data,” on page 125.
- Subtype 2 — State Data

  Contains, for the scheduled interval, summary state data for all products across the system that have registered to indicate that they are running. These products issue the MVS Register service to indicate that they are running. MVS uses information a product supplies to determine if the product is enabled and to maintain a list of active products.

The installation controls the scheduling of the type 89 record by checking the INTERVAL value specified for the SMF address space. Because SMF is a started task, this is the INTERVAL value for SUBSYS=STC in the SMFPRMxx member. If the INTERVAL value is less than or equal to one hour, then that value is used as the reporting interval for type 89 records. If that value is greater than one hour, or if no INTERVAL value is specified, then one hour is used as the reporting interval for type 89 recording.

There are two sets of interval START and STOP times in the record:

- Usage data interval START/STOP.
- Reporting interval START/STOP.

The usage data interval represents the hourly buckets that the usage reporting program records product usage in. This interval is synchronized to the top of the hour.

The reporting interval represents the increment when the type 89 records are generated and is also synchronized to the top of the hour. For example, if you specified an interval value of 30 minutes, type 89 records would be generated at 9:00, 9:30, 10:00... If you are collecting usage data at the task level, you may want to synchronize interval processing to the top of the hour in your SMFPRMxx member because task level data collection is scheduled by interval processing.

SMF type 89 records are generated on the interval as requested; if no products are registered, then a type 89 record is generated with a product count of 0.

Product intersection time data sections are generated when a product registers at the ADDRSP level, and then invokes a product that registers at the TASK level. When no product intersections occur, the product intersection count in SMF89CNN is zero.

SMFPRM*xx* parameters are described in *z/OS MVS Initialization and Tuning Reference*. The usage reporting program is described in *z/OS MVS Product Management*. The Register service is described in *MVS Programming: Registration Services*.

Record environment

The following conditions exist for the generation of each of the subtypes of this record:

Macro
SMFEWTM, BRANCH=YES (record exit: IEFU84)

Mode

Subtype
Mode

1
SRB

2
SRB

Storage Residency
31-bit

SUBSYS
STC

Record mapping

Header: self-defining section

This section contains the common SMF record header fields and the triplet fields (offset/length/number), if applicable, that locate the other sections on the record.

Offsets		Name	Length	Format	Description
0	0	SMF89LEN	2	binary	Record Length. This field along with the next, are referred to as the RDW (record descriptor word). See “Standard and Extended SMF record headers” on page 162 for a detailed description.
2	2	SMF89SEG	2	binary	Segment descriptor (see record length field).
4	4	SMF89FLG	1	binary	System indicator: **Bit** **Meaning when set** **0** Subsystem identification follows system identification **1** Subtypes used **2** Reserved **3-6** MVS Version Indicators (Set by SMF) **7** Reserved.
5	5	SMF89RTY	1	binary	Record type 89 (X'59').
6	6	SMF89TME	4	binary	Time since midnight, in hundredths of a second, that the record was moved to the SMF buffer.

Offsets		Name	Length	Format	Description
10	A	SMF89DTE	4	packed	Date that the record was moved to the SMF buffer, in the form 0*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for a detailed description.
14	E	SMF89SID	4	EBCDIC	System identification (from the SID parameter in the SMFPRMxx parmlib member).
18	12	SMF89WID	4	EBCDIC	Subsystem identifier for the SMF address space - 'STC' for Started Task.
22	16	SMF89STP	2	binary	Record subtype **1** Usage Data Interval Record **2** State Data Interval Record
24	18	SMF89SDL	4	binary	Length of self-defining section: X'34'

Self-Defining section

This section contains the triplet fields (offset/length/number) that locate other sections on the record. This triplet information should be checked prior to accessing a section of the record. The 'number' triplet field is the primary indication of the existence of the field. This section is an extension of the header and follows it physically in the record.

Offsets		Name	Length	Format	Description
0	0	SMF89PRO	4	binary	Offset to Record Product section from start of record, including the record descriptor word (RDW).
4	4	SMF89PRL	2	binary	Length of Record Product section.
6	6	SMF89PRN	2	binary	Number of Record Product sections (1).
8	8	SMF89SIO	4	binary	Offset to System ID section from start of record, including the record descriptor word (RDW).
12	0C	SMF89SIL	2	binary	Length of System ID section.
14	0E	SMF89SIN	2	binary	Number of System ID sections on record (1).
16	10	SMF89UDO	4	binary	Offset to first Usage or State Data section from start of record, including the record descriptor word (RDW).
20	14	SMF89UDL	2	binary	Length of each Usage Data section or State Data section.
22	16	SMF89UDN	2	binary	Number of Usage or State Data sections on record (minimum of 0).
24	18	SMF89UDR	4	binary	Number of State Data sections remaining (or 0 for Usage Data section).
28	1C	SMF89CNO	4	binary	Offset to first product intersection data section (from start of record including the RDW).
32	20	SMF89CNL	2	binary	Length of product intersection data section.
34	22	SMF89CNN	2	binary	Number of product intersection data sections (minimum of 0).
36	24	SMF89TRO	4	binary	Offset of first Tenant Resource Group Data Section (from start of record, including the RDW).
40	28	SMF89TRL	2	binary	Length of each Tenant Resource Group Data Section.
42	2A	SMF89TRN	2	binary	Number of Tenant Resource Group Data Sections (Min '0').
44	2C	SMF89TCO	4	binary	Offset of first Tenant Resource Group Intersection Data Section (from start of record, including the RDW).
48	30	SMF89TCL	2	binary	Length of each Tenant Resource Group Intersection Data Section.
50	32	SMF89TCN	2	binary	Number of Tenant Resource Group Intersection Data Sections (Min '0').

Record product section

This section provides information about the type 89 record, the system, and the recording interval.

Triplet information

This section is located in the record using the following triplet fields, which are located in the "self-defining" section:

Offset
SMF89PRO

Length
SMF89PRL

Number
SMF89PRN - This field is always "1" because each type 89 record that is generated has one record product section.

Offsets		Name	Length	Format	Description
0	0	SMF89PNM	8	EBCDIC	Record product name - "SMF".
8	8	SMF89RVN	4	binary	Record version number - "1".
12	0C	SMF89OSL	8	EBCDIC	MVS system level (For example, SP4.3.0).
20	14	SMF89IST	4	binary	Reporting interval START Time (local, hundredths of a second from midnight). This field and SMF89IET define the recording interval. This is different from the usage data interval that is used to collect data into hourly buckets.
24	18	SMF89ISD	4	packed	Reporting interval START Date in the form 0*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for a detailed description.
28	1C	SMF89IET	4	binary	Reporting interval END Time (local, hundredths of a second from midnight). This field and SMF89IST define the recording interval. This is different from the usage data interval that is used to collect data into hourly buckets.
32	20	SMF89IED	4	packed	Reporting interval END Date in the form 0*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for a detailed description.
36	24	SMF89PFL	1	binary	**Bit** **Meaning when set** **0** Reserved. **1** Indicates that LICENSE=zNALC was specified in IEASYSxx. (SMF89ZNA) **2 - 7** Reserved.
37	25		3	binary	Reserved
40	28	SMF89HOF	8	binary	Hypervisor date/time offset in STCK format. When present, this field contains the sysplex timer offset value.
48	30	SMF89DTO	8	binary	Local data/time offset, copied from CVTLDTO.
56	38	SMF89_CoreMode_CP	2	binary	The number of CPUs that are active on a CP core.
58	3A	SMF89_CoreMode_zAAP	2	binary	The number of CPUs that are active on a zAAP core.
60	3C	SMF89_CoreMode_zIIP	2	binary	The number of CPUs that are active on a zIIP core.

System ID section

This section provides information about the system (both hardware and software) at the time the usage data was collected.

Triplet information

This section is located on the record using the following triplet fields, which are located in the "self-defining" section:

Offset
SMF89SIO

Length
SMF89SIL

Number
SMF89SIN - This field is always 1 because each type 89 record that is generated has one system ID section.

Offsets		Name	Length	Format	Description
0	0	SMF89SYN	8	EBCDIC	MVS system name (SYSNAME from IEASYSxx).
8	8	SMF89UST	4	binary	Usage data interval START time (local, hundredths of a second from midnight). This is usually an hour value (such as 01:00:00.00) except in the case of the first record during an IPL (which reports the “IPL” time). This is different from the recording interval that is used to report on the generation of the usage records. This field and SMF89UET define the hour "bucket"that the usage data reflects. This field is only filled in for the SMF89 subtype 1 records.
12	0C	SMF89USD	4	packed	Usage data interval START Date in the form 0*cyydddF*. See “Standard and Extended SMF record headers” on page 162 for a detailed description. This field is only filled in for the SMF89 subtype 1 records.
16	10	SMF89UET	4	binary	Usage data interval END time (local, hundredths of a second from midnight). This is usually an hour value (such as 01:00:00.00). This field and SMF89UST define the hour "bucket" that the usage data reflects. This field is only filled in for the SMF89 subtype 1 records.
20	14	SMF89UED	4	packed	Usage data interval END date in the form 0*cyydddF*. See “Standard and Extended SMF record headers” on page 162 for a detailed description. This field is only filled in for the SMF89 subtype 1 records.
24	18	*	4	binary	Reserved.
28	1C	*	4	binary	Reserved.
32	20	SMF89CMN	2	packed	CPU model number.
34	22	SMF89CVN	1	binary	CPU version number.

Offsets		Name	Length	Format	Description
35	23	SMF89LPI	1	binary	LPAR indicators: **Bit** **Meaning when set** **0** The one digit LPAR ID contained in SMF89LP2 (bit 4) is valid (SMF89LPV). **1** The two digit LPAR ID contained in field SMF89LP3 is valid (SMF89LPM). **2 - 3** Reserved. **4-7** The one digit LPAR ID (X'0-F') (SMF89LP2). **Note:** 1. For a one digit LPAR ID (X'0-F'), both SMF89LPV (bit 0) and SMF89LPM (bit 1) is on and both SMF89LP2 (bits 4-7) and field SMF89LP3 contain the LPAR ID. 2. For the two digit LPAR ID (greater than X'F'), SMF89LPM (bit 1) is on, and SMF89LP3 contains the LPAR ID.
36	24	SMF89SER	3	packed	CPU serial number.
39	27	SMF89LP3	1	binary	LPAR ID.
40	28	SMF89RPP	4	binary	CPU relative processing power indicator.
44	2C	SMF89SPN	8	EBCDIC	Sysplex name (from the SYSPLEX parameter in the COUPLExx parmlib member).
52	34	SMF89CPT	6	EBCDIC	CPC type number (blanks if data is not available).
58	3A	SMF89CPM	3	EBCDIC	CPC model number (blanks if data is not available).
61	3D	SMF89CPS	12	EBCDIC	CPC sequence number (blanks if data is not available).
73	49	SMF89SIF	1	binary	**Bit** **Meaning when set** **0** Field SMF89LPN is valid. (SMF89LNV) **1** This is the last record for this usage interval. (SMF89LCR) **2 - 7** Reserved.
74	4A	*	2	binary	Reserved.
76	4C	SMF89MNF	16	EBCDIC	V1-CPC manufacturer.
92	5C	SMF89TID	4	EBCDIC	V1-CPC type.
96	60	SMF89MDL	16	EBCDIC	V1-CPC model.
112	70	SMF89SQC	16	EBCDIC	V1-CPC sequence code.
128	80	SMF89POM	4	EBCDIC	V1-CPC plant of manufacturer.
132	84	SMF89CPC	4	binary	CPU capability.
136	88	SMF89CCC	2	binary	Configured CPU count.
138	8A	SMF89SCC	2	binary	Standby CPU count.

Offsets		Name	Length	Format	Description
140	8C	SMF89MAF	30	binary	Array of multiprocessing CPU capability adjustment factors. This array contains information for only the first 15 general processors. Obtain additional processor information from RMF records, or issuing the STSI instruction.
170	AA	SMF89LPN	8	EBCDIC	LPAR name when SYSIB 2.2.2 is valid, when returned by the STSI instruction (such as when running under z/VM). Bit SMF89LPV is on when the field is valid. Avoid looking at this field unless SMF89LNV is on.
178	B2	SMF89_Capacity _Change_Cnt	2	binary	The number of processor capacity changes that occurred since the previous interval or event interval. This number is greater than 1 when the number of processor capacity changes exceeded the number specified in the MAXEVENTINTRECS parmlib option.
180	B4	SMF89 _RCTPCPUA _Actual	4	binary	Physical CPU adjustment factor (this is the adjustment factor for converting CPU time to equivalent service in basic-mode with all processors online). Based on model capacity rating.
184	B8	SMF89 _RCTPCPUA _Nominal	4	binary	Physical CPU adjustment factor (this is the adjustment factor for converting CPU time to equivalent service in basic-mode with all processors online). Based on nominal model capacity rating.
188	BC	SMF89 _RCTPCPUA _scaling_factor	4	binary	Scaling factor for SMF89_RCTPCPUA_Actual and SMF89_RCTPCPUA_Nominal.
192	C0	SMF89_Capacity _Adjustment _Ind	1	binary	When: **0** The indication is not reported. **1-99** Some amount of reduction is indicated. **100** The machine is operating in normal capacity. The Primary CPU and all secondary-type CPU are similarly affected.
193	C1	SMF89_Capacity _Change_Rsn	1	binary	Indicates the reason that is associated with the present value contained in SMF89_Capacity_Adjustment_Ind. The bit values of this field correspond to those described in RMCTZ_Capacity_Adjustment_Indication of the IRARMCTZ mapping macro. (See *z/OS MVS Data Areas*.)

Offsets		Name	Length	Format	Description
194	C2	SMF89_Capacity _Flags	1	binary	Processor capacity flags. **Bit** **Meaning when set** **0** SMF89_Event_Driven_Interval_Rec **Meaning:** When on, indicates that the current record was generated as a result of an event, rather than as a result of a standard interval expiration based on time. **1** SMF89_Capacity_Data_err **Meaning:** When on, indicates that an error occurred while collecting the processor capacity data, therefore the following fields are unreliable: SMF89_RCTPCPUA_Actual SMF89_RCTPCPUA_Nominal SMF89_RCTPCPUA_scaling_factor SMF89_Capacity_Adjustment_Ind SMF89_Capacity_Change_Rsn **2** SMF89_PCD_Rsvd_Exists **Meaning:** When on, indicates records generated on systems running z/OS V1R7 through z/OS V1R9. When off, indicates records generated on systems running z/OS V1R10 and later.
195	C3	*	1	binary	Reserved.
196	C4	SMF89ZNF	4	binary	zAAP normalization factor for zAAP service time.
200	C8	SMF89SNF	4	binary	zIIP Normalization factor for zIIP service time.
204	CC	SMF89SEQ	2	binary	Record sequence number when multiple records are written for the same interval.
206	CE	SMF89SolutionID	64	EBCDIC	The Tailored Fit Pricing solution ID from the SOLUT system parameter; otherwise, binary zeros if the SOLUT parameter was not specified.

Subtype 1 — Usage data section

This section contains the product information (specified on the IFAUSAGE REGISTER request) and the usage data that has been collected for the interval specified by the start and end times (SMF89UST and SMF89UET) for that product.

There is one usage data section for each unique product identification (specified by owner, name, version, qualifier) that is actively registered for any part of that specified interval. The data reported is accumulated for ALL address spaces that had any interaction with the product.

Triplet information

This section is located on the record using the following triplet fields, which are located in the "self-defining" section:

Offset
SMF89UDO

Length
SMF89UDL

Number
SMF89UDN

Offsets		Name	Length	Format	Description
0	0	SMF89UPO	16	EBCDIC	Product owner or vendor name (specified on the PRODOWNER option of the IFAUSAGE macro).
16	10	SMF89UPN	16	EBCDIC	Product name (specified on the PRODNAME option of the IFAUSAGE macro).
32	20	SMF89UPV	8	EBCDIC	Product version (specified on the PRODVERS option of the IFAUSAGE macro).
40	28	SMF89UPQ	8	EBCDIC	Product qualifier (specified on the PRODQUAL option of the IFAUSAGE macro).
48	30	SMF89UPI	8	EBCDIC	Product ID number (specified on the PRODID option of the IFAUSAGE macro).
56	38	SMF89UCT	8	long floating point	Product TCB time (in hundredths of a second).
64	40	SMF89USR	8	long floating point	Product SRB time (in hundredths of a second).
72	48	SMF89UFG	1	binary	Usage entry flags **Bit** **Meaning when set** **0** Unauthorized register **1** Ineligible for measured usage **2** Unauthorized register with SAF-authorized UNAUTHSERV=LEVEL1 requested **3 - 7** Unused
73	49	SMF89UF2	1	binary	**Bit** **Meaning when set** **0** This product has product intersection time sections (SMF89HCS). **1** All ADDRSP registrations of this product are the first registration in the respective address space (SMF89AFS). **2** An ADDRSP registration of this product registered or deregister while active TASK level registrations were present in one or more address spaces (SMF89TSH). **3** All ADDRSP level registrations were at a service level that support product intersection time (SMF89PLV). **4** This intersection has Tenant Resource Group Sections. Check SMF89TCO for the offset to the first TRG Intersection section. Then check each of those in the section for an exact match of the product information to find the corresponding section (SMF89HTR) **5-7** Reserved.

Offsets		Name	Length	Format	Description
74	4A	SMF89_BoostInfo	1	binary	Boost information **Bit** **Meaning when set** **0** zIIP boost was active at some point within the interval. **1** Speed boost was active at some point within the interval. **5-7** Boost class: 001: IPL 010: Shutdown 011: Recovery process **Note:** The boost class value is valid only when one or more boosts is active; that is, a boost active bit is also on.
75	4B	SMF89URT	1	binary	Data format of value in SMF89URD (specified on the FORMAT option of the IFAUSAGE macro FUNCTIONDATA request). **Bit** **Meaning when set** **0** No data specified **1** CPU time, in long floating point (in hundredths of a second) **2** Binary (64-bit) **3** Long floating point **4 - 7** Reserved
76	4C	SMF89URD	8	various	Product specific resource data (specified by the data option of the IFAUSAGE macro FUNCTIONDATA request). SMF89URT identifies the format of the data in this field.
84	54	SMF89UZT	8	long floating point	Product offload engine time (hundredth of a second).
92	5C	SMF89CountAsTrad	4	binary	Count of active address spaces in traditional (non-TRG) sub-capacity workload environment.
96	60	SMF89CountAsTrg	4	binary	Count of active address spaces in TRG workload environment.

Subtype 1 — Product intersection data section

This section contains information about intersections that occur between products registered with the IFAUSAGE service. Intersections are generated when a product registered at the ADDRSP level invokes a program that registers at the TASK level for a task in the current address space. The ADDRSP scope product is known as the containing product and the TASK scope product is known a the intersecting product.

There is one product intersection data section for each intersection detected. The data reported is accumulated for ALL address spaces that had any intersection between two products.

Triplet information

This section is located on the record using the following triplet fields, which are located in the "self-defining" section:

Offset
SMF89CNO

Length
SMF89CNL

Number
SMF89UDN

Offsets		Name	Length	Format	Description
0	0	SMF89CPO	16	EBCDIC	Product owner or vendor name (obtained PRODOWNER option of IFAUSAGE macro) of the containing product.
16	10	SMF89CPN	16	EBCDIC	Product Name (obtained PRODNAME option of IFAUSAGE macro) of the containing product.
32	20	SMF89CPV	8	EBCDIC	Product Version (obtained PRODVERS option of IFAUSAGE macro) of the containing product.
40	28	SMF89CPQ	8	EBCDIC	Product Qualifier (obtained PRODQUAL option of IFAUSAGE macro) of the containing product.
48	30	SMF89CPI	8	EBCDIC	Product ID (obtained PRODID option of IFAUSAGE macro) of the containing product.
56	38	SMF89IPO	16	EBCDIC	Product Owner or Vendor Name (obtained PRODOWNER option of IFAUSAGE macro) of the intersecting product.
72	48	SMF89IPN	16	EBCDIC	Product Name (obtained PRODNAME option of IFAUSAGE macro) of the intersecting product.
88	58	SMF89IPV	8	EBCDIC	Product Version (obtained PRODVERS option of IFAUSAGE macro) of the intersecting product.
96	60	SMF89IPQ	8	EBCDIC	Product Qualifier (obtained PRODQUAL option of IFAUSAGE macro) of the intersecting product.
104	68	SMF89IPI	8	EBCDIC	Product ID (obtained PRODID option of IFAUSAGE macro) of the intersecting product.
112	70	SMF89CFG	1	binary	**Bit** / **Meaning when set** **0** The container product was registered unauthorized (SMF89CUC). **1** The intersecting product was registered unauthorized (SMF89CUP). **2** Some time for the intersection was a result of a SCOPE(FUNCTION) registered product (SMF89CFC). **3** Some time for the intersection was a result of a SCOPE(ALL) registered product (SMF89CTC). **4** Intersection time might be complete for this product. **Note:** Not all products use (SMF89CGO). **5** This intersection has Tenant Resource Group Sections. Check SMF89TCO for the offset to the first TRG Intersection section. Then check each of those in the section for an exact match of the product information to find the corresponding section (SMF89CHTR). **6-7** Reserved.
113	71		7		Reserved
120	78	SMF89CCT	8	long floating point	Product Intersect TCB Time (in hundredths of a second)
128	80	SMF89CZT	8	long floating point	Product Intersect Offload Engine Time (in hundredths of a second)

Subtype 1 — Tenant resource group section

This section contains the product information (specified on the IFAUSAGE REGISTER request), tenant resource group name, and the usage data that has been collected for the interval specified by the start and end times (SMF89UST and SMF89UET) for that product.

There is one Tenant resource group Data Section for each unique product identification (specified by owner, name, version, qualifier) that is actively registered for any part of that specified interval. The data reported is accumulated for ALL address spaces that had any interaction with the product.

Triplet information

This section is located on the record using the following triplet fields, which are located in the "self-defining" section:

Offset
SMF89TRO

Length
SMF89TRL

Number
SMF89TRN

Offsets		Name	Length	Format	Description
0	0	SMF89TPO	16	EBCDIC	Product owner or vendor name (specified on the PRODOWNER option of the IFAUSAGE macro).
16	10	SMF89TPN	16	EBCDIC	Product name (specified on the PRODNAME option of the IFAUSAGE macro).
32	20	SMF89TPV	8	EBCDIC	Product version (specified on the PRODVERS option of the IFAUSAGE macro).
40	28	SMF89TPQ	8	EBCDIC	Product qualifier (specified on the PRODQUAL option of the IFAUSAGE macro).
48	30	SMF89TPI	8	EBCDIC	Product ID number (specified on the PRODID option of the IFAUSAGE macro).
56	38	SMF89TRG_Name	8	EBCDIC	Tenant resource group.
64	40	SMF89TCT	8	long floating point	Tenant resource group TCB time (hundredths of a second - floating point)
72	48	SMF89TSR	8	long floating point	TRG SRB Time (in hundredths of a second - floating point)
80	50	SMF89TZT	8	long floating point	TRG offload engine time (hundredth of a second).
88	58	SMF89TRGData	8	binary	Product-specific resource data (specified by the DATA option of the FUNCTIONDATA request of the IFAUSAGE macro).
96	60	SMF89TRGDataType	1	binary	Data format of value in SMF89TRGData (specified by the FORMAT option of the FUNCTIONDATA request of the IFAUSAGE macro). **Value** **Meaning when set** **0** No data specified **1** CPU time, in long floating point (in hundredths of a second) **2** Binary (64-bit) **3** Long floating point **4 - 7** Reserved

Subtype 1 — Intersection data for tenant resource groups

This section contains information about intersections that occur between products registered with the IFAUSAGE service while running in a tenant resource group. Intersections are generated when a product registered at the ADDRSP level invokes a program that registers at the TASK level for a task in the current address space. The ADDRSP scope product is known as the containing product and the TASK scope product is known a the intersecting product.

There is one product intersection data section for each intersection detected. The data reported is accumulated for ALL address spaces that had any intersection between two products.

Triplet information

This section is located on the record using the following triplet fields, which are located in the "self-defining" section:

Offset
SMF89TCO

Length
SMF89TCL

Number
SMF89TCN

Offsets		Name	Length	Format	Description
0	0	SMF89TCPO	16	EBCDIC	Product owner or vendor name (specified on the PRODOWNER option of the IFAUSAGE macro).
16	10	SMF89TCPN	16	EBCDIC	Product name (specified on the PRODNAME option of the IFAUSAGE macro).
32	20	SMF89TCPV	8	EBCDIC	Product version (specified on the PRODVERS option of the IFAUSAGE macro).
40	28	SMF89TCPQ	8	EBCDIC	Product qualifier (specified on the PRODQUAL option of the IFAUSAGE macro).
48	30	SMF89TCPI	8	EBCDIC	Product ID number (specified on the PRODID option of the IFAUSAGE macro).
56	38	SMF89TIPO	16	EBCDIC	Intersecting Product Owner or Vendor Name (obtained PRODOWNER option of IFAUSAGE macro).
72	48	SMF89TIPN	16	EBCDIC	Intersecting Product Name (obtained PRODNAME option of IFAUSAGE macro).
88	58	SMF89TIPV	8	EBCDIC	Intersecting Product Version (obtained PRODVERS option of IFAUSAGE macro).
96	60	SMF89TIPQ	8	EBCDIC	Intersecting Product Qualifier (obtained PRODQUAL option of IFAUSAGE macro).
104	68	SMF89TIPI	8	EBCDIC	Intersecting Product ID (obtained PRODID option of IFAUSAGE macro).
112	70	SMF89T_TRG_Name	8	EBCDIC	Tenant resource group.
120	78	SMF89TCFG	1	binary	Usage Entry Flags **Bit** **Meaning when set** **0** UNAUTHORIZED REGISTER Requested on container product (SMF89TCUC). **1** UNAUTHORIZED REGISTER Requested on intersecting product (SMF89TCUP).
121	79		7		Reserved.

Offsets		Name	Length	Format	Description
128	80	SMF89TCCT	8	long floating point	Product Intersect TCB time (hundredths of a second - floating point).
136	88	SMF89TCZT	8	long floating point	Product Intersection Offload Engine Time (hundredths of a second - floating point).

Subtype 2 — State data section

This section contains the product information (specified on the MVS register service or in the IFAPRDxx parmlib member) and the state data that has been collected for the interval at the time when the record was collected for that product.

There is one state data section for each unique product identification registered (specified by owner, name, feature, version, release, and modification level) for any part of the interval.

Triplet information

This section is located on the record using the following triplet fields, which are located in the "self-defining" section:

Offset
SMF89UDO

Length
SMF89UDL

Number
SMF89UDN

Offsets		Name	Length	Format	Description
0	0	SMF89T2ProdOwner	16	EBCDIC	Product owner or vendor name (from the prodowner parameter on the Register service or the OWNER field on the PROD statement in IFAPRDxx).
16	10	SMF89T2ProdName	16	EBCDIC	Product name (from the prodname parameter on the Register service or the NAME field on the PROD statement in IFAPRDxx).
32	20	SMF89T2FeatureName	16	EBCDIC	Feature name (from the featurename parameter on the Register service or the FEATURENAME field on the PROD statement in IFAPRDxx).
48	30	SMF89T2ProdVers	2	EBCDIC	Product version (from the prodvers parameter on the Register service or the VERSION field on the PROD statement in IFAPRDxx).
50	32	SMF89T2ProdRel	2	EBCDIC	Product release (from the prodrel parameter on the Register service or the RELEASE field on the PROD statement in IFAPRDxx).
52	34	SMF89T2ProdMod	2	EBCDIC	Product modification level (from the prodmod parameter on the Register service or the MOD field on the PROD statement in IFAPRDxx).

Offsets		Name	Length	Format	Description
54	36	SMF89T2ProdID	8	EBCDIC	Product identifier (from the prodID parameter on the Register service or the ID field on the PROD statement in IFAPRDxx).
62	3E	SMF89T2Flags	1	binary	State entry flags **Bit** **Meaning when set** **0** Entry is not defined in IFAPRDxx **1** Entry is enabled in IFAPRDxx **2-3** Reserved **4** Register entry **5** State entry **6** "No Report"entry — registered with Ifaedreg_Type_NoReport **7** Registered with Ifaedreg_Type_LicensedUnderProd
63	3F	SMF89T2_BoostInfo	1	binary	Boost information **Bit** **Meaning when set** **0** zIIP boost was active at some point within the interval. **1** Speed boost was active at some point within the interval. **5 - 7** Boost class: `001`: IPL `010`: Shutdown `011`: Recovery process **Note:** The boost class value is valid only when one or more boosts is active; that is, a boost active bit is also on.
64	40	SMF89T2NumInstances	4	binary	Number of instances of registration for this product.

Offsets		Name	Length	Format	Description
68	44	SMF89T2NumCurrentInstances	4	binary	Current number of instances of registrations of this product. This field cannot be assumed to be present. Check SMF89UDL to see if this field is present.
72	48	SMF89T2NumInstancesinTrgs	4	binary	Number of instances of registrations of this product that are currently associated with TRGs. Check the SMF89T2TRG section for details. This field cannot be assumed to be present. Check SMF89UDL to see if this field is present.
76	4C	SMF89T2NumNewRegistrations	4	binary	Number of instances of registrations of this product since the last SMF89 Record. This field cannot be assumed to be present. Check SMF89UDL to see if this field is present.
80	50	SMF89T2NumNewTrgRegistrations	4	binary	Number of instances of registrations of this product since the last SMF89 Record that were a part of TRGs. This field cannot be assumed to be present. Check SMF89UDL to see if this field is present.

Subtype 2 — State tenant resource group data section

This section contains the product information (specified on the MVS register service or in the IFAPRDxx parmlib member), the tenant resource group name, and instance data that has been collected for the interval at the time when the record was collected for that product.

There is one state data section for each unique product identification registered (specified by owner, name, feature, version, release, and modification level) for any part of the interval.

Triplet information

This section is located on the record using the following triplet fields, which are located in the "self-defining" section:

Offset
SMF89TRO

Length
SMF89TRL

Number
SMF89TRN

Offsets		Name	Length	Format	Description
0	0	SMF89T2TRGProdOwner	16	EBCDIC	Product Owner or Vendor Name (from prodowner parameter of IFAEDREG or OWNER option of PRODUCT statement of IFAPRDxx)
16	10	SMF89T2TRGProdName	16	EBCDIC	Product name (from prodname parameter of IFAEDREG or NAME option of PRODUCT statement of IFAPRDxx)
32	20	SMF89T2TRGFeatureName	16	EBCDIC	Feature name (from featurename parameter of IFAEDREG or FEATURENAME option of PRODUCT statement of IFAPRDxx)
48	30	SMF89T2TRGProdVers	2	EBCDIC	Product version (from prodvers parameter of IFAEDREG or VERSION option of PRODUCT statement of IFAPRDxx)
50	32	SMF89T2TRGProdRel	2	EBCDIC	Product release (from prodrel parameter of IFAEDREG or RELEASE option of PRODUCT statement of IFAPRDxx)

Offsets		Name	Length	Format	Description
52	34	SMF89T2TRGProdMod	2	EBCDIC	Product modification level(from prodmod parameter of IFAEDREG or MOD option of PRODUCT statement of IFAPRDxx)
54	36	SMF89T2TRGProdID	8	EBCDIC	Product ID (from prodowner parameter of IFAEDREG or OWNER option of PRODUCT statement of IFAPRDxx)
62	3E		2		Reserved
64	40	SMF89T2TrgName	8	EBCDIC	Tenant Resource Group Name
72	48	SMF89T2TrgNumInstances	4	binary	Current number of registration of this product currently in this TRG

Record type 90 (X'5A') — System status

Record type 90 is written during initialization processing and whenever certain operator commands are issued. This variable length record is created for operator tracking and reporting of reliability data. It allows the installation to establish availability statistics.

Note: The type 90 record does not contain a standard SMF record header with subtypes. The subtype value for the type 90 record resides in the SMF90TID field of the product section. The SMF dump utilities, IFASMFDL and IFASMFDP, do not support subtype selection via the TYPE option of the OUTDD parameter for type 90 records.

The following events cause the recording of this record during IPL. (See the Product Section for the individual subtype indicator.)

- HALT EOD command
- IPL
- RESET command
- SET DAE command
- SET DATE command
- SET IEFOPZ command
- SET MPF command
- SET OPT command
- SET PFK command
- SET PROG command
- SETSMF command
- SET SMF command
- SET SMFLIM command
- SET TIME command
- SWITCH SMF command
- VARY WLM command

Subtype 2 is written only if the CLOCK parameter is not specified on the SET DATE command. Any SET DATE command that uses the CLOCK parameter produces a subtype 1 record.

Subtype 8 is written only when the operator responds to message IEE956A, the system prompt for information about the IPL.

Subtype 23 is written each time the workload management service definition is installed on the WLM couple data set. A service definition is installed on the WLM couple data set by a function in the WLM ISPF application.

Subtype 24 is written each time a workload management service policy is activated. A service policy can be activated either by the VARY WLM command, or by a function in the WLM ISPF application.

Subtype 29 is written each time a LNKLST set is activated for the LNKLST concatenation, except during LNKLST set activation at IPL through the ACTIVATE statement in PROGxx - SMF is not active this early in

IPL. Subtype 29 is written when the SET PROG and SETPROG LNKLST commands are issued after IPL to activate a new LNKLST set.

Subtype 30 is written each time a RESET operator command completes successfully. The record identifies the job that was reset, the operator who initiated the command, and the change that was requested.For an enclave, the record identifies the name of the owner address space, the user and application that initiated the request, and the change that was requested.

Subtype 31 is written each time that a module has been added to or deleted from LPA after IPL through the SETPROG LPA command, the LPA statement of the PROGxx parmlib member through the SET PROG=xx command, or the CSVDYLPA macro.

Subtype 32 is written each time there is a successful policy change.

Subtype 40 is written when boosts start and end.

For descriptions of all the record type 90 subtypes, see the description of the SMF90TID field in "Product section" on page 846.

For information about operator system commands, see *z/OS MVS System Commands*. For information about SYS1.PARMLIB, see *z/OS MVS Initialization and Tuning Reference*.

Record environment

The following conditions exist for the generation of each of the subtypes of this record:

Subtype
  Macro

5, 6, 8, 9, 13, 15
  SMFEWTM(1), BRANCH=YES (record exit: IEFU84)

7
  SMFWTM(1) (record exit: IEFU83)

Storage Residency
  31-bit

Record mapping

Header/self-defining section

This section contains the common SMF record headers fields and the triplet fields (offset/length/number) that locate the other sections on the record.

Offsets		Name	Length	Format	Description
0	0	SMF90LEN	2	binary	Record length. This field and the next field (total of four bytes) form the RDW (record descriptor word). See "Standard and Extended SMF record headers" on page 162 for details.
2	2	SMF90SEG	2	binary	Segment descriptor (see record length field).

Offsets		Name	Length	Format	Description
4	4	SMF90FLG	1	binary	System indicator: **Bit** **Meaning when set** **0-2** Reserved. **3-6** Version indicators (See "Standard and Extended SMF record headers" on page 162 for a detailed description.) **7** Reserved.
5	5	SMF90RTY	1	binary	Record type 90 (X'5A').
6	6	SMF90TME	4	binary	Time since midnight, in hundredths of a second, that the record was moved into the SMF buffer.
10	A	SMF90DTE	4	packed	Date when the record was moved into the SMF buffer, in the form 0*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for a detailed description.
14	E	SMF90SID	4	EBCDIC	System identification (from the SID parameter).
18	12		2		Reserved.
20	14	SMF90POF	4	binary	Offset to product section from start of record, including the record descriptor word (RDW).
24	18	SMF90PLN	2	binary	Length of the product section.
26	1A	SMF90PON	2	binary	Number of product sections.
28	1C	SMF90DOF	4	binary	Offset to subtype data section from start of record, including the record descriptor word (RDW).
32	20	SMF90DLN	2	binary	Length of subtype data section.
34	22	SMF90DON	2	binary	Number of subtype data sections.

Product section

Offsets		Name	Length	Format	Description
0	0	SMF90TID	2	binary	Sub-type identifier. **1** SET TIME **2** SET DATE **4** Reserved. **5** SET SMF **6** SWITCH SMF **7** HALT EOD **8** IPL PROMPT **9** IPL SMF **10** IPL SRM **11** SET OPT **12** Reserved. **13** SETSMF **14** SET MPF **15** SET SMF (to restart SMF) **16** SET DAE **17** SET PFK **18** SET GRSRNL **19** SET APPC **20** SET ASCH **21** SET SCH **22** SET CNGRP **23** IPL WLM **24** VARY WLM **25** MODIFY WLM

Offsets	Name	Length	Format	Description
				26 IPL LOGREC **27** SETXCF START (to enable automatic restart management) **28** SETXCF STOP (to disable automatic restart management) **29** SET PROG (for LNKLST set activation) **30** RESET **31** SET PROG (for LPALST activation) **32** WLM policy change **33** SET AUTOR **34** Processor capacity change **35** SETLOAD *xx*,IEASYM **36** SET CON **37** Dynamic APF **38** SET IEFOPZ **39** SET SMFLIM **40** Boost information
2	SMF90RVN	2	EBCDIC	Record version number.
4	SMF90PNM	8	EBCDIC	Product name — SMF, SRM, SUP, etc.

Subtypes 1 or 2 — SET TIME and SET DATE

SET TIME section and SET DATE section

Offsets		Name	Length	Format	Description
0	0	SMF90OTM	4	binary	Time before the SET command was issued, in the form hhmmssth, where hh is hours, mm is minutes, ss is seconds, and th is hundredths of a second.
4	4	SMF90ODT	4	packed	Date before the SET command was issued, in the form 0cyydddF.
8	8	SMF90NTM	4	binary	Time after the SET command was issued, in the form hhmmssth, where hh is hours, mm is minutes, ss is seconds, and th is hundredths of a second.
12	C	SMF90NDT	4	packed	Date after the SET command was issued, in the form 0cyydddF.

Subtypes 5, 9, 13, and 15 only — IPL SMF, SET SMF, and SETSMF

Self-Defining section

Offsets		Name	Length	Format	Description
0	0	SMF90OSM	4	binary	Offset to IPL SMF or SET SMF section from start of record, including the record descriptor word (RDW).
4	4	SMF90LSM	2	binary	Length of IPL SMF or SET SMF section.
6	6	SMF90NSM	2	binary	Number of IPL SMF or SET SMF sections.
8	8	SMF90ODA	4	binary	Offset to data set section from the start of record, including the record descriptor word (RDW).
12	C	SMF90LDA	2	binary	Length of the data set section.
14	E	SMF90NDA	2	binary	Number of data set sections. For subtype 9 records, this field will be zero at IPL time, and will be filled in once the MANx data sets are established and known to SMF.
16	10	SMF90OWK	4	binary	Offset to subsystem section from the start of the record, including the record descriptor word (RDW).
20	14	SMF90LWK	2	binary	Length of subsystem section.
22	16	SMF90NWK	2	binary	Number of subsystem sections.
24	18	SMF90OOT	4	binary	Offset to subsystem parameter segment.
28	1C	SMF90LOT	2	binary	Length of subsystem parameter segment.
30	1E	SMF90NOT	2	binary	Number of subsystem parameter segments.

IPL SMF/SET SMF/SETSMF section

Offsets		Name	Length	Format	Description
0	0	SMF90MAX	4	EBCDIC	Current value for MAXDORM, in the form *mmss*.
4	4	SMF90STA	6	EBCDIC	Current value for STATUS, in the form *hhmmss*.
10	A	SMF90JWT	4	EBCDIC	Current value for JWT, in the form *hhmm*.
14	E	SMF90SYI	4	EBCDIC	System identification.
18	12	SMF90BUF	1		Reserved. (previously the minimum number of buffers)
19	13	SMF90BUM	1		Reserved. (previously the minimum number of buffers)

Offsets		Name	Length	Format	Description
20	14	SMF90SWT	1	binary	SMF Options **Bit** **Meaning when set** **0** PROMPT(ALL) **1** PROMPT(LIST) **2** PROMPT(IPLR) **3** NOPROMPT **4** REC(PERM) **5** REC(ALL) **6** LISTDSN **7** NOLISTDSN.
21	15	SMF90SW2	1	binary	SMF Options **Bit** **Meaning when set** **0** NOBUFFS(MSG) **1** NOBUFFS(HALT) **2** LASTDS(MSG) **3** LASTDS(HALT) **4** AUTHSETSMF **5** NOAUTHSETSMF **6** SMF30COUNT **7** NOSMF30COUNT

Offsets		Name	Length	Format	Description
22	16	SMF90SBU	1	binary	SMF Options **Bit** **Meaning when set** **0** {Default} **1** SID(xxxx) **2** SID(xxxx,ser#[,ser#]...) **3** SID(xxxx,SYSNAME(sysname)) **4** Reserved. **5** SID(xxxx,COMBIN(ser#[,ser#]...)) **6-7** Reserved.
23	17	SMF90RV7	1		Reserved.
24	18	SMF90REL	4	EBCDIC	Operating system release number.
28	1C	SMF90IIT	4	binary	Time since midnight, in hundredths of seconds, of IPL.
32	20	SMF90IDT	4	packed	Date of IPL, in the form 0*cyydddF*. See “Standard and Extended SMF record headers” on page 162 for details.
36	24	SMF90BFM	5	EBCDIC	BUFSIZMAX value (*ddddu*).
41	29	SMF90BFL	2	EBCDIC	BUFUSEWARN value (*dd*).
43	2B	SMF90ESWT	4	EBCDIC	SWT as entered in SMFPRMxx.
47	2F	SMF90ETWT	4	EBCDIC	TWT as entered in SMFPRMxx.

SMF data set section

There is a data set section for every SMF recording data set. The first data set is the active data set at IPL or SET SMF time.

For subtype 9 records, this section will not be generated at IPL time. It is created once the MANx data sets are established and known to SMF.

Offsets		Name	Length	Format	Description
0	0	SMF90DSE	44	structure	SMF data set section
0	0	SMF90DSN	44	EBCDIC	SMF data set name.

Subsystem record section

There are entries defining sub-options specified for the SYS and each SUBSYS option specified in SMFPRMxx.

Offsets		Name	Length	Format	Description
0	0	SMF90WKN	4	EBCDIC	Name of subsystem.

Offsets		Name	Length	Format	Description
4	4	SMF90DTL	1	binary	DETAIL recording indicator **Bit** **Meaning when set** **0** Detail recording on **1-7** Reserved.
5	5	SMF90RS9	3		Reserved.
8	8	SMF90SVL	8	binary	Length of interval, in TOD clock format, between checkpoint SMF records.
16	10	SMF90SYS	32	binary	Bit representation of SMF record types. If the bit is on (1), the record is enabled for recording. If the bit is off (0), the record is not enabled for recording. Bit 0 corresponds to record type 0. Bit 255 corresponds to record type 255.
48	30	SMF90EXN	120	EBCDIC	Names of the active exits for this subsystem. Each sequentially listed exit name is 8-characters long. Up to 15 exits can be specified. If less than 15 exits are specified, the remaining portion of the list is filled with binary zeros.
168	A8	SMF90SYE	256	binary	Record selectivity bits for extended record types. The first 256 bits are also recorded in SMF90SYS.

Subsystem parameter section

There is an entry for each subsystem for which a subsystem parameter has been specified.

Offsets		Name	Length	Format	Description
0	0	SMF90ASN	4	EBCDIC	Subsystem name.
4	4	SMF90APM	60	EBCDIC	Accounting parameter.

Subtypes 6 or 7 — SWITCH SMF and HALT EOD

Switch SMF/Halt EOD section

Offsets		Name	Length	Format	Description
0	0	SMF90T6	116	structure	Switch SMF/Halt EOD section.
0	0	SMF90SWO	10	EBCDIC	Subtype 6: This field is the old recording data set name. This field will be blank if data is lost through a SWITCH SMF. Subtype 7: This field is blank. **Note:** If the data set name is greater than 10 characters, this field is blank. See SMF90SOD for the complete data set name.
10	A	SMF90SWN	10	EBCDIC	Subtype 6: This field is the new recording data set name. Subtype 7: This field is blank. **Note:** If the data set name is greater than 10 characters, this field is blank. See SMF90SND for the complete data set name.
20	14	SMF90IT	4	binary	Time since midnight, in hundredths of seconds, of IPL.

Offsets		Name	Length	Format	Description
24	18	SMF90ID	4	packed	Date of the IPL, in the form 0*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for a detailed description.
28	1C	SMF90SOD	44	EBCDIC	Subtype 6: This field is the old recording data set name. This field will be blank if data is lost through a SWITCH SMF. Subtype 7: This field is blank.
72	48	SMF90SND	44	EBCDIC	Subtype 6: This field is the new recording data set name. Subtype 7: This field is blank.

Subtype 8 only — System IPL prompt

System IPL prompt data section

Offsets		Name	Length	Format	Description
0	0	SMF90DTM	8	EBCDIC	System down time, in the form *hh-mm-ss* or 'u'.
8	8	SMF90RSN	65	EBCDIC	Reason for the IPL or 'u'.
73	49	SMF90OPR	20	EBCDIC	Operators name or 'u'.
93	5D	SMF90ITM	4	binary	Time since midnight, in hundredths of seconds, of IPL.
97	61	SMF90DTT	4	packed	Date of the IPL, in the form 0*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for details.

Subtype 10 — IPL SRM

The fields in the second table appear only if SMF90DLN > 32.

IPL SRM command section

Offsets		Name	Length	Format	Description
0	0	SMF90IPT	8	binary	Time of IPL.
8	8	SMF90IPS	8	EBCDIC	Reserved.
16	10	SMF90OPT	8	EBCDIC	OPT parmlib member used. IEAOPT-- indicates no OPT.
24	18	SMF90ICS	8	EBCDIC	Reserved.
32	20	SMF90SPN	8	EBCDIC	Active service policy name.
40	28	SMF90SPT	8	binary	Time/date (STCK format) that the active service policy was originally activated.
48	30	SMF90SPU	8	EBCDIC	User ID of the operator or service administrator that activated the service policy.
56	38	SMF90SPS	8	EBCDIC	Name of the system on which the service policy activation was initiated.
64	40	SMF90SDN	8	EBCDIC	Name of the installed service definition at the time the policy was activated.
72	48	SMF90SDT	8	EBCDIC	Time/date (STCK format) that the service definition was installed

Offsets		Name	Length	Format	Description
80	50	SMF90SDU	8	EBCDIC	User ID of service administrator that installed the service definition.
88	58	SMF90SDS	8	EBCDIC	Name of the system on which the service definition was installed.

Subtype 11 — SET OPT

SET OPT command section

Offsets		Name	Length	Format	Description
0	0	SMF90TOP	8	binary	Time (in STCK format) of OPT change. STCK format is indicated on the TIME macro.
8	8	SMF90OPO	8	EBCDIC	Old OPT parmlib member. IEAOPT*xx* indicates no OPT.
16	10	SMF90OPN	8	EBCDIC	New OPT parmlib member.

Subtype 14 — SET MPF

SET MPF command section

Offsets		Name	Length	Format	Description
0	0	SMF90TMP	8	binary	Time and date of change.
8	8	SMF90MPO	8	EBCDIC	Reserved (was name of old parmlib member).
16	10	SMF90MPN	8	EBCDIC	Reserved (was name of new parmlib member, for color).
24	18	SMF90MPC	8	EBCDIC	Reserved (was name of old parmlib member, for color).
32	20	SMF90MCN	8	EBCDIC	Reserved (was name of new parmlib member, for command).
40	28	SMF90MCO	8	EBCDIC	Reserved (was name of old parmlib member, for command).
48	30	SMF90CMP	4	binary	Count of MPF entries.
52	34	SMF9014D	78	EBCDIC	Array of 2-byte suffixes of specified parmlib members (39 maximum).

Subtype 16 — SET DAE

SET DAE command section

Offsets		Name	Length	Format	Description
0	0	SMF90DAT	8	binary	Time of date and change.
8	8	SMF90DAO	8	EBCDIC	Name of the old parmlib member.
16	10	SMF90DAN	8	EBCDIC	Name of the new parmlib member.

Subtype 17 — SET PFK

SET PFK command data section

Offsets		Name	Length	Format	Description
0	0	SMF90TPF	8	binary	Time of SET PFK change.
8	8	SMF90PFO	8	EBCDIC	Old PFK parmlib member (written to object).
16	10	SMF90PFN	8	EBCDIC	New PFK parmlib member.

Subtype 18 — SET GRSRNL

SET GRSRNL command data section

Offsets		Name	Length	Format	Description
0	0	SMF90SGT	8	binary	Time that the command was entered.
8	8	SMF90SGS	8	EBCDIC	System that issued the command.
16	10	SMF90SGC	4	binary	Count of suffixes of specified parmlib members. This field contains zeroes if the command was not issued on this system.
20	14	SMF90SGN	78	EBCDIC	Array of two-byte suffixes of specified parmlib members. When SMF90SGC is zero, this array is not valid (and contains zeroes).

Subtype 19 — SET APPC

SET APPC command data section

Offsets		Name	Length	Format	Description
0	0	SMF90APT	8	binary	Time and date that the SET APPC command was issued.
8	8	SMF90APC	4	binary	Number of entries that follow.
12	C	SMF90APN	8	EBCDIC	Name of the new parmlib member used to update the APPC/MVS (Advanced Program-to-Program Communication/MVS) configuration. This subtype is repeated.

Subtype 20 — SET ASCH

SET ASCH command data section

Offsets		Name	Length	Format	Description
0	0	SMF90SCT	8	binary	Time and date of the SET ASCH change.
8	8	SMF90SCC	4	binary	Number of entries that follow.
12	C	SMF90SCN	8	EBCDIC	Name of the new parmlib member used to update the APPC/MVS scheduler configuration. This subtype is repeated for each member specified on the command.

Subtype 21 — SET SCH

SET SCH command data section

Offsets		Name	Length	Format	Description
0	0	SMF90SHT	8	binary	Time and date of SET SCH change.
8	8	SMF90SHC	4	binary	Number of entries that follow.
12	C	SMF90SHN	8	EBCDIC	Name of the new parmlib member used to update the APPC/MVS scheduler configuration. This subtype is repeated for each member specified on the command.

Subtype 22 — SET CNGRP

SET CNGRP command section

Offsets		Name	Length	Format	Description
0	0	SMF90CGT	8	binary	Time and date of SET CNGRP change.
8	8	SMF90CGC	4	binary	Number of entries that follow.
12	C	SMF90CGN	8	EBCDIC	Name of specified CNGRP parmlib member. This field is repeated for each member specified on the command.

Subtype 23 — Install WLM service definition

Install workload management service definition

Offsets		Name	Length	Format	Description
0	0	SMF90IDN	8	EBCDIC	Service definition name
8	8	SMF90TDI	8	EBCDIC	Time and date (STCK) of installation
16	10	SMF90IDU	8	EBCDIC	User ID of service level administrator that installed this service definition.
24	18	SMF90IDS	8	EBCDIC	Name of the system from which the service definition was installed.

Subtype 24 — VARY WLM

Subtype 24 contains the workload management service policy, as mapped by the IWMSVPOL macro. It has a size dependency of 32K. If the policy exceeds 32K, additional subtype 24 records are written. Each subtype contains the header information. You must map the corresponding service policy information as mapped in IWMSVPOL. For a mapping of IWMSVPOL, see *z/OS MVS Data Areas* in the z/OS Internet library (www.ibm.com/servers/resourcelink/svc00100.nsf/pages/zosInternetLibrary).

The field SMF9024N contains the number of subtype 24 records that are written to map the service policy. The field SMF9024P contains the length of the subtype 24.

Mapping a single subtype 24 record

To map the WLM policy when there is one subtype 24 (SMF9024N = 1), base IWMSVPOL on ADDR(SMF90T24) + LENGTH(SMF9024P).

Mapping multiple subtype 24 records

To map the WLM policy when there is more than one subtype 24 written (SMF9024N > 1), use the following procedure:

1. Determine the storage required by multiplying 32K times the number of subtype 24 records.

```
32K * SMF9024N
```

2. Obtain a storage block equal to 32K * SMF9024N
3. Read all (SMF9024N) subtype 24 records that have the same unique identifier (SMF9024I).
4. Copy the first subtype 24 record (SMF9024S=1) beginning at SMF9024A for a length of SMF90DLN - LENGTH(SMF9024P) to the start of the obtained storage.
5. Copy the next subtype 24 record (SMF9024S=2) beginning at SMF9024A for a length of SMF90DLN-LENGTH(SMF9024P) to the byte in the obtained storage immediately after the previous record.
6. Repeat the previous step for each additional subtype 24 record.

When you have merged all the subtype 24 records, map the resulting data to the IWMSVPOL mapping macro.

VARY WLM command data section - service policy header

Offsets		Name	Length	Format	Description
		SMF9024P			Prefix area to subtype 24. Allows assembling several records together to map the entire WLM service policy.
0	0	SMF9024S	4	binary	Sequence number. When the service policy is larger than will fit in 1 subtype 24 record, this field describes the order in which individual records must be combined to view the entire service policy.
4	4	SMF9024N	4	binary	Number of subtype 24 records which must be combined to map the policy. When 1 record is enough, both SMF9024S and SMF9024N will be 1.
8	8	SMF9024I	4	binary	Unique ID that is used to ensure all “N” records of 1 policy can be combined without mixing data from 2 rapid VARY policy commands.
12	C	SMF9024A	*	EBCDIC	The active service policy. This area is mapped by IWMSVPOL.

Subtype 25 — MODIFY WLM

MODIFY WLM command data section

Offsets		Name	Length	Format	Description
0	0	SMF90MOD	1	bitstring	Reserved. **Bit** **Meaning when set** **0** Reserved. **1** Reserved.
1	1	SMF90MRS	3	binary	Reserved.
4	4	SMF90MTD	8	EBCDIC	Reserved.
12	C	SMF90NSP	8	EBCDIC	Name of the service policy activated by the VARY WLM command.
20	14	SMF90TPA	8	EBCDIC	Time and date (STCK) associated with the initial activation of this service policy.

Offsets		Name	Length	Format	Description
28	1C	SMF90IPU	8	EBCDIC	User IDof the system operator or service level administrator who activated this service policy. A service policy can be activated by the VARY WLM command, or by an option in the WLM ISPF administrative application.
32	20	SMF90SNA	8	EBCDIC	System name (sysname) from which the service policy was activated.
40	28	SMF9025N	8	EBCDIC	Service definition name from which this service policy was activated.
48	30	SMF9025T	8	EBCDIC	Time and date (STCK) of the installation of this service definition.
56	38	SMF9025U	8	EBCDIC	User IDof the service level administrator who installed the service definition.
64	40	SMF9025S	8	EBCDIC	Name of the system from which the service definition was installed.
72	48	SMF90MOU	8	EBCDIC	Reserved.

Subtype 26 — IPL logrec

IPL Logrec data set section

Offsets		Name	Length	Format	Description
0	0	SMF90LOG	44	EBCDIC	Original logrec data set name or blanks.
44	2C	SMF9026M	10	EBCDIC	Original logrec recording medium: • LOGSTREAM • DATASET • IGNORED
54	36	SMF9026G	26	EBCDIC	Original logrec log stream name or blanks
80	50	SMF9026N	44	EBCDIC	New logrec data set name or blanks
124	7C	SMF9026R	10	EBCDIC	New logrec recording medium: • LOGSTREAM • DATASET • IGNORED
134	86	SMF9026H	26	EBCDIC	New logrec log stream name or blanks

Subtypes 27 and 28 — SETXCF START and STOP (to enable and disable ARM)

Automatic restart management policy section

Offsets		Name	Length	Format	Description
0	0	SMF90PN7	8	EBCDIC	Name of policy being processed (blank if no policy specified on start, or if no policy is active on stop).
8	8	SMF90PS7	8	EBCDIC	System name from parmlib member IEASYSxx SYSNAME parameter.

Subtype 29 — SET PROG (to activate LNKLST set)

LNKLST set activation

Offsets		Name	Length	Format	Description
0	0	SMF90T29LNKLSTSEQ#	4	binary	Sequence number for the LNKLST set. The sequence number is increased whenever a LNKLST set is activated.
4	4	SMF90T29LNKLSTNAME	16	EBCDIC	Name of the LNKLST set activated.
20	14	SMF90T29TIMESTAMP	8	binary	Time and date (STCK) of the LNKLST set activation.
28	1C	SMF90T29CONSID	4	binary	Console ID of the console that issued the command for LNKLST activation.
32	20	SMF90T29UTOKEN	80	binary	User token of the issuer of the command for LNKLST activation.

Subtype 30 — RESET

RESET command complete

Offsets		Name	Length	Format	Description
0	0	SMF90T30_JOBNAME	8	EBCDIC	Name of the job that was reset. This field will be blank in the case of an enclave reset request.
8	8	SMF90T30_JOBID	8	EBCDIC	JES Job ID of the reset job. This field will be blank if there is no JSAB associated with the job, or in the case of an enclave reset request.
16	10	SMF90T30_ENTRY_TIME	4	binary	Program entry time, in hundredths of a second since midnight. For a job, this is the program entry time, or zero if no JSAB is associated with the job. For an enclave, this is the time the enclave was created.
20	14	SMF90T30_ENTRY_DATE	4	EBCDIC	Program entry date, in the form 0cyydddF. For a job, this is the program entry date, or zero if no JSAB is associated with the job. For an enclave, this is the date the enclave was created.
24	18	SMF90T30_OPERATOR	8	EBCDIC	Operator ID that issued the RESET command.
32	20	SMF90T30_FLAGS	1	bitstring	Indicators, as follows: **Bit** **Meaning when set** **0** QUIESCE operand used **1** RESUME operand used **2** SRVCLASS operand used **3** PGN operand used **4** The enclave service class was reset **5** The enclave was quiesced **6** The enclave was resumed **7** Reserved

Offsets		Name	Length	Format	Description
33	21	SMF90T30_FLAGS2	1	bitstring	Additional characteristics, as follows: **Bit** **Meaning when set** **0** Original independent enclave **1–7** Reserved
34	22	SMF90T30_RSV	2	EBCDIC	Reserved
36	24	SMF90T30_OLDSRV	8	EBCDIC	Service class name associated with the job or enclave before the RESET was processed. This field is blank if the system was in compatibility mode. The OLD and NEW service classes are the same when the RESET quiesced the address space or enclave.
44	2C	SMF90T30_NEWSRV	8	EBCDIC	Service class name associated with the job or enclave after the RESET was processed. This field is blank if the system was in compatibility mode. The OLD and NEW service classes are the same when the RESET quiesced the address space or enclave.
52	34	SMF90T30_OLDPGN	2	binary	Beginning with z/OS V1R3, this field is always zero.
54	36	SMF90T30_NEWPGN	2	binary	Beginning with z/OS V1R3, this field is always zero.
56	38	SMF90T30_EnclaveOwner	8	EBCDIC	Name of the address space that owns the enclave. This field is blank in the case of a job reset request.

Subtype 31 — SET PROG (to activate LPALST)

Dynamic LPA management section

Offsets		Name	Length	Format	Description
0	0	SMF90T31ADDORDELETE	1	binary	“0” this record is the result of an ADD to LPA; “1” this record is the result of a DELETE from LPA
1	1		3	EBCDIC	Reserved
4	4	SMF90T31NUMMODS	2	binary	Number of modules in this record.
6	6	SMF90T31MODOFFSET	2	binary	Offset from SMF90T31 to start of MODENTRIES. The modentries are contiguous in this area, each mapped by DSECT LPMEA within macro CSVLPRET
8	8	SMF90T31NUMMODS REMAINING	4	binary	Number of module entries to be written in subsequent records.
12	C	SMF90T31REQUESTOR	16	EBCDIC	The requestor ID provided through CSVDYLPA.
28	1C	SMF90T31TIMESTAMP	8	EBCDIC	Time value (from STCK) of the activation.
36	24	SMF90T31CONSID	4	binary	Console ID of issuer of the LPA request. The value is -1 if the request was through the CSVDYLPA macro.
40	28	SMF90T31UTOKEN	80	EBCDIC	Security product user token issuer of the LPA request.

Subtype 32 — WLM policy change

Subtype 32 contains all the workload management scheduling environment information following a successful policy change. It has a maximum size dependency of 32K. If the information exceeds 32K, additional subtype 32 records are written. Each subtype contains the header information. You must map the corresponding scheduling environment information as mapped in IWMSVPSE. For a mapping of IWMSVPSE, see *z/OS MVS Data Areas* in the z/OS Internet library (www.ibm.com/servers/resourcelink/svc00100.nsf/pages/zosInternetLibrary).

The field SMF9032N contains the number of subtype 32 records that are written to map the scheduling environment structure. The field SMF9032P contains the length of the subtype 32.

Mapping a single subtype 32 record

To map the WLM scheduling environment structure when there is one subtype 32 (SMF9032N = 1), base IWMSVPSE on ADDR(SMF90T32) + LENGTH(SMF9032P).

Mapping multiple subtype 32 records

To map the WLM scheduling environment structure when there is more than one subtype 32 written (SMF9032N > 1), use the following procedure:

1. Determine the storage required by multiplying 32K times the number of subtype 32 records.

```
32K * SMF9032N
```

2. Obtain a storage block equal to 32K * SMF9032N
3. Read all (SMF9032N) subtype 32 records that have the same unique identifier (SMF9032I).
4. Copy the first subtype 32 record (SMF9032S=1) beginning at SMF9032A for a length of SMF90DLN - LENGTH(SMF9032P) to the start of the obtained storage.
5. Copy the next subtype 32 record (SMF9032S=2) beginning at SMF9032A for a length of SMF90DLN- LENGTH(SMF9032P) to the byte in the obtained storage immediately after the previous record.
6. Repeat the previous step for each additional subtype 32 record.

When you have merged all the subtype 32 records, map the resulting data to the IWMSVPSE mapping macro.

Scheduling environment information

Offsets		Name	Length	Format	Description
		SMF9032P			Prefix area to subtype 32. Allows assembling several records together to map the entire WLM scheduling environment structure.
0	0	SMF9032S	4	binary	Sequence number. When the scheduling environment structure is larger than will fit in 1 subtype 32 record, this field describes the order in which individual records must be combined to view the entire scheduling environment structure.
4	4	SMF9032N	4	binary	Number of subtype 32 records which must be combined to map the scheduling environment structure. When 1 record is enough, both SMF9032S and SMF9032N will be 1.
8	8	SMF9032I	4	binary	Unique ID that is used to ensure all “N” records of 1 policy can be combined without mixing data from 2 rapid VARY policy commands.
12	C	SMF9032A	*	EBCDIC	The active service policy. This area is mapped by IWMSVPSE.

Subtype 33 — SET AUTOR

SET AUTOR command section

Offsets		Name	Length	Format	Description
0	0	SMF90T33_Timestamp	8	binary	Time of auto-reply policy change.
8	8	SMF90T33_#_Suffixes	4	binary	Count of AUTORxx suffixes used to set the policy.
12	C	SMF90T33_Suffixes	76	EBCDIC	Array of 2-byte suffixes of specified AUTORxx parmlib members (38 maximum).

Subtype 34 — Processor capacity change

A subtype 34 record is generated when a processor capacity change occurs, which is triggered by an ENF61 signal, qualified by WLMENF12 along with a change in processor capacity.

Processor capacity change section

This record is generated when a processor capacity change occurs.

Offsets		Name	Length	Format	Description
0	0	SMF90T34_Capacity_Change _Time	8	binary	Time when the capacity was last changed.
8	8	SMF90T34_RQSVSUS	4	binary	Current service unit factor (SU factor) from RQSVSUS.
12	C	SMF90T34_RCTPCPUA _Actual	4	binary	Physical CPU adjustment factor (for example, adjustment factor for converting CPU time to equivalent service in basic-mode with all processors online). Based on model capacity rating.
16	10	SMF90T34_RCTPCPUA _Nominal	4	binary	Physical CPU adjustment factor (for example, adjustment factor for converting CPU time to equivalent service in basic-mode with all processors online). Based on nominal model capacity rating.
20	14	SMF90T34_RCTPCPUA _scaling_factor	4	binary	Scaling factor for RCTPCPUA_actual and RCTPCPUA_nominal.
24	18	SMF90T34_Capacity_Adjustment _ Ind	1	binary	When: **0** The indication is not reported. **1-99** Some amount of reduction is indicated. **100** The machine is operating in normal capacity. Primary CPUs and all secondary-type CPUs are similarly affected.
25	19	SMF90T34_Capacity_Change _Reason	1	binary	Indicates the reason that is associated with the present value contained in SMF90T34_Capacity_Adjustment_ Ind. The bit values of this field correspond to those described in RMCTZ_Capacity_Adjustment_Indication of the IRARMCTZ mapping macro. (See *MVS Data Areas*).
26	1A	SMF90T34_Flags	1	binary	Error flags. **Bit** **Meaning when set** **0** SMF90T34_RQSVSUS_Err**Meaning:** When on, indicates that an error occurred while collecting the value from RQSVSUS. **1** SMF90T34_Capacity_Data_err**Meaning:** When on, indicates that an error occurred while collecting the processor capacity data. **2** SMF90T34_PCD_Rsvd_Exists**Meaning:** When on, indicates records generated on systems running z/OS V1R7 through z/OS V1R9. When off, indicates records generated on systems running z/OS V1R10 and later.
28	1C	SMF90T34_RMCTADJN_Nominal	4	binary	Nominal CPU rate adjustment

Subtype 35 — SETLOAD xx,IEASYM

A subtype 35 record is generated when a SETLOAD xx,IEASYM command is processed.

SETLOAD xx,IEASYM command section

This record is generated when a SETLOAD xx,IEASYM command is processed.

Offsets		Name	Length	Format	Description
0	0	SMF90T35_Timestamp	8	binary	Time of SETLOAD xx,IEASYM.

Offsets		Name	Length	Format	Description
8	8	SMF90T35_ConsID	4	binary	Console ID of issuer.
12	C	SMF90T35_LOADxxName	8	EBCDIC	LOADxx member name.
20	14	SMF90T35_IeasymStatement	72	EBCDIC	IEASYM statement. Identifies the IEASYMxx suffixes.

Subtype 36 — SET CON

SET CON command section

Offsets		Name	Length	Format	Description
0	0	SMF90T36_TimeStamp	8	binary	Time stamp.
8	8	SMF90T36_MemberName	8	EBCDIC	CONSOLxx parmlib member name.

Subtype 37 — Dynamic APF

Dynamic APF section

Offsets		Name	Length	Format	Description
0	0	SMF90T37Function	1	binary	Function indicator: **Value** **Meaning** **1** APF Add **2** APF Delete **4** APF Format (Dynamic) **6** APF Format (Static)
1	1	SMF90T37Flags SMF90T37_SETPROG SMF90T37_SET_PROG SMF90T37_CSVAPF	1	binary	Flags: **Bit** **Meaning when set** **0** Update from SETPROG command **1** Update from SET PROG command **2** Update from CSVAPF macro
2	2	SMF90T37ParmMemSuffix	2	EBCDIC	When bit 1 (SMF90T37_SET_PROG) of SMF90T37Flags is set, the *xx* portion of the name of the PROG*xx* parmlib member.
4	4	SMF90T37DSNAME	44	EBCDIC	The data set name when the function is not APF Format (Dynamic) or APF Format (Static); otherwise, undefined.
48	30	SMF90T37Volume	6	EBCDIC	The volume when the function is not APF Format (Dynamic) or APF Format (Static); otherwise, undefined. This field is set to zeros for an add or delete indicating SMS-managed, such as by specifying SMS on a SETPROG APF,ADD command or on an APF ADD statement in the PROG*xx* member of parmlib.
54	36	–	2	binary	Reserved.
56	38	SMF90T37TIMESTAMP	8	binary	Time (via STCK) of the update.
64	40	SMF90T37Jobname	8	EBCDIC	The job name of the issuer of the APF request. For a SETPROG command or SET PROG processing, this is the job name of the ASID processing the command (ASID 1 - *MASTER*).

Offsets		Name	Length	Format	Description
72	48	SMF90T37ChKey	8	EBCDIC	The CHKEY field from the CSCB (for a started task, this is the step name); otherwise, zeros if there is no CSCB.
80	50	SMF90T37ConsID	4	binary	The console ID of the issuer of the APF request. The value is -1 if the request was from the CSVAPF macro.
84	54	–	4	binary	Reserved.
88	58	SMF90T37UTOKEN	80	binary	The security product user token of the issuer of the APF request.

Subtype 38 — SET IEFOPZ

SMF record type 90 subtype 38 is generated to capture the entire data set optimization (IEFOPZ) configuration. One or more records may be written if the entire configuration does not fit within a single record. The record includes:

- The MAXARCH value (and the member name suffix of the IEFOPZ*xx* parmlib member that was the source of the definition).
- Every active OldNew definition, showing the old data set name (referred to as the IEFOPZ-Old data set name) and volume, and the particular new data set name (referred to as the IEFOPZ-New data set name) and volume that will be used (which depends on the MAXARCH value, the current machine, and the ARCH specification for the new data set). Also included is the member name suffix of the IEFOPZ*xx* parmlib member that was the source of the definition.
  - The member list is not included in the SMF record because z/OS itself does nothing for the members themselves; the exploiter would do that, and updates to the members of an IEFOPZ-New data set can be viewed via other SMF records.
- Every DD name and job name definition, along with the member name suffix of the IEFOPZ*xx* parmlib member that was the source of the definition.

The record is mapped by the IFASMFR macro (via the IFASMFRA and IEFOPSMF macros).

IEFOPZ configuration section

Offsets		Name	Length	Format	Description
0	0	SMF90T38Flags	1	binary	Flags: **Bit** **Meaning when set** **0 (SMF90T38_SET_IEFOPZ)** Update from SET IEFOPZ command. **1 (SMF90T38_MSI)** Master Scheduler Init processing. **2-5** Reserved. **6 (SMF90T38_More)** Not all data fits; a subsequent record will be produced. **7 (SMF90T38_Continuation)** This is a continuation of the previous record.
1	1	*	1	binary	Reserved.
2	2	SMF90T38_ContinuationNumber	2	binary	The value is 0 for a record that is not a continuation, incremented by 1 for each continuation of a non-continuation record.
4	4	SMF90T38_MaxArch	2	binary	MAXARCH value.
6	6	SMF90T38_MaxArchIEFOPZxxSuffix	2	EBCDIC	The *xx* portion of the IEFOPZ*xx* parmlib member name in which the MaxArch was defined, or binary zeros if MaxArch was not specified (the default value was used).
8	8	*	4	binary	Reserved.
12	C	SMF90T38_Consid	4	binary	Console ID of the issuer of the SET IEFOPZ command.
16	10	SMF90T38_Consname	8	EBCDIC	Console name of the issuer of the SET IEFOPZ command.

Offsets		Name	Length	Format	Description
24	18	SMF90T38_TimeStamp	8	binary	Time value (from STCK) of the update. Continuations of this record will have the same TimeStamp value.
32	20	SMF90T38_Jobname	8	EBCDIC	The job name of the issuer of the IEFOPZ request. For SET IEFOPZ, this will be the job name of the ASID processing the command (ASID 1 = *MASTER*).
40	28	SMF90T38_CHKEY	8	EBCDIC	The CHKEY field from the CSCB (for a started task, this is the step name), or zeros if there is no CSCB.
48	30	SMF90T38_UToken	80	binary	Security product user token for the IEFOPZ request, mapped by ICHRUTKN.
118	70	SMF90T38_UtokenUserid	8	EBCDIC	TOKUSER (user ID) field of the user token.
128	80	SMF90T38_Num_OldNew	4	binary	Number of OldNew entries in this record.
132	84	SMF90T38_OldNew_Offset	4	binary	Offset from SMFRCD90 to first OldNew entry. Entry is mapped by SMF90T38_OldNew. (See “SMF90T38_OldNew section” on page 864.)
136	88	SMF90T38_OldNew_Len	4	binary	Length of an OldNew entry. Use this length to navigate from one OldNew entry to the next.
140	8C	SMF90T38_Num_DDJobname	4	binary	Number of DDJobname entries in this record.
144	90	SMF90T38_DDJobname_Offset	4	binary	Offset from SMFRCD90 to the first DDJobname entry. Entry is mapped by SMF90T38_DDJobname. (See “SMF90T38_DDJobname section” on page 865.)
148	94	SMF90T38_DDJobname_Len	4	binary	Length of a DDJobname. Use this length to navigate from one DDJobname entry to the next.

SMF90T38_OldNew section

Offsets		Name	Length	Format	Description
0	0	SMF90T38ON_Flags	1	binary	Flags: **Bit** **Meaning when set** **0 (SMF90T38ON_OVolProvided)** The IEFOPZ-Old data set was specified with volume. **1 (SMF90T38ON_NVolProvided)** The IEFOPZ-New data set was specified with volume. **2-7** Reserved.
1	1	*	1	binary	Reserved.
2	2	SMF90T38ON_IEFOPZxxSuffix	2	EBCDIC	The *xx* portion of the IEFOPZ*xx* parmlib member name in which the OldNew was defined.
4	4	SMF90T38ON_ODSName	44	EBCDIC	IEFOPZ-Old data set name.
48	30	SMF90T38ON_OR	44	EBCDIC	Real IEFOPZ-Old data set name, if IEFOPZ-Old is an alias; otherwise, matches SMF90T38ON_ODSName.
92	5C	SMF90T38ON_OVolume	6	EBCDIC	IEFOPZ-Old volume. This is the value when the data set was last allocated by IEFOPZ processing.
98	62	SMF90T38ON_NDSName	44	EBCDIC	The IEFOPZ-New data set name that will be used.
142	8E	SMF90T38ON_NRDSName	44	EBCDIC	Real IEFOPZ-New data set name, if IEFOPZ-New is an alias; otherwise, matches SMF90T38ON_NDSName.
186	BA	SMF90T38ON_NVolume	6	EBCDIC	IEFOPZ-New volume that will be used. This is the value when the data set was last allocated by IEFOPZ processing.
192	C0	SMF90T38ON_NArch	2	binary	The ARCH value of the IEFOPZ-New data set.
194	C2	*	2	binary	Reserved.

SMF90T38_DDJobname section

Offsets		Name	Length	Format	Description
0	0	SMF90T38DDJ_IEFOPZxxSuffix	2	EBCDIC	The *xx* portion of the IEFOPZ*xx* parmlib member name in which the DDName/Jobname pair was defined.
2	2	*	2	binary	Reserved.
4	4	SMF90T38DDJ_DDName	8	EBCDIC	DDName.
12	C	SMF90T38DDJ_Jobname	8	EBCDIC	Jobname.

Subtype 39 — SET SMFLIM

A subtype 39 record is generated when the SET SMFLIM command is processed.

SET SMFLIM command section

Offsets		Name	Length	Format	Description
0	0	SMF90T39_Timestamp	8	binary	Time of the SET SMFLIM policy change.
8	8	SMF90T39_Num_Suffixes	4	binary	Count of SMFLIMxx suffixes.
12	C	SMF90T39_Suffixes	76	EBCDIC	Array of 2-byte suffixes of specified SMFLIMxx members.

Subtype 40 — Boost information

A subtype 40 record is created when boosts start and end.

- No SMF record is created if the IPL boost was never activated.
- There is no SMF record produced when recovery process boosts are extended, only when they are started or ended.
- A recovery process boosts end record can occur after multiple recovery process boosts, if there was overlap.
- If a record spans events of multiple boost classes, the earliest boost class (IPL or recovery process) is used.

Boost information section

Offsets		Name	Length	Format	Description
0		SMF90T40_ETOD	16	binary	Time of boosts end, in STCKE format.
16	10	SMF90T40_Event	4	binary	The boost event. Valid values are: **1** IPL boosts start **2** IPL boosts end **3** Shutdown boosts start **4** Shutdown boosts end **5** Recovery process boosts start **6** Recovery process boosts end
20	14	SMF90T40_NUMTransientzIIPCores	76	binary	Number of zIIP cores configured online due to zIIP boost (and configured offline upon boost end).

Offsets		Name	Length	Format	Description
22	16	SMF90T40_Flags0	1	binary	Flags: **Bit** **Meaning when set** **0 (SMF90T40_zIIPBoost_Active)** For the "boosts end" events, the zIIP boost was active. For the "boosts start" event, the zIIP boost is active. **1 (SMF90T40_SpeedBoost_Active)** For the "boosts end" events, the speed boost was active. For the "boosts start" event, the speed boost is active. **2 (SMF90T40_zIIP_Boost_EndedByError)** The system encountered an error and had to end the zIIP boost (the speed boost was not affected by the error). Applies only to the "boosts end" events. **3 (SMF90T40_SpeedBoost_EndedByError)** The system encountered an error and had to end the speed boost. Applies only to the “boosts end” events. **4 (SMF90T40_RPBoosts_Last_EndedByError)** The system encountered an error and had to end the last (most recent) recovery process boosts. Applies only to the "boosts end" events. **5 - 7 (SMF90T40_BoostClass)** Boost class: `001`: IPL `010`: Shutdown `011`: Recovery process **Note:** The boost class value is valid only when one or more boosts is active; that is, a boost active bit is also on.
23	17	SMF90T40_Flags1	1	binary	Flags: **Bit** **Meaning when set** **0 (SMF90T40_Boosts_EndedByTimer)** All IPL boosts were ended. The time limit was reached. Applies only to the "boosts end" events. **1 (SMF90T40_Boosts_EndedByPgm)** The customer activated a program to end the IPL boost (the normal method to activate this program is using the IEABE PROC). The system ends whichever boosts were active. Applies only to the "boosts end" events. **2 (SMF90T40_Boosts_EndedBySD)** The IPL or recovery process boosts were ended because shutdown began. Applies only to the "IPL boosts end" and "recovery process boosts end" events. **3 (SMF90T40_Boosts_EndedByError)** The system encountered an error and ended whichever boosts were active. Applies only to the "boosts end" events.

Offsets		Name	Length	Format	Description
24	18	SMF90T40_RP_Start_Requestor_ID	1	binary	The ID of the requestor for which the boost was started. Applies only to "recovery process boosts start" events. Possible values are: **0** Not identified **1** Sysplex partitioning **2** Coupling facility structure recovery **3** Coupling facility datasharing member recovery **4** Hyperswap
25	19	*	7	binary	Reserved.
32	1A	SMF90T40_RP_Duration	8	binary	Total duration for the life of the IPL of recovery process boosts, in STCK format. Updated when a recovery process boost is extended or ends. Applies only to "recovery process boosts start" and "recovery process boosts end" events.

Record type 91 (X'5B') — BatchPipes statistics

IBM BatchPipes® for OS/390 writes SMF type 91 records to collect statistics about BatchPipes activities.

For information about SMF record type 91, see "Appendix A: SMF record descriptions" in *IBM BatchPipes OS/390 V2R1 User's Guide and Reference*, SA22-7458 (`asf1a210.pdf`) , which is available in the IBM BatchPipes Indexed PDF Collection (ibm.biz/BdqnJ9) which you can download from IBM Z Publications Library Archive (www.ibm.com/servers/resourcelink/svc00100.nsf/pages/zos-library-archives?OpenDocument).

Record type 92 (X'5C') — File system activity

SMF record type 92 reports activity of mounted file systems and files. For more information about SMF record type 92, see *z/OS UNIX System Services Planning*.

For a description of when open and close records are written, see “Accounting for open() and close()” on page 113.

Rules:

1. To collect information about the activity of a mounted file system, you must be collecting SMF type 92 subtype 5 (unmount) records at the time the file system is mounted and at the time the file system is unmounted.
2. To collect information on the activity of a specific file, you must be collecting SMF type 92 subtype 11 (close) records at the time the file is opened and at the time the file is closed.
3. To collect zFS file system event data, you must be collecting SMF type 92 subtype 50 records at the time of the event. For a detailed description of all events, see “Subtype 50” on page 880.

The subtypes are:

1
: Contains information that was written when a file system is mounted.

2
: Contains information that was written after the file system is quiesced (or suspended).

4
: Contains information that was written after the file system is unquiesced (or resumed).

5
Contains information that was written when the file system is unmounted.

6
Contains information that was written when the file system is remounted.

7
Contains information that was written when the file system is moved.

8
Contains information that was written when a file system is migrated.

10
Contains information that was written when a file is opened.

11
Contains information that was written when a file is closed.

12
Contains MMAP subtype information.

13
Contains MUNMAP subtype information.

14
Contains information that was written when a file or file directory is deleted or renamed.

15
Contains information that was written when a file's security attributes for APF-authorized, program control, or shared library are changed.

16
Contains information that was written when a socket, character special file, pipe, or FIFO is closed. The record format is the same as for subtype 11.

17
Contains information about how many times a file is accessed throughout the life of an open and is written on the SMF global recording interval.

50
Used for various file system events that occur during the life of a file system. It is recorded (assuming that type 92 subtype 50 is active) whenever the event occurs. The SMF interval does not apply for this particular subtype.

51
Shows the accumulated counts and response times that were made for the calls to zFS. It is recorded if subtype 51 was active at the SMF interval time or zFS defined interval, depending on what the user has requested.

52
Contains the statistics for the zFS user file cache.

53
Contains statistics for the zFS metadata cache.

54
Contains zFS locking and sleeps statistics, including most highly contended locks.

55
Contains general zFS disk IO statistics. It does not break down the IO per DASD volume because volume; per-file system statistics will have some of that information.

56
Provides information about the token manager.

57
Details zFS use of memory, with total bytes allocated to each zFS subcomponent.

58
Contains records that indicate how many transmit/receives and average time it takes to talk between zFS members in the sysplex.

59
Contains per-file system usage. Per-file system usage is one data section for each file system included in the record. zFS places at most 4000 or so bytes (approximately 14 file systems worth) in the record before calling SMF to write the record. For systems that have many mounted file systems, multiple calls are made to write the records. You might want to ensure that subtype 59 does not overwhelm SMF or generate too much overhead.

Note: SMF92DON is the number of data sections in the record (which indicates how many file system stat records are in the data sections). SMF92DLN is the length of each file system data record. zFS will make many calls to SMF to write the records for all file systems.

Record environment

The following conditions exist for the generation of each of the subtypes of this record:

Macro
SMFEWTM(2), BRANCH=YES,MODE=XMEM (record exit: IEFU85)

Record mapping

Header and self-defining section

This section contains the common SMF record headers fields and the triplet fields (offset/length/number), if applicable, that locate the other sections on the record.

Offsets		Name	Length	Format	Description
Record Header Section:					
0	0	SMF92LEN	2	Binary	Record length.
2	2	SMF92SEG	2	Binary	Segment descriptor.
4	4	SMF92FLG	1	Binary	SMF flag bits. **0** Subsystem identification follows system identification **1** Subtypes used **2** Reserved **3-6** Version Indicators (see "Standard and Extended SMF record headers" on page 162 for details) **7** Reserved
5	5	SMF92RTY	1	Binary	Record type: 92 (X'5C').
6	6	SMF92TME	4	Binary	Time since midnight, in hundredths of a second, that the record was moved into the SMF buffer.
10	A	SMF92DTE	4	Packed	Date when record was written.
14	E	SMF92SID	4	EBCDIC	System identification (from the SID parameter).
18	12	SMF92WID	4	EBCDIC	Subsystem identification.
22	16	SMF92STP	2	Binary	Record subtype.
24	18	*	2	Binary	Reserved.
26	1A	SMF92SDL	2	Binary	Length of self-defining section.
Self-Defining Section:					
28	1C	SMF92SOF	4	Binary	Offset to subsystem section.
32	20	SMF92SLN	2	Binary	Length of subsystem section.

Offsets		Name	Length	Format	Description
34	22	SMF92SON	2	Binary	Number of subsystem sections.
36	24	SMF92IOF	4	Binary	Offset of identification section.
40	28	SMF92ILN	2	Binary	Length of identification section.
42	2A	SMF92ION	2	Binary	Number of identification sections.
44	2C	SMF92DOF	4	Binary	Offset of data section.
48	30	SMF92DLN	2	Binary	Length of data section.
50	32	SMF92DON	2	Binary	Number of data sections.
Subsystem Section:					
0	0	SMF92TYP	2	Binary	Subtype identification.
2	2	SMF92RVN	2	EBCDIC	Record version number. **Value** **Meaning** **1** OpenEdition MVS with MVS/ESA SP 4.3 **2** OpenEdition MVS with MVS/ESA SP 5.1 and later
4	4	SMF92PNM	8	EBCDIC	Product name, right-justified with blanks.
12	C	SMF92OSL	8	EBCDIC	Product service level.
Identification Section:					
0	0	SMF92JBN	8	EBCDIC	Job name.
8	8	SMF92RST	4	Binary	Reader start time.
12	C	SMF92RSD	4	Packed	Reader start date.
16	10	SMF92STM	8	EBCDIC	Step name.
24	18	SMF92RGD	8	EBCDIC	SAF group ID.
32	20	SMF92RUD	8	EBCDIC	SAF user ID.
40	28	SMF92UID	4	Binary	mreal user ID.
44	2C	SMF92GID	4	Binary	Real group ID for z/OS UNIX.
48	30	SMF92PID	4	Binary	Process ID for z/OS UNIX.
52	34	SMF92PGD	4	Binary	Process group ID for z/OS UNIX.
56	38	SMF92SSD	4	Binary	Session ID for z/OS UNIX.
60	3C	SMF92API	4	Binary	Anchor process ID for z/OS UIX.
64	40	SMF92APG	4	Binary	Anchor process group ID for z/OS UNIX.
68	44	SMF92ASG	4	Binary	Anchor session ID for z/OS UNIX.
Identification Section for zFS only:					
0	0	SMF92JBN	8	EBCDIC	Job name of zFS product.
8	8	SMF92RST	8	Binary	Start time (or latest internal restart time of zFS.
12	C	SMF92RSD	4	Packed	Packed decimal value of zFS start date.
16	10	SMF92STM	8	EBCDIC	8-character blank-padded step name. For zFS, this is IOEFSKN.
24	18	SMF92ASID	4	Binary	ASID of zFS kernel.
28	1C	SMF92RSC	4	Binary	Internal restart count.

Subtype 1

A number of the fields that describe mountable file systems are defined in the macro BPXYMNTE.

Offsets		Name	Length	Format	Description
File System Mount — Data Section:					
0	0	SMF92MTM	8	binary	Time of mount, STCK format.
8	8	SMF92MPF	4	binary	Offset of path section.
12	C	SMF92MFT	4	binary	File system type from MntEntFSType field of BPXYMNTE.
16	10	SMF92MFM	4	binary	File system mode from MntEntFSMode field of BPXYMNTE.
20	14	SMF92MDN	4	binary	File system device number from MntEntFSDev field of BPXYMNTE.
24	18	SMF92MDD	8	EBCDIC	DDNAME specified on mount from MntEntFSDDName field of BPXYMNTE.
32	20	SMF92MTN	8	EBCDIC	File system type name from MntEntFSTName field of BPXYMNTE.
40	28	SMF92MFN	44	EBCDIC	File system name from MntEntFSName field of BPXYMNTE.
84	54	SMF92MBL	4	binary	File system block size.
88	58	SMF92MST	8	binary	Total space in file system in block size units.
96	60	SMF92MSU	8	binary	Allocated space in file system in block size units.
104	68	SMF92MFG	1	binary	Flag byte **Bit** **Meaning when set** **0** File system mounted by automounter (SMF92MAU) **1** File system mounted asynchronously (SMF92MAS) **2** Mount was for remount (SMF92MRM)
105	69	SMF92MF2	1	binary	Second flag byte **Bit** **Meaning when set** **0** File system mounted locally (SMF92MLU) **1** File system mounted remotely (SMF92MNU) **2** Sysplex client (SMF92MDO) **3** File system owner (SMF92MSN)
Path Section:					
0	0	SMF92PPL	2	binary	Length of pathname for directory.
2	2	SMF92PPN	variable	EBCDIC	Pathname of directory where file system is mounted.

Subtype 2

Offsets		Name	Length	Format	Description
File System Quiesce (Suspend) — Data Section:					
0	0	SMF92STS	8	binary	Time of suspend, STCK format.
8	8	SMF92SFT	4	binary	File system type from MntEntFSType field of BPXYMNTE.
12	C	SMF92SFM	4	binary	File system mode from MntEntFSMode field of BPXYMNTE.

Offsets		Name	Length	Format	Description
16	10	SMF92SDN	4	binary	File system device number from MntEntFSDev field of BPXYMNTE.
20	14	SMF92SDD	8	EBCDIC	DDNAME specified on mount from MntEntFSDDName field of BPXYMNTE.
28	1C	SMF92STN	8	EBCDIC	File system type name from MntEntFSTName field of BPXYMNTE.
36	24	SMF92SFN	44	EBCDIC	File system name from MntEntFSName field of BPXYMNTE.
80	50	SMF92SFG	1	binary	Flag byte **Bit** **Meaning when set** **0** File system mounted locally (SMF92SLU) **1** File system mounted remotely (SMF92SNU) **2** Sysplex client (SMF92SDO) **3** File system owner (SMF92SSN)

Subtype 4

Offsets		Name	Length	Format	Description
File System Unquiesce (Resume) — Data Section:					
0	0	SMF92RTS	8	binary	Time of suspend, STCK format.
8	8	SMF92RTR	8	binary	Time of resume, STCK format.
16	10	SMF92RFT	4	binary	File system type from MntEntFSType field of BPXYMNTE.
20	14	SMF92RFM	4	binary	File system mode from MntEntFSMode field of BPXYMNTE.
24	18	SMF92RDN	4	binary	File system device number from MntEntFSDev field of BPXYMNTE.
28	1C	SMF92RDD	8	EBCDIC	DDNAME specified on mount from MntEntFSDDName field of BPXYMNTE.
36	24	SMF92RTN	8	EBCDIC	File system type name from MntEntFSTName field of BPXYMNTE.
44	2C	SMF92RFN	44	EBCDIC	File system name from MntEntFSName field of BPXYMNTE.
88	58	SMF92RFG	1	binary	Flag byte **Bit** **Meaning when set** **0** File system mounted locally (SMF92RLU) **1** File system mounted remotely (SMF92RNU) **2** Sysplex client (SMF92RDO) **3** File system owner (SMF92RSN)

Subtypes 5 and 6

Offsets		Name	Length	Format	Description
File System Unmount and Remount — Data Section:					
0	0	SMF92UTM	8	Binary	Time of mount, STCK format.
8	8	SMF92UTU	8	Binary	Time of unmount, STCK format.

Offsets		Name	Length	Format	Description
16	10	SMF92UFT	4	Binary	File system type from MntEntFSType field of BPXYMNTE.
20	14	SMF92UFM	4	Binary	File system mode from MntEntFSMode field of BPXYMNTE.
24	18	SMF92UDN	4	Binary	File system device number from MntEntFSDev field of BPXYMNTE.
28	1C	SMF92UDD	8	EBCDIC	DDNAME specified on mount from MntEntFSDDName field of BPXYMNTE.
36	24	SMF92UTN	8	EBCDIC	File system type name from MntEntFSTName field of BPXYMNTE.
44	2C	SMF92UFN	44	EBCDIC	File system name from MntEntFSName field of BPXYMNTE.
88	58	SMF92UBL	4	Binary	File system block size.
92	5C	SMF92UST	8	Binary	Total space in file system in block size units.
100	64	SMF92USU	8	Binary	Allocated space in file system in block size units.
108	6C	SMF92USR	4	Binary	Read calls issued to the mounted file system.
112	70	SMF92USW	4	Binary	Write calls issued to the mounted file system.
116	74	SMF92UDI	4	Binary	Directory I/O blocks.
120	78	SMF92UIR	4	Binary	I/O blocks read.
124	7C	SMF92UIW	4	Binary	I/O blocks written
128	80	SMF92UBR	8	Binary	Bytes read.
136	88	SMF92UBW	8	Binary	Bytes written.
144	90	SMF92UFG	1	Binary	Flag byte **Bit** **Meaning when set** **0** File system unmounted by automounter (SMF92UAU) **1** File system remounted by migration (SMF92UMI)
145	91	SMF92UF2	1	Binary	Second flag byte **Bit** **Meaning when set** **0** File system mounted locally (SMF92ULU) **1** File system mounted remotely (SMF92UNU) **2** Sysplex client (SMF92UDO) **3** File system owner (SMF92USN)

Subtype 7

Offsets		Name	Length	Format	Description
File System Move — Data Section:					
0	0	SMF92VTV	8	binary	Time of move, STCK format.
8	8	SMF92VTM	8	binary	Time of mount, STCK format.
16	10	SMF92VFT	4	binary	File system type from MntEntFSType field of BPXYMNTE.
20	14	SMF92VFM	4	binary	File system mode from MntEntFSMode field of BPXYMNTE.
24	18	SMF92VDN	4	binary	File system device number from MntEntFSDev field of BPXYMNTE.

Offsets		Name	Length	Format	Description
28	1C	SMF92VDD	8	EBCDIC	DDNAME specified on mount from MntEntFSDDName field of BPXYMNTE.
36	24	SMF92VTN	8	EBCDIC	File system type name from MntEntFSTName field of BPXYMNTE.
44	2C	SMF92VNM	44	EBCDIC	File system name from MntEntFSName field of BPXYMNTE.
88	58	SMF92VBL	4	binary	File system block size.
92	5C	SMF92VST	8	binary	Total space in file system in block size units.
100	64	SMF92VSU	8	binary	Allocated space in file system in block size units.
108	6C	SMF92VSR	4	binary	Read calls issued to the mounted file system.
112	70	SMF92VSW	4	binary	Write calls issued to the mounted file system.
116	74	SMF92VDI	4	binary	Directory I/O blocks.
120	78	SMF92VIR	4	binary	I/O blocks read.
124	7C	SMF92VIW	4	binary	I/O blocks written
132	84	SMF92VBR	8	binary	Bytes read.
140	8C	SMF92VBW	8	binary	Bytes written.
148	94	SMF92VFG	1	binary	Flag byte (reason for move) **Bit** **Meaning when set** **0** User-initiated (SMF92VUI) **1** Recovery (SMF92VRI)
149	95	SMF92VOF	1	binary	Flag byte (old status) **Bit** **Meaning when set** **0** File system mounted locally (SMF92VOL) **1** File system mounted remotely (SMF92VON) **2** Sysplex client (SMF92VOD) **3** File system owner (SMF92VOS)
150	96	SMF92VNF	1	binary	Flag byte (old status) **Bit** **Meaning when set** **0** File system mounted locally (SMF92VOL) **1** File system mounted remotely (SMF92VON) **2** Sysplex client (SMF92VOD) **3** File system owner (SMF92VOS)

Subtype 8

Offsets		Name	Length	Format	Description
File System Migration — Data Section:					
0	0	SMF92GTM	8	Binary	Time of migration, STCK format.

Offsets		Name	Length	Format	Description
8	8	SMF92GMO	4	Binary	Offset of mount parm section.
12	C	SMF92GFT	4	Binary	File system type from MntEntFSType field of BPXYMNTE.
16	10	SMF92GFM	4	Binary	File system mode from MntEntFSMode field of BPXYMNTE.
20	14	SMF92GDN	4	Binary	File system device number from MntEntFSDev field of BPXYMNTE.
24	18	SMF92GDD	4	EBCDIC	DDNAME specified on mount from MntEntFSDDName field of BPXYMNTE.
32	20	SMF92GTN	8	EBCDIC	File system type name from MntEntFSTName field of BPXYMNTE.
40	28	SMF92GFN	44	EBCDIC	File system name from MntEntFSName field of BPXYMNTE. Migration target file system name.
84	54	SMF92GON	44	EBCDIC	Migration source file system name.
128	80	SMF92GBL	4	Binary	File system block size.
132	84	SMF92GST	8	Binary	Total space in file system in block size units.
140	8C	SMF92GSU	8	Binary	Allocated space in file system in block size units.
148	94	SMF92GFG	1	Binary	Flag byte.
149	95	SMF92GF2	1	Binary	Second flag byte. **Bit** **Meaning when set** **0** File system mounted locally (SMF92GLU) **1** File system mounted remotely (SMF92GNU) **2** Not used. **3** File system owner (SMF92GSN)
Mount Parm Option Section:					
152	98	SMF92MOL	2	Binary	Length of mount parm option.
154	9A	SMF92MON	variable	EBCDIC	Mount parm option used when mounting target file system. Maximum length=500.

Subtype 10

Offsets		Name	Length	Format	Description
File System Open — Data Section:					
0	0	SMF92OTO	8	binary	Time of open, STCK format.
8	8	SMF92OTY	1	binary	File type as defined in BPXYFTYP.
9	9	SMF92OFG	1	binary	Record flag byte. **Bit** **Meaning when set** **0** Generated by vnode interface service **1** Network socket (0 indicates UNIX domain socket) **2** Client socket (0 indicates server socket)
10	A		2	EBCDIC	Reserved.
12	C	SMF92OTK	4	binary	Open file token (matches token in close data section)

Offsets		Name	Length	Format	Description
16	10	SMF92OIN	4	binary	File serial number (inode).
20	14	SMF92ODN	4	binary	Unique device number for the file.

Subtype 11

Offsets		Name	Length	Format	Description
0	0	SMF92CTO	8	binary	Time of open, STCK format.
8	8	SMF92CTC	8	binary	Time of close, STCK format.
16	10	SMF92CTY	1	binary	File type as defined in BPXYFTYP.
17	11	SMF92CFG	1	binary	Record flag byte. **Bit** **Meaning when set** **0** Generated by vnode interface service **1** Network socket (0 indicates UNIX domain socket) **2** Client socket (0 indicates server socket) **3** File was cached **4** File had Deny Read set on it. **5** File had Deny Write set on it.
18	12		2	EBCDIC	Reserved.
20	14	SMF92CTK	4	binary	Open file token.
24	18	SMF92CIN	4	binary	File serial number (inode).
28	1C	SMF92CDN	4	binary	**Bit** **Meaning when set** **0** Invalid StDev; ignore **1** Socket range denotation; ignore **Note:** Any decimal value of 1,073,741,824 or greater should be ignored.
32	20	SMF92CSR	4	binary	Read calls issued to the file.
36	24	SMF92CSW	4	binary	Write calls issued to the file.
40	28	SMF92CDI	4	binary	Directory I/O blocks.
44	2C	SMF92CIR	4	binary	I/O blocks read.
48	30	SMF92CIW	4	binary	I/O blocks written.
52	34	SMF92CBR	8	binary	Bytes read.
60	3C	SMF92CBW	8	binary	Bytes written.
68	44	SMF92CPN	64	EBCDIC	The pathname used at open time, if known. If the name is 64 characters or longer, the last 64 characters of the name. The name is left-justified and padded with blanks. This field is not always present.

Subtype 12

Offsets		Name	Length	Format	Description
MMAP Subtype — Data Section:					
0	0	SMF92MTO	8	binary	Time of mmap, STCK format.
8	8	SMF92MSZ	4	binary	Number of bytes being memory mapped or x'7FFFFFFF' if map>=2G.
12	0C	SMF92MTK	4	binary	mmap file token (matches token in munmap data section).
16	10	SMF92MIN	4	binary	File serial number (inode).
20	14	SMF92MMDN	4	binary	File unique device number.
24	18	SMF92MLSZ	8	binary	64-bit number of bytes being memory-mapped.

Subtype 13

Offsets		Name	Length	Format	Description
MUNMAP Subtype — Data Section:					
0	0	SMF92MUTO	8	binary	Time of mmap, STCK format.
8	8	SMF92MUTC	8	binary	Time of munmap, STCK format.
16	10	SMF92MUSZ	4	binary	Number of bytes being memory mapped or x'7FFFFFFF' if map>=2G.
20	14	SMF92MUTK	4	binary	mmap file token (matches token in mmap data section).
24	18	SMF92MUIN	4	binary	File serial number (inode).
28	1C	SMF92MUDN	4	binary	File unique device number.
32	20	SMF92MUIR	4	binary	I/O blocks read.
36	24	SMF92MUIW	4	binary	I/O blocks written.
40	28	SMF92MLSZ	8	binary	64-bit number of bytes being memory-mapped.

Subtype 14

Offsets		Name	Length	Format	Description
File System Delete — Data Section:					
		SMF92DFL	204		Delete Subtype 14.
0	0	SMF92DFT	8	binary	Time of delete, STCK format.
8	8	SMF92DTY	1	binary	File type as defined in BPXYFTYP.
9	9	SMF92DFLG	1	Binary Bit	Flags: **Bit (Name)** **Meaning when set** **0 (SMF92DREN)** Rename record
10	A	*	2	Binary	Reserved.
12	C	SMF92DIN	4	binary	File serial number (inode).
16	10	SMF92DINP	4	binary	File serial number (inode) of parent.
20	14	SMF92DDN	4	binary	Unique device number for the file.
24	18	SMF92DFS	44	EBCDIC	File system name.
68	44	SMF92DNL	4	binary	Length of file name for delete.

Offsets		Name	Length	Format	Description
72	48	SMF92DFN	64	EBCDIC	Name of file that was deleted or renamed, left-justified and, if longer than 64 characters, truncated on the right.
136	88	SMF92DNLR	4	Binary	Length of new name of file that was renamed.
140	8C	SM92DFNR	64	EBCDIC	New name of file that was renamed, left-justified and, if longer than 64 characters, truncated on the right.

Subtype 15

Offsets		Name	Length	Format	Description
0	0	SMF92ACT	8	binary	Time of change, STCK format.
8	8	SMF92ATY	1	binary	File type as defined in BPXYFTYP.
9	9	SMF92AFLG	1	binary	Flags.
10	0A	*	2	binary	Reserved.
12	0C	SMF92AIN	4	binary	File serial number (inode).
16	10	SMF92ADN	4	binary	File system device number for the file.
20	14	SMF92AFS	44	EBCDIC	File system name.
64	40	SMF92AOLDGENVAL	4	binary	File's original generated values, which are the same as the values of st_GenValue from BPXYSTAT.
67	43	SMF92AOLDGENVALSECBYTE	3	binary	Record flag byte. **Bit** **Meaning when set** **0–2** Reserved. **3** Shared library. **4** Reserved. **5** Program is APF authorized. **6** Program controlled. **7** Reserved.
68	44	MF92AOLDSECATTRSC	4	EBCDIC	File's original security flags in character form: A, P, S.
68	44	SMF92AOLDATTRCHAR	1	EBCDIC	The '>' delimiter.
69	45	SMF92AOLDSHRLIBC	1	EBCDIC	The value is S if shared library was on.
70	46	SMF92AOLDAPFAUTHC	1	EBCDIC	The value is A if APF authorized was on.
71	47	SMF92AOLDPGMCTLC	1	EBCDIC	The value is P if program controlled was on.
72	48	SMF92ANEWGENVAL	4	binary	New generated values after the change, which are the same as the values of st_GenValue from BPXYSTAT.

Offsets		Name	Length	Format	Description
75	4B	SMF92ANEWGENVALSECBYTE	1	binary	Record flag byte. **Bit** **Meaning when set** **0–2** Reserved. **3** Shared library. **4** Reserved. **5** Program is APF authorized. **6** Program controlled. **7** Reserved.
76	4C	SMF92ANEWSECATTRSC	4	EBCDIC	File's new security flags in character form: A, P, S.
76	4C	SMF92ANEWATTRCHAR	1	EBCDIC	The > delimiter.
77	4D	SMF92ANEWSHRLIBC	1	EBCDI	The value is S if shared library is on.
78	4E	SMF92ANEWAPFAUTHC	1	EBCDIC	The value is A if APF authorized is on.
79	4F	SMF92ANEWPGMCTLC	1	EBCDIC	The value is P if Program controlled is on.
80	50	SMF92AOWNUID	4	binary	File owner user ID.
84	54	SMF92AOWNGID	4	binary	File owner GID.
88	58	SMF92ASECLABEL	8	EBCDIC	File security label.
96	60	SMF92AAUDITFID	16	EBCDIC	RACF's file ID, which is the same as the XXXX_FILE_ID in the various RACF SMF type 80 audit records.
112	70	*	20	EBCDIC	Reserved.
132	84	SMF92ACWDRC	4	binary	Error return code from **getcwd**.
136	88	SMF92ACWDRSN	4	binary	Error return code from **getcwd**. If the full path name of the file could not be determined, these fields contain the return and reason codes of the error. In this case, the SMF92APN field will contain the relative path name as entered by the user. SMF92APN is a full path name if SMF92ACWDRC=0.
140	8C	SMF92APNL	4	binary	The length of the file path name.
144	90	SMF92APN	1024	EBCDIC	The file path name that is the absolute path name as entered by the user or the **getcwd** value for the current working directory that is concatenated with the relative name that was entered by the user.

Subtype 16

For SMF record type 92, subtype 16 is the same as subtype 11 but for a socket, character special file, pipe, or fifo. Subtype 16 uses the same record format as the subtype 11 record. See "Subtype 11" on page 876 for the record format.

Subtype 17

Offsets		Name	Length	Format	Description
0	0	SMF92FAWT	64	binary	This can be the time when the internal file control block is released. If SMF92FAIT is on, denotes SMF interval time.
8	8	SMF92FAFG	8	binary	Record flag byte. **Bit** **Meaning when set** **0** SMF92FAWT is SMF interval time.
9	9		3	EBCDIC	Reserved.
12	0C	SMF92FAIN	4	binary	File serial number (inode).

Offsets		Name	Length	Format	Description
16	10	SMF92ADN	4	binary	Unique device number.
20	14	SMF92FATI	4	binary	Total accesses to file during interval.
24	18	SMF92FAPN	64	EBCDIC	Path name, if known.

Subtype 50

Subtype 50 is used for various file system events that could occur during the life of a file system. It is recorded, assuming that type 92 subtype 50 is active, whenever the event occurs.

Offsets		Name	Length	Format	Description
File System Event - Data section					
0	0	SMF92FSN	44	EBCDIC	File system name, blank-padded to 44 characters.
44	2C	SMF92VOL	6	EBCDIC	Volume serial of first extent of file system.
50	32	SMF92CCHH	4	Binary	CCCCHH of first extent of volume serial for file system.
54	36	SMF92EVENT	1	Binary	One of the following file system type events: **1** Log file recovery of this file system performed at mount or takeover time **2** Successful grow or dynamic grow **3** Failed grow command or dynamic grow **4** The file system data set was moved since it was last mounted R/W. **5** Sysplex takeover occurred for the file system. **6** The file system was disabled due to zFS assertion. **7** The file system was disabled due to I/O error. **8** Results of the online salvage of the file system. **9** The file system was shrunk. **10** The first phase of the salvage repair of the file system was completed. **11** The second phase of the salvage repair of the file system was completed. V5 tree rebuild results. **12** Encryption command results. **13** Decryption command results. **14** Compression command results. **15** Decompression command results.
55	37	SMF92FUT	1	Binary	Future use.
56	38	SMF92SIZ	8	Binary	Size field in kilobytes; this is the formatted size of the file system.
64	40	SMF92T50	16	Binary	STCKE value for the time of day (GMT) that the event occurred.

Offsets		Name	Length	Format	Description
80	50	SMF92CODE	4	Binary	Error codes for failed operations, depending on event types. **1** Return code from log recovery. **2** Not used; will be zero. **3** Indicates which grow step failed: **1** Extend failed. **2** Format-write failed. **3** Bitmap update failed. **4** Not used; will be zero. **5** Not used; will be zero. **6** Has the value 2C3 to indicate the abend code issued by zFS. **7** Not used; will be zero. **8** Number of minor errors found with the aggregate during salvage. **9** Not used; will be zero. **10** The error code, if repair failed. If it is 0, then all errors other than V5 broken directory trees were repaired. **11** The error code if the rebuild of V5 directory trees failed. **12,13** Error code for the encrypt or decrypt command processing. **13** The error code for the decrypt command processing.

Offsets		Name	Length	Format	Description
84	54	SMF92RSN	4	Binary	Reason code or additional information for failed operations, depending on event types. **1-2** Not used; will be zero. **3** Media Manager or DFSMS return code, if applicable. **4-5** Not used; will be zero. **6** The zFS abend reason code causing disablement. **7** Not used; will be zero. **8** Number of security-related errors found during salvage verification. **9** Not used; will be zero. **10** Set to value 1 if there are still V5 directories that need their tree rebuilt, which is the next phase of salvage repair. Otherwise, it is set to 0. **11** Is set to value 1 if there are still some V5 directories that require rebuilding of the tree. Otherwise, it is set to 0. **12,13** The percentage of the file system that was left encrypted, in case the commands were interrupted. It is 0 if not encrypted, 100 if fully encrypted, and between 0 and 100 if partially encrypted state left to interruption or another error.
88	58	SMF92OVS	6	EBCDIC	Prior volume serial; completed only for event type 4.
94	5E	SMF92OCH	4	Binary	CCCCHH of prior volume serial; completed only for event type 4. Otherwise, zero.
The following fields are completed only for event type 1.					
98	62	SMF92LRT	4	Binary	Log file recovery time in milliseconds.
102	66	SMF92LRP	4	Binary	Number of log pages processed.
106	6A	SMF92LRR	4	Binary	Number of log records processed.
110	6E	SMF92LRD	4	Binary	Number of log blocks modified.
114	72	SMF92LRE	4	Binary	Number of redo data records processed.
118	76	SMF92LRF	4	Binary	Number of fill records processed.
122	7A	SMF92LRN	4	Binary	Number of new block security records processed.
The following fields are used for all event types.					
126	7E	SMF92SYS	8	EBCDIC	Name of system reporting event.

Subtype 51

Subtype 51 shows the accumulated counts and response times made for the calls to zFS.

Offsets		Name	Length	Format	Description
zFS call counts - Data section					
0	0	SMF92CCT	16	Binary	STCKE of time that counts were last recorded.
16	10	SMF92CCC	4	Binary	Number of calls in the call-section area.
20	14	SMF92CCL	4	Binary	Length of each call count record.

Offsets		Name	Length	Format	Description
Call section area number of calls recorded determined by SMF92CCC					
0	0	SMF92VCC	8	Binary	Count of calls made to file systems owned locally or R/O file systems.
8	8	SMF92VCX	8	Binary	Count of calls that required a transmit to another sysplex member to complete for locally-owned file systems.
16	10	SMF92VCR	8	Binary	Count of calls made to file systems owned remotely from this member.
24	18	SMF92VCRX	8	Binary	Count of calls that required a transmit to another sysplex member to complete for remotely-owned file systems.
32	20	SMF92VCT	4	Binary	Average number of microseconds per call for locally-owned file systems.
36	24	SMF92VCRT	4	Binary	Average number of microseconds per call for remotely-owned file systems.
40	28	SMF92VCN	52	EBCDIC	Name of call; will be one of the following and will occur in this order in the record buffer: • zfs_opens • zfs_closes • zfs_reads • zfs_writes • zfs_ioctls • zfs_fileinfos • zfs_converts • zfs_getattrs • zfs_setattrs • zfs_accesses • zfs_lookups • zfs_creates • zfs_removes • zfs_links • zfs_renames • zfs_mkdirs • zfs_rmdirs • zfs-readdirs • zfs_symlinks • zfs_readlinks • zfs_fsyncs • zfs_inactivates • zfs_setacls • zfs_getacls • zfs_truncs • zfs_recoveries • zfs_audits • zfs_pfsctls • zfs_setatfss • zfs_vgets • zfs_unmounts • zfs_vinacts • zfs_syncs • zfs_clones • zfs_declones

Subtype 52

Subtype 52 contains file cache statistics for zFS users.

Offsets		Name	Length	Format	Description
User cache statistics - Data section					
0	0	SMF92UCT	16	Binary	STCKE value of time statistics were last recorded in SMF.
16	10	SMF92UCSCH	8	Binary	Number of times the dirty data for a file was scheduled for writing to disk.
24	18	SMF92UCSET	8	Binary	Number of calls to change attributes (particularly of interest to the user cache is changes to file size) of a file.
32	20	SMF92UCFSY	8	Binary	Number of calls to sync all dirty data for a file to disk (and sync implies waiting for all pending I/O).
40	28	SMF92UCUNM	8	Binary	Number of calls to purge user cache of data for a file due to unlink resulting in a link count of zero.
48	30	SMF92UCRD	8	Binary	Number of times a call was made to read data from a file in the user cache.
56	38	SMF92UCRDA	8	Binary	Number of async read-aheads that are scheduled for files that zFS considers are being accessed sequentially by the applications on the system.
64	40	SMF92UCWR	8	Binary	Number of times a call was made to write data to a file in the user file cache.
72	48	SMF92UCGET	8	Binary	Number of times user file cache called to obtain attributes of a file (user cache controls lengths of files).
80	50	SMF92UCFL	8	Binary	Number of times user file cache called to flush all data for a file system.
88	58	SMF92UCDEL	8	Binary	Number of times a write of dirty data was avoided because the file has become link count and open count zero.
96	60	SMF92UCRDF	8	Binary	Number of times a read call to the user file cache found that the data was not present in the cache (a cache miss).
104	68	SMF92UCWRF	8	Binary	Number of times a write call (which is updating existing regions of a file) to the user file cache found the data was not present in the cache (a cache miss).
112	70	SMF92UCRIO	8	Binary	Number of read I/Os made to disk on behalf of user file cache.
120	78	SMF92UCWRS	8	Binary	Number of normal write I/Os scheduled by the user file cache (due to file close or sync daemon).
128	80	SMF92UCWRE	8	Binary	Number of write I/Os scheduled by the user file cache when an error was found with the file.
136	88	SMF92UCWRR	8	Binary	Number of write I/Os scheduled by the user file cache due to reclaim-steal processing during a cache miss.
144	90	SMF92UCRWR	8	Binary	Number of times a task waited for I/O that was scheduled to read in data from disk for a file.
152	98	SMF92UCWW	8	Binary	Number of times a write to a portion of a file had to wait for I/O because the portion of that file was pending I/O to or from disk.
160	A0	SMF92UCWWF	8	Binary	Number of times a task had to wait for pending I/O for fsync calls.
168	A8	SMF92UCWWE	8	Binary	Number of times a task had to wait for I/O when performing error processing for a file.
176	B0	SMF92UCWWR	8	Binary	Number of times a task had to wait for I/O when performing reclaim-steal processing for a file.
184	B8	SMF92UCRST	8	Binary	Number of times reclaim-steal processing was invoked.
192	C0	SMF92UCCS	4	Binary	Number of caches spaces (hence LRU queues and page pools) in the user file cache. Also, the number of per-cache space records in the cache space section.

Offsets		Name	Length	Format	Description
196	C4	SMF92UCPCS	4	Binary	Number of pages in each cache space.
200	C8	SMF92UCSS	4	Binary	Size of an individual file segment.
204	CC	SMF92UCPGS	4	Binary	Size of a page in the user file cache.
208	D0	SMF92UCPGT	4	Binary	Total number of pages in the user file cache (this is SMF92UCPCS * SMF92UCCS).
212	D4	SMF92UCPGF	4	Binary	Number of free pages (not assigned to a file) in the user file cache.
216	D8	SMF92UCSGC	4	Binary	Number of allocated SEGMENT structures in the user file cache.
220	DC	SMF92UCDSL	4	Binary	Length of each per-cache space record.
Cache space section. SMF92UCCS is the number of the entries, SMF92UCDSL is the length of each of these entries.					
0	0	SMF92DSNAM	8	EBCDIC	Name of the cache space.
8	8	SMF92DSAS	4	Binary	Number of segments allocated to the cache space.
12	C	SMF92DSFR	4	Binary	Number of free pages in the cache space free list.

Subtype 53

Subtype 53 contains zFS metadata cache statistics.

Offsets		Name	Length	Format	Description
Metadata cache statistics - Data section					
0	0	SMF92MCT	16	Binary	STCKE value of time statistics for the metadata cache that were last recorded in SMF.
16	10	SMF92MCB	8	Binary	Number of buffers in the metadata cache.
24	18	SMF92MCLK	8	Binary	Number of calls to search for a buffer in the metadata cache.
32	20	SMF92MCHT	8	Binary	Number of search calls that already found the buffer in the cache (cache hits).
40	28	SMF92MCWP	8	Binary	Number of calls to update a metadata cache buffer.
48	30	SMF92MCPW	8	Binary	Number of partial buffers written (less than one buffer).
56	38	SMF92MCBS	4	Binary	Number of bytes in a metadata cache buffer.

Subtype 54

Subtype 54 contains zFS locking and sleep statistics including the most highly contended locks.

Offsets		Name	Length	Format	Description
Locking statistics - Data section					
0	0	SMF92LKT	16	Binary	STCKE value of time locking statistics were last recorded in SMF.
16	10	SMF92LKUTS	8	Binary	Number of untimed sleeps.
24	18	SMF92LKTS	8	Binary	Number of timed sleep calls (those whose sleep time is measured).
32	20	SMF92LKWK	8	Binary	Number of wakeup calls.
40	28	SMF92LKWT	8	Binary	Number of lock waits.
48	30	SMF92LKWTT	8	Binary	Average wait time in microseconds of a lock wait (this means a task was put into a wait state while waiting for a lock).
56	38	SMF92LKTST	8	Binary	Number of lock contentions of any kind. (zFS has three methods of resolving lock contention.)
64	40	SMF92LKLLL	2	Binary	Length of a lock contention record.

Offsets		Name	Length	Format	Description
66	42	SMF92LKLLC	2	Binary	Number of lock contention records that follow this record. A lock contention record indicates the contentions on a specific lock with the SMF92LKLLC most heavily contended locks listed.
68	44	SMF92LKSLL	2	Binary	Length of sleep contention record.
70	46	SMF92LKSLC	2	Binary	Number of sleep contention records (the most frequent SMF92LKSLC sleeps are listed).
Lock contention records: SMF92LKLC indicates how many of these follow here.					
0	0	SMF92LLWT	8	Binary	Number of times contention required a thread wait for this lock.
8	8	SMF92LLASY	8	Binary	Number of times contention was resolved using asynchronous dispatch of work.
16	10	SMF92LLSPN	8	Binary	Number of times contention was resolved via short (bounded) spin loop.
24	18	SMF92LLPCT	4	Binary	Fraction of all lock-waits that were for this specific lock represented in thousandths. Divide this number by 1000 to obtain a percentage with three decimal points
28	1C	SMF92LLDS	84	EBCDIC	String that describes the lock that is being contended on. Blank-padded.
Sleep contention records: SMF92LKSLC indicates how many of these follow here.					
0	0	SMF92SLCT	8	Binary	Count of indicated sleeps.
8	8	SMF92SLPCT	4	Binary	Fraction of all sleeps that were for this particular reason. Divide this number by 1000 to obtain a percentage with three decimal point precision.
12	C	SMF92SLDS	84	EBCDIC	String that describes the sleep (the reason the task was put to sleep). Blank-padded.

Subtype 55

Subtype 55 contains general zFS disk I/O statistics. It does not break down the I/O per DASD volume because doing so might generate too much data. Per-file system statistics that contain some of that information are available.

Offsets		Name	Length	Format	Description
DASD I/O statistics - Data section					
0	0	SMF92IOT	16	Binary	STCKE value of time I/O statistics were last recorded in SMF.
16	10	SMF92IORD	8	Binary	Number of read disk I/Os initiated.
24	18	SMF92IOWR	8	Binary	Number of write disk I/Os initiated.
32	20	SMF92IORDB	8	Binary	Number of bytes read from disk since last recording.
40	28	SMF92IOWRB	8	Binary	Number of bytes written to disk since last recording.
48	30	SMF92LIOWT	8	Binary	Number of times a task is made to wait for a pending I/O.
56	38	SMF92IOWTT	8	Binary	Average time in microseconds for a disk I/O wait (this is the amount of time a task waits in zFS for an I/O to complete. It is affected by DASD response time but is not DASD response time).
64	40	SMF92IOUC	8	Binary	User cache I/Os initiated.
72	48	SMF92IOUCM	8	Binary	User cache I/Os merged.
80	50	SMF92IOUCC	8	Binary	User cache I/Os canceled.
88	58	SMF92IOMC	8	Binary	Metadata cache I/Os initiated.
96	60	SMF92IOMCM	8	Binary	Metadata cache I/Os merged.
104	68	SMF92IOMCC	8	Binary	Metadata cache I/Os canceled.

Offsets		Name	Length	Format	Description
112	70	SMF92IOLC	8	Binary	Log cache I/Os initiated.
120	78	SMF92IOLCM	8	Binary	Log cache I/Os merged.
128	80	SMF92IOLCC	8	Binary	Log cache I/Os canceled.
136	88	SMF92IOCCT	2	Binary	Number of I/O circumstance records that follow.
138	8A	SMF90IOCCL	2	Binary	Length of each I/O circumstance record that follows.
I/O circumstance records: SMF92IOCCT indicates how many of these follow here. These count the number of times zFS performs an I/O for a given reason and indicate why zFS is issuing disk I/O.					
0	0	SMF92ICCT	8	Binary	Number of times and I/O performed for this circumstance.
8	8	SMF92ICWT	8	Binary	Number of times a task waited for I/O performed for this circumstance.
16	10	SMF92ICC	8	Binary	Number of times an I/O was canceled for this circumstance.
24	18	SMF92ICM	8	Binary	Number of times an I/O was merged for this circumstance.
32	20	SMF92ICD	54	EBCDIC	String that describes the circumstance, blank-padded. Will be one of the following, and in this order for version 1 statistics: • Metadata cache read miss • User cache read • Log file read • Metadata cache asynchronous delete • Metadata cache asynchronous write • Metadata cache lazy write • Metadata cache synchronous delete • User cache write • Metadata cache fsync write • Metadata cache sync daemon write • Metadata cache file system unmount write • Metadata cache buffer reclaim-steal write • Metadata cache buffer allocation write • Metadata cache quiesce write • Metadata cache buffer written due to full log file • Log file write • File system format write

Subtype 56

Subtype 56 provides token manager information.

Offsets		Name	Length	Format	Description
Metadata cache statistics - Data section					
0	0	SMF92TMT	16	Binary	STCKE value of time that tkm statistics were last recorded in SMF.
16	10	SMF92TMMX	8	Binary	Maximum number of tokens allowed for sysplex locking.
24	18	SMF92TMAL	8	Binary	Number of tokens currently allocated.
32	20	SMF92TMUS	8	Binary	Number of tokens in use.
40	28	SMF92TMFL	8	Binary	Number of file structures allocated.
48	30	SMF92TMOB	8	Binary	Number of token obtains.
56	38	SMF92TMRT	8	Binary	Number of token returns.
64	40	SMF92TMRV	8	Binary	Number of token revokes.

Offsets		Name	Length	Format	Description
72	48	SMF92TMAG	8	Binary	Number of async grants.
80	50	SMF92TMGC	8	Binary	Number of garbage collections.
88	58	SMF92TMTH	8	Binary	Number of thrashing files.
96	60	SMF92TMTR	8	Binary	Number of thrash resolutions performed.
104	68	SMF92TMSYC	2	Binary	Number of systems in the per-system monitoring section.
106	6A	SMF92TMSYL	2	Binary	Length of each record in the per-system monitoring section.
108	6C	SMF92TMTHC	2	Binary	Number of records in the thrashing files section.
110	6E	SMF92TMTHL	2	Binary	Length of each record in the thrashing files section.
Per-system token usage records: SMF92TMSYC indicates how many of these follow here.					
0	0	SMF92SUNAME	8	EBCDIC	Name of system, blank-padded.
8	8	SMF92SUTK	8	Binary	Number of tokens held by this system.
16	10	SMF92SUOB	8	Binary	Number of token obtains by this system.
24	18	SMF92SURT	8	Binary	Number of token returns from this system.
32	20	SMF92SURV	8	Binary	Number of tokens revoked from this system.
40	28	SMF92SUAG	8	Binary	Number of async grants of tokens to this system.
Thrashing file records: SMF92TMTHC indicates how many of those follow here.					
0	0	SMF92THIN	4	Binary	Inode number of thrashing file.
4	4	SMF92THUN	4	Binary	Uniquifier of thrashing file.
8	8	SMF92THM	45	EBCDIC	Name of file system, blank-padded.
53	35	SMF92THRS	3	Binary	Reserved for future use.

Subtype 57

Subtype 57 details the use of memory by zFS, with total bytes allocated to each zFS subcomponent.

Offsets		Name	Length	Format	Description
Metadata cache statistics - Data section					
0	0	SMF92STTT	16	Binary	STCKE value of time that storage statistics were last recorded in SMF.
16	10	SMF92STTAB	8	Binary	Total memory allocated to zFS above the bar. This is the address space that zFS resides in. If zFS is in the z/OS UNIX address space, then this is the total above the bar for both zFS and z/OS UNIX.
24	18	SMF92TTBB	8	Binary	Total memory allocated to zFS below the bar.This is the address space that zFS resides in. If zFS is in the z/OS UNIX address space, then this is the total below the bar for both zFS and z/OS UNIX.
32	20	SMF92THAA	8	Binary	Number of bytes allocated to zFS heap above the bar.
40	28	SMF92THAB	8	Binary	Number of bytes allocated to zFS heap below the bar.
48	30	SMF92THPA	8	Binary	Number of pieces of memory allocated from heap above the bar.
56	38	SMF92THPB	8	Binary	Number of pieces of memory allocated from heap below the bar.
64	40	SMF92THARA	8	Binary	Number of allocation requests for heap above the bar.
72	48	SMF92THBA	8	Binary	Number of allocation requests for heap below the bar.
80	50	SMF92THAR	8	Binary	Number of deallocation requests for heap above the bar.
88	58	SMF92THBR	8	Binary	Number of deallocation requests for heap below the bar.
96	60	SMF92STHCC	2	Binary	Number of subcomponent records that follow.

Offsets		Name	Length	Format	Description
98	62	SMF92STHCL	2	Binary	Length of each subcomponent record that follows.
Subcomponent storage usage records: SMF92STHCC indicates how many of these follow here.					
0	0	SMF92HCTA	8	Binary	Number of bytes allocated to subcomponent above the bar.
8	8	SMF92HCTB	8	Binary	Number of bytes allocated to subcomponent below the bar.
16	10	SMF92HCPA	8	Binary	Number of memory pieces allocated to subcomponent above the bar.
24	18	SMF92HCPB	8	Binary	Number of memory pieces allocated to subcomponent below the bar.
32	20	SMF92HCAA	8	Binary	Number of allocation requests for above-the-bar storage from this subcomponent.
40	28	SMF92HCAB	8	Binary	Number of allocation requests for below-the-bar storage for this subcomponent.
48	30	SMF92HCFA	8	Binary	Number of deallocation requests for above-the-bar storage for this subcomponent.
56	38	SMF92HCFB	8	Binary	Number of deallocation requests for below-the-bar storage for this subcomponent.
64	40	SMF92HCDS	84	EBCDIC	Name of subcomponent, padded with blanks.

Subtype 58

Subtype 58 contains records that indicate the number of transmits/receives and the average time it takes for zFS members in the sysplex to communicate with each other.

Offsets		Name	Length	Format	Description
Storage statistics - Data section					
0	0	SMF92TRT	16	Binary	STCKE value of time transmit/receive statistics were last recorded in SMF.
16	10	SMF92TRC	2	Binary	Number of transmit/receive records that follow.
18	12	SMF92TRL	2	Binary	Length of each transmit/receive records that follow.
Per-system transmit/receive records: SMF92TRC indicates how many of these follow here.					
0	0	SMF92TRTC	8	Binary	Number of file protocol transmits to indicated system.
8	8	SMF92TRRC	8	Binary	Number of file protocol messages received from indicated system.
16	10	SMF92TRTQ	8	Binary	Number of incoming file protocol messages that required queuing because all processing tasks were busy.
24	18	SMF92TRTW	8	Binary	Average time in microseconds that it took for the transmit to complete. This is the response time of the request to the remote member.
32	20	SMF92TRRW	8	Binary	Average time in microseconds that it took zFS to process the incoming message.
40	28	SMF92TRSN	52	EBCDIC	Name of system, blank-padded.

Subtype 59

Subtype 59 contains per-file system usage.

Offsets		Name	Length	Format	Description
Metadata cache statistics - Data section					
0	0	SMF92FST	16	Binary	STCKE value of time that file system statistics were last recorded in SMF for this file system.

Offsets		Name	Length	Format	Description
16	10	SMF92FSVN	8	Binary	Number of vnodes in memory for this file system.
24	18	SMF92FSVU	8	Binary	Number of vnodes held by z/OS UNIX for this file system.
32	20	SMF92FSOP	8	Binary	Number of open files for this file system.
40	28	SMF92FSUS	8	Binary	Number of pages in the user file cache for this file system.
48	30	SMF92FSMT	8	Binary	Number of pages in the metacache for this file system.
56	38	SMF92FSAR	4	Binary	Number of application read requests to this file system. A read is any operation that does not change file or directory contents.
64	3C	SMF92FSRR	8	Binary	Average read response time in microseconds for requests to this file system.
72	44	SMF92FSAW	8	Binary	Number of application write requests to this file system. A write is any operation that changes file or directory contents.
80	4C	SMF92FSWR	8	Binary	Average write response time in microseconds for requests to this file system.
88	54	SMF92FSXR	8	Binary	Number of read messages sent to an owner system for this file system; 0 if this system is the owner.
96	5C	SMF92FSXW	8	Binary	Number of write messages sent to an owner system for this file system; 0 if this system is the owner.
104	64	SMF92FSXRR	8	Binary	Average response time in microseconds of read requests sent to owner.
112	6C	SMF92FSXWR	8	Binary	Average response time in microseconds of write requests sent to owner.
120	74	SMF92FSES	8	Binary	Number of requests that received an out-of-space condition in this file system.
128	7C	SMF92FSIO	8	Binary	Number of requests receiving disk I/O errors for requests to this file system.
136	84	SMF92FSCM	8	Binary	Number of XCF communication failures or time-outs for messages sent to owner for this file system.
144	8C	SMF92FSCA	8	Binary	Number of times a user application task was asynchronously abended while running code in zFS for this file system.
152	94	SMF92FSMN	16	Binary	STCK time of mount of file system.
168	A4	SMF92FSDD	8	EBCDIC	DDNAME of allocation of file system data set, blank-padded.
176	AC	SMF92FSTK	8	Binary	Number of sysplex tokens in memory for this file system.
184	B4	SMF92FSDR	8	Binary	Number of read I/Os made to disk for this file system.
192	BC	SMF92FSDRB	8	Binary	Number of bytes read from disk for this file system.
200	C4	SMF92FSDW	8	Binary	Number of write I/Os made to disk for this file system.
208	CC	SMF92FSDWB	8	Binary	Number of bytes written to disk for this file system.
216	D4	SMF92FSDWC	8	Binary	Number of times a task had to wait on a disk I/O for this file system.
224	DC	SMF92FSDWT	8	Binary	Average wait time for tasks that had to wait on disk I/O for this file system.
232	E4	SMF92FSNM	45	EBCDIC	File system name, blank-padded.
277	111	SMF92FSRS	3	Binary	Reserved; will be zeros.

Record type 94 (X'5E') — IBM Tape Library Dataserver Statistics

The system-managed tape library accumulates statistics over the period of one hour. These statistics represent the activity of the IBM Tape Library Dataserver that results from all hosts attached to the library.

At the end of the hour, the system calculates composite statistics about the activity of all devices in the library and writes an SMF type 94 record.

The information in the SMF type 94 record represents:

- Current Information

  Represents the value of the statistic at the point the record is written.
- Summary of the Last Hour Information

  Represents statistics over the most recent hour for which composite statistics have been calculated.

For a VTS library, when microcode level F/C 4001 is installed and Outboard Policy Management is enabled, a new SMF94 record will be recorded. The new record is an SMF94 subtype=2, and will be recorded in addition to the existing SMF94 subtype=1. The SMF94 subtype=2 record is used to record Volume Pool Statistics.

The existing subtype=1 is also changed. When F/C 4001 is installed and Outboard Policy Management is enabled, some existing statistics will not be reported. The unreported fields will contain binary zero. Existing field SMF94HSF in subtype=1 records will contain the value 2 when F/C 4001 is installed and Outboard Policy Management is enabled.

Record mapping

Header/Self-defining Section

This section contains the common SMF record headers fields and the triplet fields (offset/length/number), if applicable, that locate the other sections on the record. The mapping macro resides in SYS1.MACLIB.

Offsets		Name	Length	Format	Description
0	0	SMF94LEN	2	binary	Record length. This field and the next field (total of four bytes) form the RDW (record descriptor word). See "Standard and Extended SMF record headers" on page 162 for a detailed description.
2	2	SMF94SEG	2	binary	Segment descriptor (see record length field).
4	4	SMF94FLG	1	binary	System indicator: **Bit** **Meaning when set** **0-2** Reserved **3-6** Version indicators* **7** Reserved. *See "Standard and Extended SMF record headers" on page 162 for a detailed description.
5	5	SMF94RTY	1	binary	Record type 94 (X'5E').
6	6	SMF94TME	4	binary	Time since midnight, in hundredths of a second, when the record was moved into the SMF buffer.
10	A	SMF94DTE	4	packed	Date when the record was moved into the SMF buffer, in the form 0*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for a detailed description.
14	E	SMF94SID	4	EBCDIC	System identification (from SMFPRMxx parmlib member).
18	12	SMF94WID	4	EBCDIC	Subsystem identification, worktype indicator.
22	16	SMF94STP	2	binary	Record subtype '01' — 34xx library statistics. '02' — Volume pooling statistics

Self-Defining Section (Subtype 1)

Offsets		Name	Length	Format	Description
24	18	SMF94SDL	4	binary	Self-defining section length.
28	1C	SMF94POF	4	binary	Offset to product section from start of record, including record descriptor word (RDW).
32	20	SMF94PLN	2	binary	Length of product section.
34	22	SMF94PON	2	binary	Number of product sections.
36	24	SMF94HOF	4	binary	Offset to format section from start of record, including record descriptor word (RDW).
40	28	SMF94HLN	2	binary	Length of format section.
42	2A	SMF94HON	2	binary	Number of format sections.
44	2C	SMF94SOF	4	binary	Offset to self-description information section from start of record, including record descriptor word (RDW).
48	30	SMF94SLN	2	binary	Length of self-description information section.
50	32	SMF94SON	2	binary	Number of self-description information sections.
52	34	SMF94LOF	4	binary	Offset to system-managed tape library statistics section from start of record, including record descriptor word (RDW).
56	38	SMF94LLN	2	binary	Length of system-managed tape library statistics section.
58	3A	SMF94LON	2	binary	Number of system-managed tape library statistics sections.
60	3C	SMF94MOF	4	binary	Offset to mount statistics section from start of record, including record descriptor word (RDW).
64	40	SMF94MLN	2	binary	Length of mount statistics section.
66	42	SMF94MON	2	binary	Number of mount statistics sections.
68	44	SMF94DOF	4	binary	Offset to demount statistics section from start of record, including record descriptor word (RDW).
72	48	SMF94DLN	2	binary	Length of demount statistics section.
74	4A	SMF94DON	2	binary	Number of demount statistics sections.
76	4C	SMF94EOF	4	binary	Offset to eject statistics section from start of record, including record descriptor word (RDW).
80	50	SMF94ELN	2	binary	Length of eject statistics section.
82	52	SMF94EON	2	binary	Number of eject statistics sections.
84	54	SMF94AOF	4	binary	Offset to audit statistics section from start of record, including record descriptor word (RDW).
88	58	SMF94ALN	2	binary	Length of audit statistics section.
90	5A	SMF94AON	2	binary	Number of audit statistics sections.
92	5C	SMF94IOF	4	binary	Offset to input statistics section from start of record, including record descriptor word (RDW).
96	60	SMF94ILN	2	binary	Length of input statistics section.
98	62	SMF94ION	2	binary	Number of input statistics sections.
100	64	SMF94VOF	4	binary	Offset to VTS statistics
104	68	SMF94VLN	2	binary	Length of VTS statistics
106	6A	SMF94VON	2	binary	Number of VTS statistics
108	6C	SMF94XOF	4	binary	Offset to import/export statistics
112	70	SMF94XLN	2	binary	Length of import/export statistics
114	72	SMF94XON	2	binary	Number of import/export statistics

Offsets		Name	Length	Format	Description
116	74	SMF942OF	4	binary	Offset to VTS enhanced library statistics
120	78	SMF942LN	2	binary	Length of VTS enhanced library statistics
122	7A	SMF942ON	2	binary	Number of VTS enhanced library statistics

Product Section

Offsets		Name	Length	Format	Description
0	0	SMF94TYP	2	binary	Subtype for type 94 record.
2	2	SMF94RVN	2	EBCDIC	Record version number C'01'.
4	4	SMF94PNM	8	EBCDIC	Product name 'JDZ1110 '.
12	C	SMF94MVS	8	EBCDIC	MVS operating system name.

Format Section

Offsets		Name	Length	Format	Description
0	0	SMF94HSF	1	binary	Statistics format. Always equals zero.
1	1	SMF94HHI	2	binary	Hour index. Incremented every hour. Value ranges from 0 to 23.

Self-Description Information

Offsets		Name	Length	Format	Description
0	0	SMF94SLT	6	EBCDIC	System-managed tape library type number. For example, ‘003495’ represents the IBM 3495 Tape Library Dataserver.
6	6	SMF94SLM	3	EBCDIC	System-managed tape library model number. For example, ‘L30’ represents model L30.
9	9	SMF94SMA	3	EBCDIC	System-managed tape library manufacturer. Always equals ‘IBM’.
12	C	SMF94SPL	2	EBCDIC	System-managed tape library plant of manufacture. For example, ‘13’ represents San Jose, California, and ‘77’ represents Valencia, Spain.
14	E	SMF94SNO	12	EBCDIC	System-managed tape library sequence number. Uniquely identifies a system-managed tape library.
26	1A		1		Reserved.

Self-Managed Tape Library Statistics

Offsets		Name	Length	Format	Description
0	0	SMF94LID	2	binary	Number of drives currently installed in a system-managed tape library.
2	2	SMF94LMD	2	binary	Number of drives currently mounted in a system-managed tape library.
4	4	SMF94LM1	2	binary	Maximum number of drives mounted during the last hour.
6	6	SMF94LM2	2	binary	Minimum number of drives mounted during the last hour.
8	8	SMF94LM3	2	binary	Average number of drives mounted during the last hour.
10	A	SMF94LT1	2	binary	Maximum amount of time, in seconds, that a tape volume was mounted on a drive during the last hour. The mount time of a volume is the time when the system completed mounting a volume on a drive until the time when the system-managed tape library receives an order from the host to demount the volume.

Offsets		Name	Length	Format	Description
12	C	SMF94LT2	2	binary	Minimum amount of time, in seconds, that a tape volume was mounted on a drive during the last hour. The mount time of a volume is the time when the system completed mounting a volume on a drive until the time when the system-managed tape library receives an order from the host to demount the volume.
14	E	SMF94LT3	2	binary	Average amount of time, in seconds, that all tape volumes were mounted on drives during the last hour. The mount time of a volume is the time when the system completed mounting a volume on a drive until the time when the system-managed tape library receives an order from the host to demount the volume.

Mount Statistics

Offsets		Name	Length	Format	Description
0	0	SMF94MPR	2	binary	The total number of mount requests currently pending.
2	2	SMF94MP1	2	binary	Maximum number of mount requests pending during the last hour.
4	4	SMF94MP2	2	binary	Minimum number of mount requests pending during the last hour.
6	6	SMF94MP3	2	binary	Average number of mount requests pending during the last hour.
8	8	SMF94MTO	2	binary	Total number of mounts during the last hour.
10	A	SMF94MIN	2	binary	Index mounts during the last hour. An index mount is a mount accomplished using the automatic cartridge loader of a 3490 tape drive.
12	C	SMF94MPM	2	binary	Pre-mounts during last hour. A single pre-mount operation causes a volume to be added to the automatic cartridge loader of a 3490 tape drive.
14	E	SMF94MT1	2	binary	Maximum amount of time, in seconds, required to perform any single mount operation during the last hour.
16	10	SMF94MT2	2	binary	Minimum amount of time, in seconds, required to perform any single mount operation during the last hour.
18	12	SMF94MT3	2	binary	Average amount of time, in seconds, required to perform a single mount operation during the last hour.

Demount Statistics

Offsets		Name	Length	Format	Description
0	0	SMF94DPR	2	binary	The total number of demount requests currently pending.
2	2	SMF94DP1	2	binary	Maximum number of demount requests pending during the last hour.
4	4	SMF94DP2	2	binary	Minimum number of demount requests pending during the last hour.
6	6	SMF94DP3	2	binary	Average number of demount requests pending during the last hour.
8	8	SMF94DTO	2	binary	Total number of demounts during the last hour.
10	A	SMF94DIN	2	binary	Index demounts during the last hour. An index demount moves a volume from the feed station to the output stack of the automatic cartridge loader of a 3490 tape drive.
12	C	SMF94DPM	2	binary	Post-demounts during the last hour. A post-demount operation moves a volume from the output stack of the automatic cartridge loader of a 3490 tape drive.

Offsets		Name	Length	Format	Description
14	E	SMF94DT1	2	binary	Maximum amount of time, in seconds, required to perform any single demount operation during the last hour.
16	10	SMF94DT2	2	binary	Minimum amount of time, in seconds, required to perform any single demount operation during the last hour.
18	12	SMF94DT3	2	binary	Average amount of time, in seconds, required to perform a single demount operation during the last hour.

Eject Statistics

Offsets		Name	Length	Format	Description
0	0	SMF94EPR	2	binary	The total number of eject requests currently pending. An eject operation moves one volume from the system-managed tape library to an output station for an operator to remove.
2	2	SMF94EP1	2	binary	Maximum number of eject requests pending during the last hour.
4	4	SMF94EP2	2	binary	Minimum number of eject requests pending during the last hour.
6	6	SMF94EP3	2	binary	Average number of eject requests pending during the last hour.
8	8	SMF94ETO	2	binary	Totals number of ejects during the last hour.
10	A	SMF94ET1	2	binary	Maximum amount of time, in seconds, required to perform any single eject operation during the last hour.
12	C	SMF94ET2	2	binary	Minimum amount of time, in seconds, required to perform any single eject operation during the last hour.
14	E	SMF94ET3	2	binary	Average amount of time, in seconds, required to perform a single eject operation during the last hour.

Audit statistics

Offsets		Name	Length	Format	Description
0	0	SMF94APR	2	binary	The total number of audit requests currently pending. When the host requests an audit operation, the accessor moves to a shelf location and ensures that a volume is present.
2	2	SMF94AP1	2	binary	Maximum number of audit requests pending during the last hour.
4	4	SMF94AP2	2	binary	Minimum number of audit requests pending during the last hour.
6	6	SMF94AP3	2	binary	Average number of audit requests pending during the last hour.
8	8	SMF94ATO	2	binary	Total number of audits during the last hour.
10	A	SMF94AT1	2	binary	Maximum amount of time, in seconds, required to perform any single audit operation during the last hour.
12	C	SMF94AT2	2	binary	Minimum amount of time, in seconds, required to perform any single audit operation during the last hour.
14	E	SMF94AT3	2	binary	Average amount of time, in seconds, required to perform a single audit operation during the last hour.

Insert Statistics

Offsets		Name	Length	Format	Description
0	0	SMF94INS	2	binary	Number of insert stores during last hour. This number is the number of volumes moved from an input station to a location inside the system-managed tape library.

VTS Statistics

Offsets		Name	Length	Format	Description
0	0	SMF94VNO	1	binary	Peer-to-Peer VTS reference number. X'01', User interface library. X'02', secondary library. X'FF', composite library. X'00', non-composite library.
1	1	SMF94VLS	5	EBCDIC	Library sequence number for the library segment for which VTS statistics are being reported.
6	6	SMF94VTI	1	binary	Number of underlying physical tape devices currently installed in the VTS subsystem. See Note 1.
7	7	SMF94VTA	1	binary	Number of underlying physical tape devices currently available for use by the VTS subsystem. See Note 1.
8	8	SMF94VTX	1	binary	Maximum number of underlying physical tape devices mounted concurrently in this VTS during last hour. See Note 1.
9	9	SMF94VTN	1	binary	Minimum number of underlying physical tape devices mounted concurrently in this VTS during last hour. See Note 1.
10	A	SMF94VTV	1	binary	Average number of underlying physical tape devices mounted concurrently in this VTS during last hour. Value is determined by summing number of concurrently mounted physical devices every 10 seconds, and dividing resultant sum by 360 during hourly statistics generation. See Note 1.
11	B	SMF94VR2	1	binary	Reserved, set to X'00'
12	C	SMF94VMX	2	binary	Maximum time in seconds used by the library to perform a mount request of a physical drive in the VTS in the last hour. Time is accrued from time mount request is accepted until it is completed. Mount time is accredited to the hour that mount is completed. See Note 1.
14	E	SMF94VMN	2	binary	Minimum time in seconds used by the library to perform a mount request for a physical drive in the VTS in the last hour. Time is accrued from time mount request is accepted until it is completed. Mount time is accredited to the hour that mount is completed. See Note 1.
16	10	SMF94VMV	2	binary	Average time in seconds used by the library to perform a mount request for a physical drive in the VTS in the last hour. Time is accrued from time mount request is accepted until it is completed. Mount time is accredited to the hour that mount is completed. See Note 1.
18	12	SMF94VPS	2	binary	The number of physical mount requests completed in last hour to satisfy recall mounts. See Note 1.
20	14	SMF94VPM	2	binary	The number of physical mount requests completed in last hour to satisfy copy requests. See Note 1.
22	16	SMF94VPR	2	binary	The number of physical mount requests completed in last hour to satisfy reclamation mounts. See Note 1.
24	18	SMF94VDC	1	binary	The number of virtual devices configured in this VTS at the time request for statistics was received (current). See Note 1.
25	19	SMF94VDX	1	binary	The maximum number of virtual drives that were concurrently mounted in this VTS during the last hour. See Note 1.
26	1A	SMF94VDN	1	binary	The minimum number of virtual drives that were concurrently mounted in this VTS during the last hour. See Note 1.
27	1B	SMF94VDA	1	binary	The average number of virtual drives that were concurrently mounted in this VTS during the last hour. Value is determined by summing number of concurrently mounted virtual devices every 10 seconds, and dividing resultant sum by 360 during hourly statistics generation. See Note 1.

Offsets		Name	Length	Format	Description
28	1C	SMF94VVX	2	binary	Maximum time in seconds that a virtual drive was mounted in this VTS during the last hour. Time is accrued from completion of mount until a demount is issued. Mount time is accredited to the hour that demount is issued. See Note 2.
30	1E	SMF94VVN	2	binary	Minimum time in seconds that a virtual drive was mounted in this VTS during the last hour. Time is accrued from completion of mount until a demount is issued. Mount time is accredited to the hour that demount is issued. See Note 2.
32	20	SMF94VVA	2	binary	Average time in seconds that a virtual drive was mounted in this VTS during the last hour. Time is accrued from completion of mount until a demount is issued. Mount time is accredited to the hour that demount is issued. See Note 2.
34	22	SMF94VRX	2	binary	Maximum time in seconds used to complete a mount request on a virtual drive in the last hour. Time is accrued from time mount request is accepted until it is completed. Mount time is accredited to the hour that the mount is completed. See Note 3.
36	24	SMF94VRN	2	binary	Minimum time in seconds used to complete a mount request on a virtual drive in the last hour. Time is accrued from time it is completed. Mount time is accredited to the hour that the mount is completed. See Note 3.
38	26	SMF94VRA	2	binary	Average time in seconds used to complete a mount request on a virtual drive in the last hour. Time is accrued from time mount request is accepted until it is completed. Mount time is accredited to the hour that the mount is completed. See Note 3.
40	28	SMF94VFR	2	binary	The number of virtual mounts in last hour using VTS Fast-Ready facility. Fast-Ready is used for mount-from-category request for which the specified category has the Fast-Ready attribute set, or for specific volume requests for which the specified volume is, at the time the mount request is received, assigned to a category that has the Fast-Ready attribute set. See Note 3.
42	2A	SMF94VMH	2	binary	The number of virtual mounts in the last hour that were completed for specific requested volume found resident in Tape Volume Cache (specific mount hits). See Note 3.
44	2C	SMF94VMS	2	binary	The number of virtual mounts in last hour that were completed with specific requested logic volume recalled from a physical tape back into Tape Volume Cache. See Note 3.
46	2E	SMF94VMP	2	binary	The number of virtual volumes for which a copy operation from the Tape Volume Cache to physical tape was completed in the last hour. See Note 3.
48	30	SMF94VBW	4	binary	The total number of bytes written successfully through host channels to virtual volumes in an integral multiple of 4096 bytes during the last hour. If number of bytes written is not an integer multiple of 4096, the number is rounded up. If the statistics are reported for a distributed library, the number reflects the effect of the VTC's compression of host data as written to the distributed library. See Note 2.
52	34	SMF94VBR	4	binary	The total number of bytes read successfully through host channels from virtual volumes in an integral multiple of 4096 bytes during the last hour. If number of bytes read is not an integer multiple of 4096, the number is rounded up. If the statistics are reported for a distributed library, the number reflects the effect of the VTC's compression of host data as written to the distributed library. See Note 2.
56	38	SMF94VTW	4	binary	The total number of bytes written successfully by VTS to its attached physical drives in an integral multiple of 4096 bytes during the last hour. If number of bytes written is not an integer multiple of 4096, the number is rounded up. Bytes are accredited to the hour in which the underlying premigrates of virtual volumes complete. See Note 1 and 3.

Offsets		Name	Length	Format	Description
60	3C	SMF94VTR	4	binary	The total number of bytes read successfully by VTS from its attached physical drives in an integral multiple of 4096 bytes during the last hour. If the number of bytes read is not an integer multiple of 4096, the number is rounded up. Bytes are accredited to the hour in which the underlying stage requests complete. See Note 1 and 3.
64	40	SMF94VCA	2	binary	The average, in minutes, of the age of last reference of the virtual volumes in the Tape Volume Cache, as determined at the end of the reported hour. See Note 1 and 3.
66	42	SMF94VCZ	2	binary	The average size of the virtual volumes in the Tape Volume Cache in an integral multiple of 1,048,576 bytes (1Mbytes), at the end of the reported hour. Virtual volume that contain less than 1 MB are rounded up to 1MB. See Note 1 and 3.
68	44	SMF94VNM	2	binary	The number of virtual volumes in Tape Volume Cache at the end of reported hour. See Note 1 and 3.
70	46	SMF94VR3	2	binary	Reserved, set to X'00'
72	48	SMF94VBA	4	binary	The total number of megabytes of data on the active logical volumes which are on VTS stacked volumes at the end of the reported hour. The number is the integral multiple of 1,048,576 bytes. This is the number of megabytes copied from the Tape Volume Cache to the stacked volumes and may include multiple versions of logical volumes. The obsolete versions will become inactive during the next reconciliation process. See Note 3.
76	4C	SMF94VLA	4	binary	The total number of active logical volumes which are on VTS stacked volumes at the end of the reported hour. This number may include multiple versions of logical volumes; therefore, the number may exceed the number of defined logical volumes. The obsolete versions will become inactive during the next reconciliation process. See Note 3.
80	50	SMF94VEC	4	binary	The total estimated amount of storage capacity provided by the empty cartridges managed by the Virtual Tape Server subsystem in an integral multiple of 1,048,576 bytes a (1 MByte) as of last midnight. This value is calculated by multiplying the number of scratch a cartridges for each media type present in the subsystem by the estimated storage capacity of each a media type. The storage capacity of a 3590 cartridge used by the Model B16 VTS with 3590 Model B1A tape drives is estimated by assuming a compression ratio of 2:1 which results in a storage capacity of 20 GBytes for the standard 3590 High Performance Cartridge. The Model B18 VTS uses an actual compression ratio (likely to be 1:1 with the EHPO feature since the data will already be in a compressed format in the Tape Volume Cache) resulting in an estimated storage capacity per J type cartridge of 10 GBytes for 3590 Model B1A tape drives, 20 GBytes for 3590 Model E1A tape drives and 30 GBytes for 3590 Model H1A tape drives. Storage a capacity for K type cartridges is double that for the J type. The Model B10 or B20 VTS uses the actual compression ratio and in addition to 3590 tape drives models and media, supports the 3592 Model J1A tape drives and media. The estimated storage a capacity for the JA type media is 300 GBytes and 60 GBytes for the JJ type media. See Note 3.

Note:

1. Contains zero with F/C 4001.
2. This field is a composite of all Virtual Tape Controllers (VTC) when reported for a composite library(SMF94VNO=X'FF').
3. Contains zero when reported for the composite library (SMF94VNO=X'FF')

Import/Export Statistics

Offsets		Name	Length	Format	Description
0	0	SMF94IM1	2	binary	count of physical volumes processed during import operations that completed in the last hour.
2	2	SMF94EX1	2	binary	count of physical volumes that contain the successfully exported logical volumes exported during the last hour.
4	4	SMF94IM2	4	binary	count of the number of logical volumes successfully imported during import operations that completed during the last hour.
8	8	SMF94EX2	4	binary	count of the number of logical volumes successfully exported for export operations that completed during the last hour.
12	C	SMF94IM3	4	binary	megabytes of data imported for import operations that completed in the last hour.
16	10	SMF94EX3	4	binary	megabytes of data exported during export operations that completed in the last hour.
20	14	SMF94IM4	4	binary	megabytes of data that was moved from one physical stacked volume to another as part of the import operations that completed in the last hour.
24	18	SMF94EX4	4	binary	megabytes moved from one physical stacked volume to another as part of the export operations completed in the last hour.
28	1C		8	binary	Reserved, set to X'00'
36	24	SMF94ACA	2	binary	Accessor A mounts. The count of the number of mount operations accessor A completed during the last hour.
38	26	SMF94ACB	2	binary	Accessor B mounts. The count of the number of mount operations accessor B completed during the last hour.
40	28		4	binary	Reserved, set to X'00'

VTS enhanced library statistics

Table 17. VTS enhanced library statistics

Offsets		Name	Length	Format	Description
0	0	S94BSRAT	2	binary	Backstore compression ratio in hundredths. See Note 1.
2	2	S94HARAT	2	binary	Host adapter compression ratio in hundredths. See Notes 2 and 4.
4	2	S94TVCS	2	binary	Tape volume cache size. See Note 1.
6	6	S94ESCON	1	binary	Number of ESCON channels. See Note 2.
7	7	S94SCSI	1	binary	Number of SCSI channels. See Note 1.
8	8	S94NUMBS	4	binary	Channel blocks written. See Note 2.
12	C	S940KB	1	binary	Percentage of 0 to 2K channel blocks written. See Note 2.
13	D	S942KB	1	binary	Percentage of greater than 2K to 4K channel blocks written. See Note 2.
14	E	S944KB	1	binary	Percentage of greater than 4K to 8K channel blocks written. See Note 2.
15	F	S948KB	1	binary	Percentage of greater than 8K to 16K channel blocks written. See Note 2.
16	10	S9416KB	1	binary	Percentage of greater than 16K to 32K channel blocks written. See Note 2.
17	11	S9432KB	1	binary	Percentage of greater than 32K to 64K channel blocks written. See Note 2.
18	12	S9464KB	1	binary	Percentage of greater than 64K channel blocks written. See Note 2.

Table 17. VTS enhanced library statistics (continued)

Offsets		Name	Length	Format	Description
19	13	S94RCPRT	1	binary	Recall predominate throttling percentage. See Note 1.
20	14	S94WROVT	1	binary	Write overrun predominate throttling percentage. See Note 1.
21	15		3	binary	Reserved
24	18	S94AVRCT	4	binary	Average recall throttle value. See Note 1.
28	1C	S94AVWOT	4	binary	Average write overrun throttle value. See Note 1.
32	20		4	binary	Reserved
36	24	S94TOTAT	4	binary	Overall average throttle value. See Note 1.
40	28	S94MAXFR	2	binary	Maximum fast-ready mount time. See Note 2.
42	2A	S94MINFR	2	binary	Minimum fast-ready mount time. See Note 2.
44	2C	S94AVGFR	2	binary	Average fast-ready mount time. See Note 2.
46	2E	S94MAXCH	2	binary	Maximum cache-hit mount time. See Note 2.
48	30	S94MINCH	2	binary	Minimum cache-hit mount time. See Note 2.
50	32	S94AVGCH	2	binary	Average cache-hit mount time. See Note 2.
52	34	S94MAXRM	2	binary	Maximum recall-mount mount time. See Note 2.
54	36	S94MINRM	2	binary	Minimum recall-mount mount time. See Note 2.
56	38	S94AVGRM	2	binary	Average recall-mount mount time. See Note 2.
58	3A	S94ADV05	2	binary	Number of volumes containing 0 to 5 percent active data. See Note 1.
60	3C	S94ADV10	2	binary	Number of volumes containing greater than 5 to 10 percent active data. See Note 1.
62	3E	S94ADV15	2	binary	Number of volumes containing greater than 10 to 15 percent active data. See Note 1.
64	40	S94ADV20	2	binary	Number of volumes containing greater than 15 to 20 percent active data. See Note 1.
66	42	S94ADV25	2	binary	Number of volumes containing greater than 20 to 25 percent active data. See Note 1.
68	44	S94ADV30	2	binary	Number of volumes containing greater than 25 to 30 percent active data. See Note 1.
70	46	S94ADV35	2	binary	Number of volumes containing greater than 30 to 35 percent active data. See Note 1.
72	48	S94ADV40	2	binary	Number of volumes containing greater than 35 to 40 percent active data. See Note 1.
74	4A	S94ADV45	2	binary	Number of volumes containing greater than 40 to 45 percent active data. See Note 1.
76	4C	S94ADV50	2	binary	Number of volumes containing greater than 45 to 50 percent active data. See Note 1.
78	4E	S94ADV55	2	binary	Number of volumes containing greater than 50 to 55 percent active data. See Note 1.
80	50	S94ADV60	2	binary	Number of volumes containing greater than 55 to 60 percent active data. See Note 1.
82	52	S94ADV65	2	binary	Number of volumes containing greater than 60 to 65 percent active data. See Note 1.
84	54	S94ADV70	2	binary	Number of volumes containing greater than 65 to 70 percent active data. See Note 1.
86	56	S94ADV75	2	binary	Number of volumes containing greater than 70 to 75 percent active data. See Note 1.

Table 17. VTS enhanced library statistics (continued)

Offsets		Name	Length	Format	Description
88	58	S94ADV80	2	binary	Number of volumes containing greater than 75 to 80 percent active data. See Note 1.
90	5A	S94ADV85	2	binary	Number of volumes containing greater than 80 to 85 percent active data. See Note 1.
92	5C	S94ADV90	2	binary	Number of volumes containing greater than 85 to 90 percent active data. See Note 1.
94	5E	S94ADV95	2	binary	Number of volumes containing greater than 90 to 95 percent active data. See Note 1.
96	60	S94ADV00	2	binary	Number of volumes containing greater than 95 to 100 percent active data. See Note 1.
98	62	S94THRES	1	binary	Reclaim threshold percentage. See Notes 1 and 5.
99	63		1	binary	Reserved (set to zero).
100	64	S94SRTCT	2	binary	Scratch stacked volume count. See Note 1.
102	66	S94PRICT	2	binary	Private stacked volume count. See Note 1.
104	68	S94MTVCA	4	binary	Maximum tape volume cache age. See Note 1.
108	6C	S94CMGTS	1	binary	If the request was for a distributed library of a PTP VTS Subsystem or a non-PTP VTS subsystem, this field reports the cache management setting for copy and recalled volumes. Each sub-field reports the cache management preference level set. The defaults are preference level 0 for copies and preference level 1 for recalls. The values for the sub-fields are only valid if bit 0 is active, otherwise the sub-fields are to be ignored. See Note 1. **Bit(s)** **Description** **0** Fields valid **1-3** Copy volume management preference level (0-7) **4** Reserved (set to B'0') **5–7** Recall volume management preference level (0-7)
109	6D		3	binary	Reserved (set to zero).
112	70	S94LVVCM	2	binary	VTS code Modification value. This two byte hexadecimal field contains the Modification portion for the VTS subsystem code level that generated the statistical record.
114	72	S94LVVCF	2	binary	VTS code fix value. This two byte hexadecimal field contains the Fix portion for the VTS subsystem code level that generated the statistical record.
116	74	S94LVLMV	2	binary	Library manager code version value. This two byte hexadecimal field contains the Version portion for the Library Manager code level that generated the statistical record.
118	76	S94LVLMR	2	binary	Library manager code release value. This two byte hexadecimal field contains the Release portion for the Library Manager code level that generated the statistical record.
120	78		8	binary	Reserved (set to zero).
128	80	S94CLLVC	4	binary	Composite library logical volumes to be copied. See Note 3.
132	84	S94CLDTC	4	binary	Composite library data yet to be copied. See Note 3.
136	88	S94CLMT0	2	binary	Composite library mounts completed for VTS-0. See Note 3.
138	8A	S94CLMT1	2	binary	Composite library mounts completed for VTS-1. See Note 3.

Table 17. VTS enhanced library statistics (continued)

Offsets		Name	Length	Format	Description
140	8C		4	binary	Reserved (set to zero).
144	90	S94CLDC0	4	binary	Data copied by VTC number 0. See Note 3.
148	94	S94CLVC0	4	binary	Volumes copied by VTC number 0. See Note 3.
152	98	S94CLRD0	4	binary	Read data transferred through VTC number 0. See Note 3.
156	9C	S94CLWD0	4	binary	Write data transferred through VTC number 0. See Note 3.
160	A0	S94CLCM0	2	binary	Category mounts for VTC number 0. See Note 3.
162	A2	S94CLSM0	2	binary	Specific cache mounts for VTC number 0. See Note 3.
164	A4	S94CLRM0	2	binary	Specific recall mounts for VTC number 0. See Note 3.
166	A6	S94CLCR0	2	binary	Compression ratio of the data that has moved through the host adapters of the VTC to the Tape Volume Cache of the I/O VTSs in the last hour. The granularity of the value reported is in hundredths. If no data has been moved through the host adapters in the last hour, a compression value of zero is reported. See Note 3.
168	A8	S94CLPF0	1	binary	I/O VTS and master VTS preferences for the VTC. See Note 3. **Bit(s)** **Description** **0–3** Preferred I/O. This field indicates if a preferred VTS has been specified for I/O operations. If possible all host I/O operations will be directed to the specified VTS. If bit 0 is not active, then the VTS does not support the reporting of a preferred I/O VTS. **Value** **Description** **8** VTS 0 **9** VTS 1 **F** No preference Values not listed are reserved. **4–7** This field indicates if a preferred master VTS has been specified. If the specified VTS is not the current master, the VTC will attempt a master switchover to the preferred VTS, if conditions within the PTP VTS would allow it. If bit 0 is not active, then the VTS does not support the reporting of a preferred master VTS.Values not listed are reserved. **Value** **Description** **8** VTS 0 **9** VTS 1 **F** No preference

Table 17. VTS enhanced library statistics (continued)

Offsets		Name	Length	Format	Description
169	A9	S94CLCS0	2	binary	Configured settings. Operational settings configured for the VTC. The reported operational setting are valid only if bit 15 is active. See Note 3. **Bit(s)** **Description** **0–1** Default copy mode. Reports the copy mode set as the default for the VTC: **Value** **Description** **0** Deferred copy mode **1** Immediate copy mode Values not listed are reserved. **2** Force Scratch to preferred I/O VTS. If this bit is active, all scratch mounts use the preferred VTS, if available, independent of the data validity on the preferred VTS. **3** Primary I/O. If this bit is active, a PSF-PMC order was accepted that specified a VTS I/O Selection Criteria of Primary. **4–5** Controller Operational Mode This field reports the operational mode. **Value** **Description** **0** Deferred copy mode **1** Immediate copy mode Values not listed are reserved. **6** Write protect mode. If this bit is active, the Virtual Tape Controllers (VTC) is in write protected mode. All host commands that attempt to change the attributes of a volume or modify/add data to a volume will fail. This mode supersedes the controller operational mode. **7–14** Reserved (set to 0) **15** Fields valid

Table 17. VTS enhanced library statistics (continued)

Offsets		Name	Length	Format	Description
171	AB	S94CLRL0	1	binary	Relative link speeds. Reports the CE settings for the relative link speeds between the VTC and VTS0 and VTS1. See Note 3. The following values are defined: **Value** **Description** **0** No support for reporting relative link speeds **1** ESCON < 5 km, FICON < 30 km **2** ESCON < 10 km, FICON < 80 km **3** Channel Ext < 1000 km, ESCON over DWDM < 10 km, FICON < 100 km **4** Channel Ext > 1000 km, ESCON over DWDM < 15 km **5** ESCON over DWDM > 15 km Values not listed are reserved. **Bit(s)** **Description** **0–3** VTC to VTS0 link speed value **4–7** VTC to VTS1 link speed value
172	AC		4	binary	Reserved (set to zero).
176	B0	S94CLDC1	4	binary	Data copied by AX0 number 1. See Note 3.
180	B4	S94CLVC1	4	binary	Volumes copied by AX0 number 1. See Note 3.
184	B8	S94CLRD1	4	binary	Read data transferred through AX0 number 1. See Note 3.
188	BC	S94CLWD1	4	binary	Write data transferred through AX0 number 1. See Note 3.
192	C0	S94CLCM1	2	binary	Category mounts for AX0 number 1. See Note 3.
194	C2	S94CLSM1	2	binary	Specific cache mounts for AX0 number 1. See Note 3.
196	C4	S94CLRM1	2	binary	Specific recall mounts for AX0 number 1. See Note 3.
198	C6	S94CLCR1	2	binary	Compression ratio of the data that has moved through the host adapters of the VTC to the Tape Volume Cache of the I/O VTSs in the last hour. The granularity of the value reported is in hundredths. If no data has been moved through the host adapters in the last hour, a compression value of zero is reported. See Note 3.

Table 17. VTS enhanced library statistics (continued)

Offsets		Name	Length	Format	Description
200	C8	S94CLPF1	1	binary	I/O VTS and master VTS preferences for the VTC. See Note 3. **Bit(s)** **Description** **0–3** Preferred I/O. This field indicates if a preferred VTS has been specified for I/O operations. If possible all host I/O operations will be directed to the specified VTS. If bit 0 is not active, then the VTS does not support the reporting of a preferred I/O VTS. **Value** **Description** **8** VTS 0 **9** VTS 1 **F** No preference Values not listed are reserved. **4–7** This field indicates if a preferred master VTS has been specified. If the specified VTS is not the current master, the VTC will attempt a master switchover to the preferred VTS, if conditions within the PTP VTS would allow it. If bit 0 is not active, then the VTS does not support the reporting of a preferred master VTS.Values not listed are reserved. **Value** **Description** **8** VTS 0 **9** VTS 1 **F** No preference

Table 17. VTS enhanced library statistics (continued)

Offsets		Name	Length	Format	Description
201	C9	S94CLCS1	2	binary	Configured settings. Operational settings configured for the VTC. The reported operational setting are valid only if bit 15 is active. See Note 3. **Bit(s)** **Description** **0–1** Default copy mode. Reports the copy mode set as the default for the VTC: **Value** **Description** **0** Deferred copy mode **1** Immediate copy mode Values not listed are reserved. **2** Force Scratch to preferred I/O VTS. If this bit is active, all scratch mounts use the preferred VTS, if available, independent of the data validity on the preferred VTS. **3** Primary I/O. If this bit is active, a PSF-PMC order was accepted that specified a VTS I/O Selection Criteria of Primary. **4–5** Controller Operational Mode This field reports the operational mode. **Value** **Description** **0** Deferred copy mode **1** Immediate copy mode Values not listed are reserved. **6** Write protect mode. If this bit is active, the Virtual Tape Controllers (VTC) is in write protected mode. All host commands that attempt to change the attributes of a volume or modify/add data to a volume will fail. This mode supersedes the controller operational mode. **7–14** Reserved (set to 0) **15** Fields valid

Table 17. VTS enhanced library statistics (continued)

Offsets		Name	Length	Format	Description
203	CB	S94CLRL1	1	binary	Relative link speeds. Reports the CE settings for the relative link speeds between the VTC and VTS0 and VTS1. See Note 3. The following values are defined: **Value** **Description** **0** No support for reporting relative link speeds **1** ESCON < 5 km, FICON < 30 km **2** ESCON < 10 km, FICON < 80 km **3** Channel Ext < 1000 km, ESCON over DWDM < 10 km, FICON < 100 km **4** Channel Ext > 1000 km, ESCON over DWDM < 15 km **5** ESCON over DWDM > 15 km Values not listed are reserved. **Bit(s)** **Description** **0–3** VTC to VTS0 link speed value **4–7** VTC to VTS1 link speed value
204	CC		4	binary	Reserved (set to zero).
208	D0	S94CLDC2	4	binary	Data copied by AX0 number 2. See Note 3.
212	D4	S94CLVC2	4	binary	Volumes copied by AX0 number 2. See Note 3.
216	D8	S94CLRD2	4	binary	Read data transferred through AX0 number 2. See Note 3.
220	DC	S94CLWD2	4	binary	Write data transferred through AX0 number 2. See Note 3.
224	E0	S94CLCM2	2	binary	Category mounts for AX0 number 2. See Note 3.
226	E2	S94CLSM2	2	binary	Specific cache mounts for AX0 number 2. See Note 3.
228	E4	S94CLRM2	2	binary	Specific recall mounts for AX0 number 2. See Note 3.
230	E6	S94CLCR2	2	binary	Compression ratio of the data that has moved through the host adapters of the VTC to the Tape Volume Cache of the I/O VTSs in the last hour. The granularity of the value reported is in hundredths. If no data has been moved through the host adapters in the last hour, a compression value of zero is reported. See Note 3.

Table 17. VTS enhanced library statistics (continued)

Offsets		Name	Length	Format	Description
232	E8	S94CLPF2	1	binary	I/O VTS and master VTS preferences for the VTC. See Note 3. **Bit(s)** **Description** **0–3** Preferred I/O. This field indicates if a preferred VTS has been specified for I/O operations. If possible all host I/O operations will be directed to the specified VTS. If bit 0 is not active, then the VTS does not support the reporting of a preferred I/O VTS. **Value** **Description** **8** VTS 0 **9** VTS 1 **F** No preference Values not listed are reserved. **4–7** This field indicates if a preferred master VTS has been specified. If the specified VTS is not the current master, the VTC will attempt a master switchover to the preferred VTS, if conditions within the PTP VTS would allow it. If bit 0 is not active, then the VTS does not support the reporting of a preferred master VTS.Values not listed are reserved. **Value** **Description** **8** VTS 0 **9** VTS 1 **F** No preference

Table 17. VTS enhanced library statistics (continued)

Offsets		Name	Length	Format	Description
233	E9	S94CLCS2	2	binary	Configured settings. Operational settings configured for the VTC. The reported operational setting are valid only if bit 15 is active. See Note 3. **Bit(s)** **Description** **0–1** Default copy mode. Reports the copy mode set as the default for the VTC: **Value** **Description** **0** Deferred copy mode **1** Immediate copy mode Values not listed are reserved. **2** Force Scratch to preferred I/O VTS. If this bit is active, all scratch mounts use the preferred VTS, if available, independent of the data validity on the preferred VTS. **3** Primary I/O. If this bit is active, a PSF-PMC order was accepted that specified a VTS I/O Selection Criteria of Primary. **4–5** Controller Operational Mode This field reports the operational mode. **Value** **Description** **0** Deferred copy mode **1** Immediate copy mode Values not listed are reserved. **6** Write protect mode. If this bit is active, the Virtual Tape Controllers (VTC) is in write protected mode. All host commands that attempt to change the attributes of a volume or modify/add data to a volume will fail. This mode supersedes the controller operational mode. **7–14** Reserved (set to 0) **15** Fields valid

Table 17. VTS enhanced library statistics (continued)

Offsets		Name	Length	Format	Description
235	EB	S94CLRL2	1	binary	Relative link speeds. Reports the CE settings for the relative link speeds between the VTC and VTS0 and VTS1. See Note 3. The following values are defined: **Value** **Description** **0** No support for reporting relative link speeds **1** ESCON < 5 km, FICON < 30 km **2** ESCON < 10 km, FICON < 80 km **3** Channel Ext < 1000 km, ESCON over DWDM < 10 km, FICON < 100 km **4** Channel Ext > 1000 km, ESCON over DWDM < 15 km **5** ESCON over DWDM > 15 km Values not listed are reserved. **Bit(s)** **Description** **0–3** VTC to VTS0 link speed value **4–7** VTC to VTS1 link speed value
236	EC		4	binary	Reserved (set to zero).
240	F0	S94CLDC3	4	binary	Data copied by AX0 number 3. See Note 3.
244	F4	S94CLVC3	4	binary	Volumes copied by AX0 number 3. See Note 3.
248	F8	S94CLRD3	4	binary	Read data transferred through AX0 number 3. See Note 3.
252	FC	S94CLWD3	4	binary	Write data transferred through AX0 number 3. See Note 3.
256	100	S94CLCM3	2	binary	Category mounts for AX0 number 3. See Note 3.
258	102	S94CLSM3	2	binary	Specific cache mounts for AX0 number 3. See Note 3.
260	104	S94CLRM3	2	binary	Specific recall mounts for AX0 number 3. See Note 3.
262	106	S94CLCR3	2	binary	Compression ratio of the data that has moved through the host adapters of the VTC to the Tape Volume Cache of the I/O VTSs in the last hour. The granularity of the value reported is in hundredths. If no data has been moved through the host adapters in the last hour, a compression value of zero is reported. See Note 3.

Table 17. VTS enhanced library statistics (continued)

Offsets		Name	Length	Format	Description
264	108	S94CLPF3	1	binary	I/O VTS and master VTS preferences for the VTC. See Note 3. **Bit(s)** **Description** **0–3** Preferred I/O. This field indicates if a preferred VTS has been specified for I/O operations. If possible all host I/O operations will be directed to the specified VTS. If bit 0 is not active, then the VTS does not support the reporting of a preferred I/O VTS. **Value** **Description** **8** VTS 0 **9** VTS 1 **F** No preference Values not listed are reserved. **4–7** This field indicates if a preferred master VTS has been specified. If the specified VTS is not the current master, the VTC will attempt a master switchover to the preferred VTS, if conditions within the PTP VTS would allow it. If bit 0 is not active, then the VTS does not support the reporting of a preferred master VTS.Values not listed are reserved. **Value** **Description** **8** VTS 0 **9** VTS 1 **F** No preference

Table 17. VTS enhanced library statistics (continued)

Offsets		Name	Length	Format	Description
265	109	S94CLCS3	2	binary	Configured settings. Operational settings configured for the VTC. The reported operational setting are valid only if bit 15 is active. See Note 3. **Bit(s)** **Description** **0–1** Default copy mode. Reports the copy mode set as the default for the VTC: **Value** **Description** **0** Deferred copy mode **1** Immediate copy mode Values not listed are reserved. **2** Force Scratch to preferred I/O VTS. If this bit is active, all scratch mounts use the preferred VTS, if available, independent of the data validity on the preferred VTS. **3** Primary I/O. If this bit is active, a PSF-PMC order was accepted that specified a VTS I/O Selection Criteria of Primary. **4–5** Controller Operational Mode This field reports the operational mode. **Value** **Description** **0** Deferred copy mode **1** Immediate copy mode Values not listed are reserved. **6** Write protect mode. If this bit is active, the Virtual Tape Controllers (VTC) is in write protected mode. All host commands that attempt to change the attributes of a volume or modify/add data to a volume will fail. This mode supersedes the controller operational mode. **7–14** Reserved (set to 0) **15** Fields valid

Table 17. VTS enhanced library statistics (continued)

Offsets		Name	Length	Format	Description
267	10B	S94CLRL3	1	binary	Relative link speeds. Reports the CE settings for the relative link speeds between the VTC and VTS0 and VTS1. See Note 3. The following values are defined: **Value** **Description** **0** No support for reporting relative link speeds **1** ESCON < 5 km, FICON < 30 km **2** ESCON < 10 km, FICON < 80 km **3** Channel Ext < 1000 km, ESCON over DWDM < 10 km, FICON < 100 km **4** Channel Ext > 1000 km, ESCON over DWDM < 15 km **5** ESCON over DWDM > 15 km Values not listed are reserved. **Bit(s)** **Description** **0–3** VTC to VTS0 link speed value **4–7** VTC to VTS1 link speed value
268	10C		4	binary	Reserved (set to zero).
272	110	S94CLDC4	4	binary	Data copied by AX0 number 4. See Note 3.
276	114	S94CLVC4	4	binary	Volumes copied by AX0 number 4. See Note 3.
280	118	S94CLRD4	4	binary	Read data transferred through AX0 number 4. See Note 3.
284	11C	S94CLWD4	4	binary	Write data transferred through AX0 number 4. See Note 3.
288	120	S94CLCM4	2	binary	Category mounts for AX0 number 4. See Note 3.
290	122	S94CLSM4	2	binary	Specific cache mounts for AX0 number 4. See Note 3.
292	124	S94CLRM4	2	binary	Specific recall mounts for AX0 number 4. See Note 3.
294	126	S94CLCR4	2	binary	Compression ratio of the data that has moved through the host adapters of the VTC to the Tape Volume Cache of the I/O VTSs in the last hour. The granularity of the value reported is in hundredths. If no data has been moved through the host adapters in the last hour, a compression value of zero is reported. See Note 3.

Table 17. VTS enhanced library statistics (continued)

Offsets		Name	Length	Format	Description
296	128	S94CLPF4	1	binary	I/O VTS and master VTS preferences for the VTC. See Note 3. **Bit(s)** **Description** **0–3** Preferred I/O. This field indicates if a preferred VTS has been specified for I/O operations. If possible all host I/O operations will be directed to the specified VTS. If bit 0 is not active, then the VTS does not support the reporting of a preferred I/O VTS. **Value** **Description** **8** VTS 0 **9** VTS 1 **F** No preference Values not listed are reserved. **4–7** This field indicates if a preferred master VTS has been specified. If the specified VTS is not the current master, the VTC will attempt a master switchover to the preferred VTS, if conditions within the PTP VTS would allow it. If bit 0 is not active, then the VTS does not support the reporting of a preferred master VTS.Values not listed are reserved. **Value** **Description** **8** VTS 0 **9** VTS 1 **F** No preference

Table 17. VTS enhanced library statistics (continued)

Offsets		Name	Length	Format	Description
297	129	S94CLCS4	2	binary	Configured settings. Operational settings configured for the VTC. The reported operational setting are valid only if bit 15 is active. See Note 3. **Bit(s)** **Description** **0–1** Default copy mode. Reports the copy mode set as the default for the VTC: **Value** **Description** **0** Deferred copy mode **1** Immediate copy mode Values not listed are reserved. **2** Force Scratch to preferred I/O VTS. If this bit is active, all scratch mounts use the preferred VTS, if available, independent of the data validity on the preferred VTS. **3** Primary I/O. If this bit is active, a PSF-PMC order was accepted that specified a VTS I/O Selection Criteria of Primary. **4–5** Controller Operational Mode This field reports the operational mode. **Value** **Description** **0** Deferred copy mode **1** Immediate copy mode Values not listed are reserved. **6** Write protect mode. If this bit is active, the Virtual Tape Controllers (VTC) is in write protected mode. All host commands that attempt to change the attributes of a volume or modify/add data to a volume will fail. This mode supersedes the controller operational mode. **7–14** Reserved (set to 0) **15** Fields valid

Table 17. VTS enhanced library statistics (continued)

Offsets		Name	Length	Format	Description
299	12B	S94CLRL4	1	binary	Relative link speeds. Reports the CE settings for the relative link speeds between the VTC and VTS0 and VTS1. See Note 3. The following values are defined: **Value** **Description** **0** No support for reporting relative link speeds **1** ESCON < 5 km, FICON < 30 km **2** ESCON < 10 km, FICON < 80 km **3** Channel Ext < 1000 km, ESCON over DWDM < 10 km, FICON < 100 km **4** Channel Ext > 1000 km, ESCON over DWDM < 15 km **5** ESCON over DWDM > 15 km Values not listed are reserved. **Bit(s)** **Description** **0–3** VTC to VTS0 link speed value **4–7** VTC to VTS1 link speed value
300	12C		4	binary	Reserved (set to zero).
304	130	S94CLDC5	4	binary	Data copied by AX0 number 5. See Note 3.
308	134	S94CLVC5	4	binary	Volumes copied by AX0 number 5. See Note 3.
312	138	S94CLRD5	4	binary	Read data transferred through AX0 number 5. See Note 3.
316	13C	S94CLWD5	4	binary	Write data transferred through AX0 number 5. See Note 3.
320	140	S94CLCM5	2	binary	Category mounts for AX0 number 5. See Note 3.
322	142	S94CLSM5	2	binary	Specific cache mounts for AX0 number 5. See Note 3.
324	144	S94CLRM5	2	binary	Specific recall mounts for AX0 number 5. See Note 3.
326	146	S94CLCR5	2	binary	Compression ratio of the data that has moved through the host adapters of the VTC to the Tape Volume Cache of the I/O VTSs in the last hour. The granularity of the value reported is in hundredths. If no data has been moved through the host adapters in the last hour, a compression value of zero is reported. See Note 3.

Table 17. VTS enhanced library statistics (continued)

Offsets		Name	Length	Format	Description
328	148	S94CLPF5	1	binary	I/O VTS and master VTS preferences for the VTC. See Note 3. **Bit(s)** **Description** **0–3** Preferred I/O. This field indicates if a preferred VTS has been specified for I/O operations. If possible all host I/O operations will be directed to the specified VTS. If bit 0 is not active, then the VTS does not support the reporting of a preferred I/O VTS. **Value** **Description** **8** VTS 0 **9** VTS 1 **F** No preference Values not listed are reserved. **4–7** This field indicates if a preferred master VTS has been specified. If the specified VTS is not the current master, the VTC will attempt a master switchover to the preferred VTS, if conditions within the PTP VTS would allow it. If bit 0 is not active, then the VTS does not support the reporting of a preferred master VTS.Values not listed are reserved. **Value** **Description** **8** VTS 0 **9** VTS 1 **F** No preference

Offsets		Name	Length	Format	Description
Table 17. VTS enhanced library statistics (continued)					
329	149	S94CLCS5	2	binary	Configured settings. Operational settings configured for the VTC. The reported operational setting are valid only if bit 15 is active. See Note 3. **Bit(s)** **Description** **0–1** Default copy mode. Reports the copy mode set as the default for the VTC: **Value** **Description** **0** Deferred copy mode **1** Immediate copy mode Values not listed are reserved. **2** Force Scratch to preferred I/O VTS. If this bit is active, all scratch mounts use the preferred VTS, if available, independent of the data validity on the preferred VTS. **3** Primary I/O. If this bit is active, a PSF-PMC order was accepted that specified a VTS I/O Selection Criteria of Primary. **4–5** Controller Operational Mode This field reports the operational mode. **Value** **Description** **0** Deferred copy mode **1** Immediate copy mode Values not listed are reserved. **6** Write protect mode. If this bit is active, the Virtual Tape Controllers (VTC) is in write protected mode. All host commands that attempt to change the attributes of a volume or modify/add data to a volume will fail. This mode supersedes the controller operational mode. **7–14** Reserved (set to 0) **15** Fields valid

Table 17. VTS enhanced library statistics (continued)

Offsets		Name	Length	Format	Description
331	14B	S94CLRL5	1	binary	Relative link speeds. Reports the CE settings for the relative link speeds between the VTC and VTS0 and VTS1. See Note 3. The following values are defined: **Value** **Description** **0** No support for reporting relative link speeds **1** ESCON < 5 km, FICON < 30 km **2** ESCON < 10 km, FICON < 80 km **3** Channel Ext < 1000 km, ESCON over DWDM < 10 km, FICON < 100 km **4** Channel Ext > 1000 km, ESCON over DWDM < 15 km **5** ESCON over DWDM > 15 km Values not listed are reserved. **Bit(s)** **Description** **0–3** VTC to VTS0 link speed value **4–7** VTC to VTS1 link speed value
332	14C		4	binary	Reserved (set to zero).
336	150	S94CLDC6	4	binary	Data copied by AX0 number 6. See Note 3.
340	154	S94CLVC6	4	binary	Volumes copied by AX0 number 6. See Note 3.
344	158	S94CLRD6	4	binary	Read data transferred through AX0 number 6. See Note 3.
348	15C	S94CLWD6	4	binary	Write data transferred through AX0 number 6. See Note 3.
352	160	S94CLCM6	2	binary	Category mounts for AX0 number 6. See Note 3.
354	162	S94CLSM6	2	binary	Specific cache mounts for AX0 number 6. See Note 3.
356	164	S94CLRM6	2	binary	Specific recall mounts for AX0 number 6. See Note 3.
358	166	S94CLCR6	2	binary	Compression ratio of the data that has moved through the host adapters of the VTC to the Tape Volume Cache of the I/O VTSs in the last hour. The granularity of the value reported is in hundredths. If no data has been moved through the host adapters in the last hour, a compression value of zero is reported. See Note 3.

Table 17. VTS enhanced library statistics (continued)

Offsets		Name	Length	Format	Description
360	168	S94CLPF6	1	binary	I/O VTS and master VTS preferences for the VTC. See Note 3. **Bit(s)** **Description** **0–3** Preferred I/O. This field indicates if a preferred VTS has been specified for I/O operations. If possible all host I/O operations will be directed to the specified VTS. If bit 0 is not active, then the VTS does not support the reporting of a preferred I/O VTS. **Value** **Description** **8** VTS 0 **9** VTS 1 **F** No preference Values not listed are reserved. **4–7** This field indicates if a preferred master VTS has been specified. If the specified VTS is not the current master, the VTC will attempt a master switchover to the preferred VTS, if conditions within the PTP VTS would allow it. If bit 0 is not active, then the VTS does not support the reporting of a preferred master VTS.Values not listed are reserved. **Value** **Description** **8** VTS 0 **9** VTS 1 **F** No preference

Table 17. VTS enhanced library statistics (continued)

Offsets		Name	Length	Format	Description
361	169	S94CLCS6	2	binary	Configured settings. Operational settings configured for the VTC. The reported operational setting are valid only if bit 15 is active. See Note 3. **Bit(s)** **Description** **0–1** Default copy mode. Reports the copy mode set as the default for the VTC: **Value** **Description** **0** Deferred copy mode **1** Immediate copy mode Values not listed are reserved. **2** Force Scratch to preferred I/O VTS. If this bit is active, all scratch mounts use the preferred VTS, if available, independent of the data validity on the preferred VTS. **3** Primary I/O. If this bit is active, a PSF-PMC order was accepted that specified a VTS I/O Selection Criteria of Primary. **4–5** Controller Operational Mode This field reports the operational mode. **Value** **Description** **0** Deferred copy mode **1** Immediate copy mode Values not listed are reserved. **6** Write protect mode. If this bit is active, the Virtual Tape Controllers (VTC) is in write protected mode. All host commands that attempt to change the attributes of a volume or modify/add data to a volume will fail. This mode supersedes the controller operational mode. **7–14** Reserved (set to 0) **15** Fields valid

Offsets		Name	Length	Format	Description
363	16B	S94CLRL6	1	binary	Relative link speeds. Reports the CE settings for the relative link speeds between the VTC and VTS0 and VTS1. See Note 3. The following values are defined: **Value** **Description** **0** No support for reporting relative link speeds **1** ESCON < 5 km, FICON < 30 km **2** ESCON < 10 km, FICON < 80 km **3** Channel Ext < 1000 km, ESCON over DWDM < 10 km, FICON < 100 km **4** Channel Ext > 1000 km, ESCON over DWDM < 15 km **5** ESCON over DWDM > 15 km Values not listed are reserved. **Bit(s)** **Description** **0–3** VTC to VTS0 link speed value **4–7** VTC to VTS1 link speed value
364	16C		4	binary	Reserved (set to zero).
368	170	S94CLDC7	4	binary	Data copied by AX0 number 7. See Note 3.
372	174	S94CLVC7	4	binary	Volumes copied by AX0 number 7. See Note 3.
376	178	S94CLRD7	4	binary	Read data transferred through AX0 number 7. See Note 3.
380	17C	S94CLWD7	4	binary	Write data transferred through AX0 number 7. See Note 3.
384	180	S94CLCM7	2	binary	Category mounts for AX0 number 7. See Note 3.
386	182	S94CLSM7	2	binary	Specific cache mounts for AX0 number 7. See Note 3.
388	184	S94CLRM7	2	binary	Specific recall mounts for AX0 number 7. See Note 3.
390	186	S94CLCR7	2	binary	Compression ratio of the data that has moved through the host adapters of the VTC to the Tape Volume Cache of the I/O VTSs in the last hour. The granularity of the value reported is in hundredths. If no data has been moved through the host adapters in the last hour, a compression value of zero is reported. See Note 3.

Table 17. VTS enhanced library statistics (continued)

Table 17. VTS enhanced library statistics (continued)

Offsets		Name	Length	Format	Description
392	188	S94CLPF7	1	binary	I/O VTS and master VTS preferences for the VTC. See Note 3. **Bit(s)** **Description** **0–3** Preferred I/O. This field indicates if a preferred VTS has been specified for I/O operations. If possible all host I/O operations will be directed to the specified VTS. If bit 0 is not active, then the VTS does not support the reporting of a preferred I/O VTS. **Value** **Description** **8** VTS 0 **9** VTS 1 **F** No preference Values not listed are reserved. **4–7** This field indicates if a preferred master VTS has been specified. If the specified VTS is not the current master, the VTC will attempt a master switchover to the preferred VTS, if conditions within the PTP VTS would allow it. If bit 0 is not active, then the VTS does not support the reporting of a preferred master VTS.Values not listed are reserved. **Value** **Description** **8** VTS 0 **9** VTS 1 **F** No preference

Table 17. VTS enhanced library statistics (continued)

Offsets		Name	Length	Format	Description
393	189	S94CLCS7	2	binary	Configured settings. Operational settings configured for the VTC. The reported operational setting are valid only if bit 15 is active. See Note 3. **Bit(s)** **Description** **0–1** Default copy mode. Reports the copy mode set as the default for the VTC: **Value** **Description** **0** Deferred copy mode **1** Immediate copy mode Values not listed are reserved. **2** Force Scratch to preferred I/O VTS. If this bit is active, all scratch mounts use the preferred VTS, if available, independent of the data validity on the preferred VTS. **3** Primary I/O. If this bit is active, a PSF-PMC order was accepted that specified a VTS I/O Selection Criteria of Primary. **4–5** Controller Operational Mode This field reports the operational mode. **Value** **Description** **0** Deferred copy mode **1** Immediate copy mode Values not listed are reserved. **6** Write protect mode. If this bit is active, the Virtual Tape Controllers (VTC) is in write protected mode. All host commands that attempt to change the attributes of a volume or modify/add data to a volume will fail. This mode supersedes the controller operational mode. **7–14** Reserved (set to 0) **15** Fields valid

Table 17. VTS enhanced library statistics (continued)

Offsets		Name	Length	Format	Description
395	18B	S94CLRL7	1	binary	Relative link speeds. Reports the CE settings for the relative link speeds between the VTC and VTS0 and VTS1. See Note 3. The following values are defined: **Value** **Description** **0** No support for reporting relative link speeds **1** ESCON < 5 km, FICON < 30 km **2** ESCON < 10 km, FICON < 80 km **3** Channel Ext < 1000 km, ESCON over DWDM < 10 km, FICON < 100 km **4** Channel Ext > 1000 km, ESCON over DWDM < 15 km **5** ESCON over DWDM > 15 km Values not listed are reserved. **Bit(s)** **Description** **0–3** VTC to VTS0 link speed value **4–7** VTC to VTS1 link speed value
396	18C		4	binary	Reserved (set to zero).
400	190	S94CMV_VTC0	2	binary	VTC 0 code modification value. Contains the modification portion for the VTC code level that is part of the PTP VTS subsystem that generated the statistical record. See Note 3.
402	192	S94CFV_VTC0	2	binary	VTC 0 code fix value. Contains the Fix portion for the VTC code level that is part of the PTP VTS subsystem that generated the statistical record. See Note 3.
404	194	S94CMV_VTC1	2	binary	VTC 1 code modification value. Contains the modification portion for the VTC code level that is part of the PTP VTS subsystem that generated the statistical record. See Note 3.
406	194	S94CFV_VTC1	2	binary	VTC 1 code fix value. Contains the Fix portion for the VTC code level that is part of the PTP VTS subsystem that generated the statistical record. See Note 3.
408	198	S94CMV_VTC2	2	binary	VTC 2 code modification value. Contains the modification portion for the VTC code level that is part of the PTP VTS subsystem that generated the statistical record. See Note 3.
410	19A	S94CFV_VTC2	2	binary	VTC 2 code fix value. Contains the Fix portion for the VTC code level that is part of the PTP VTS subsystem that generated the statistical record. See Note 3.
412	19C	S94CMV_VTC3	2	binary	VTC 3 code modification value. Contains the modification portion for the VTC code level that is part of the PTP VTS subsystem that generated the statistical record. See Note 3.
414	19E	S94CFV_VTC3	2	binary	VTC 3 code fix value. Contains the Fix portion for the VTC code level that is part of the PTP VTS subsystem that generated the statistical record. See Note 3.
416	1A0	S94CMV_VTC4	2	binary	VTC 4 code modification value. Contains the modification portion for the VTC code level that is part of the PTP VTS subsystem that generated the statistical record. See Note 3.

Table 17. VTS enhanced library statistics (continued)

Offsets		Name	Length	Format	Description
418	1A2	S94CFV_VTC4	2	binary	VTC 4 code fix value. Contains the Fix portion for the VTC code level that is part of the PTP VTS subsystem that generated the statistical record. See Note 3.
420	1A4	S94CMV_VTC5	2	binary	VTC 5 code modification value. Contains the modification portion for the VTC code level that is part of the PTP VTS subsystem that generated the statistical record. See Note 3.
422	1A6	S94CFV_VTC5	2	binary	VTC 5 code fix value. Contains the Fix portion for the VTC code level that is part of the PTP VTS subsystem that generated the statistical record. See Note 3.
424	1A8	S94CMV_VTC6	2	binary	VTC 6 code modification value. Contains the modification portion for the VTC code level that is part of the PTP VTS subsystem that generated the statistical record. See Note 3.
426	1AA	S94CFV_VTC6	2	binary	VTC 6 code fix value. Contains the Fix portion for the VTC code level that is part of the PTP VTS subsystem that generated the statistical record. See Note 3.
428	1AC	S94CMV_VTC7	2	binary	VTC 7 code modification value. Contains the modification portion for the VTC code level that is part of the PTP VTS subsystem that generated the statistical record. See Note 3.
430	1AE	S94CFV_VTC7	2	binary	VTC 7 code fix value. Contains the Fix portion for the VTC code level that is part of the PTP VTS subsystem that generated the statistical record. See Note 3.
432	1B0		96	binary	Reserved (set to zero).
When F/C 4001 is installed and enabled, the following statistics are reported.					
528	210	S94OPM_VDC	2	binary	Virtual Drives Configured (current). This two byte field contains the number of virtual devices configured in the Virtual Tape Server subsystem at the time the request was received. See Note 2.
530	212	S94OPM_MAXVDM	2	binary	Max virtual drives mounted (last hour). This two byte field contains the maximum number of virtual drives that were concurrently mounted in the Virtual Tape Server subsystem during the last hour. See Note 2.
532	214	S94OPM_MINVDM	2	binary	Min virtual drives mounted (last hour). This two byte field contains the minimum number of virtual drives that were concurrently mounted in the Virtual Tape Server subsystem during the last hour. See Note 2.
534	216	S94OPM_AVGVDM	2	binary	Avg virtual drives mounted (last hour). This two byte field contains the average number of virtual drives that were concurrently mounted in the Virtual Tape Server subsystem during the last hour. This value is determined by summing the number of concurrently mounted virtual devices every 10 seconds and then, during the hourly generation of the statistics, dividing the resultant value by 360. See Note 2.
536	218		8	binary	Reserved (set to zero).
When F/C 4001 is installed and enabled, the following array information is included.					

Table 17. VTS enhanced library statistics (continued)

Offsets		Name	Length	Format	Description
544	220	S94OPM_DCI1	1	binary	Device Class Identifier. This one byte field contains the device class identifier for one of the set of physical tape devices installed in the VTS. See Note 1. The following are the defined values for this field: **Value** **Description** **X'00'** There is no device class configured. **X'11'** 3590 Model B1A **X'13'** 3590 Model E1A **X'14'** 3590 Model H1A **X'20'** 3592 Model J1A
545	221	S94OPM_PDI1	1	binary	Installed Virtual Tape Server physical devices. This one byte field contains the number of physical tape devices, of the device class indicated, that are installed in the Virtual Tape Server subsystem at the time the request was received. See Note 1.
546	222	S94OPM_CAFU1	1	binary	Available Virtual Tape Server physical devices. This one byte field contains the number of physical tape devices, of the device class indicated, currently available for use by the Virtual Tape Server subsystem at the time the request was received. See Note 1.
547	223	S94OPM_MAXCM1	1	binary	Max Virtual Tape Server physical devices mounted. This one byte field contains the maximum number of physical tape devices, of the device class indicated, that were concurrently mounted in the Virtual Tape Server subsystem during the last hour. See Note 1.
548	224	S94OPM_MINCM1	1	binary	Min Virtual Tape Server physical devices mounted. This one byte field contains the minimum number of physical tape devices, of the device class indicated, that were concurrently mounted in the Virtual Tape Server subsystem during the last hour. See Note 1.
549	225	S94OPM_AVGCM1	1	binary	Avg Virtual Tape Server physical devices mounted (last hour). This one byte field contains the average number of physical tape devices, of the device class indicated, that were concurrently mounted in the Virtual Tape Server subsystem during the last hour. This value is determined by summing the number of concurrently mounted physical devices every 10 seconds and then, during the hourly generation of the statistics, dividing the resultant value by 360. See Note 1.
550	226	S94OPM_MAXTTM1	2	binary	Max physical mount time (last hour). This two byte field contains the maximum time, in seconds, that the library took to complete the execution of a mount request for a physical tape device, of the device class indicated, in the Virtual Tape Server subsystem. Mount time is accrued from the time the mount request is accepted until the mount is completed. The mount time is accredited to the hour it was completed. See Note 1.

Table 17. VTS enhanced library statistics (continued)

Offsets		Name	Length	Format	Description
552	228	S94OPM_MINTTM1	2	binary	Min physical mount time (last hour). This two byte field contains the minimum time, in seconds, that the library took to complete the execution of a mount request for a physical tape device, of the device class indicated, in the Virtual Tape Server subsystem. Mount time is accrued from the time the mount request is accepted until the mount is completed. The mount time is accredited to the hour it was completed. See Note 1.
554	22A	S94OPM_AVGTTM1	2	binary	Avg physical mount time (last hour). This two byte field contains the average time, in seconds, that the library took to complete the execution of a mount request for a physical tape device, of the device class indicated, in the Virtual Tape Server subsystem. Mount time is accrued from the time the mount request is accepted until the mount is completed. The mount time is accredited to the hour it was completed. See Note 1.
556	22C	S94OPM_STGMNTS1	2	binary	Physical mounts - stage (last hour). This two byte field contains the number of physical mount requests completed by the library in the last hour to satisfy stage mounts, of the device class indicated. See Note 1.
558	22E	S94OPM_MIGMNTS1	2	binary	Physical mounts - migrate (last hour). This two byte field contains the number of physical mount requests completed by the library in the last hour to satisfy migration mounts, of the device class indicated. See Note 1.
560	230	S94OPM_RECMNTS1	2	binary	Physical mounts - reclaim (last hour). This two byte field contains the number of physical mount requests completed by the library in the last hour to satisfy reclamation mounts, of the device class indicated. See Note 1.
562	232	S94OPM_SDEMNTS1	2	binary	This two byte field contains the number of physical mount requests completed by the library in the last hour to satisfy Secure Data Erase mounts, of the device class indicated.
564	234	S94OPM_PPWRITN1	4	binary	Data Written to a Primary Pool (last hour). This four byte field contains the number of MBytes premigrated from the tape volume cache to a primary pool for the device class indicated during the last hour. Only the data for logical volumes that have completed premigration when statistics were calculated at the end of the last hour are included in this value. The value is reset and a new count begins after statistics are calculated. It is accumulated in bytes and reported in an integral multiple of 1,048,576 bytes (1 MByte). See Note 1.
568	238	S94OPM_SPWRITN1	4	binary	Data Written to a Secondary Pool (last hour). This four byte field contains the number of MBytes premigrated from the tape volume cache to a secondary pool for the device class indicated during the last hour. Only the data for logical volumes that have completed premigration when statistics were calculated at the end of the last hour are included in this value. The value is reset and a new count begins after statistics are calculated. It is accumulated in bytes and reported in an integral multiple of 1,048,576 bytes (1 MByte). See Note 1.
572	23C		4	binary	Reserved (set to X'00')

Table 17. VTS enhanced library statistics (continued)

Offsets		Name	Length	Format	Description
576	240	S94OPM_DCI2	1	binary	Device Class Identifier. This one byte field contains the device class identifier for one of the set of physical tape devices installed in the VTS. See Note 1.The following are the defined values for this field: **Value** **Description** **X'00'** There is no device class configured. **X'11'** 3590 Model B1A **X'13'** 3590 Model E1A **X'14'** 3590 Model H1A **X'20'** 3592 Model J1A
577	241	S94OPM_PDI2	1	binary	Installed Virtual Tape Server physical devices. This one byte field contains the number of physical tape devices, of the device class indicated, that are installed in the Virtual Tape Server subsystem at the time the request was received. See Note 1.
578	242	S94OPM_CAFU2	1	binary	Available Virtual Tape Server physical devices. This one byte field contains the number of physical tape devices, of the device class indicated, currently available for use by the Virtual Tape Server subsystem at the time the request was received. See Note 1.
579	243	S94OPM_MAXCM2	1	binary	Max Virtual Tape Server physical devices mounted. This one byte field contains the maximum number of physical tape devices, of the device class indicated, that were concurrently mounted in the Virtual Tape Server subsystem during the last hour. See Note 1.
580	244	S94OPM_MINCM2	1	binary	Min Virtual Tape Server physical devices mounted. This one byte field contains the minimum number of physical tape devices, of the device class indicated, that were concurrently mounted in the Virtual Tape Server subsystem during the last hour. See Note 1.
581	245	S94OPM_AVGCM2	1	binary	Avg Virtual Tape Server physical devices mounted (last hour). This one byte field contains the average number of physical tape devices, of the device class indicated, that were concurrently mounted in the Virtual Tape Server subsystem during the last hour. This value is determined by summing the number of concurrently mounted physical devices every 10 seconds and then, during the hourly generation of the statistics, dividing the resultant value by 360. See Note 1.
582	246	S94OPM_MAXTTM2	2	binary	Max physical mount time (last hour). This two byte field contains the maximum time, in seconds, that the library took to complete the execution of a mount request for a physical tape device, of the device class indicated, in the Virtual Tape Server subsystem. Mount time is accrued from the time the mount request is accepted until the mount is completed. The mount time is accredited to the hour it was completed. See Note 1.

Table 17. VTS enhanced library statistics (continued)

Offsets		Name	Length	Format	Description
584	248	S94OPM_MINTTM2	2	binary	Min physical mount time (last hour). This two byte field contains the minimum time, in seconds, that the library took to complete the execution of a mount request for a physical tape device, of the device class indicated, in the Virtual Tape Server subsystem. Mount time is accrued from the time the mount request is accepted until the mount is completed. The mount time is accredited to the hour it was completed. See Note 1.
586	24A	S94OPM_AVGTTM2	2	binary	Avg physical mount time (last hour). This two byte field contains the average time, in seconds, that the library took to complete the execution of a mount request for a physical tape device, of the device class indicated, in the Virtual Tape Server subsystem. Mount time is accrued from the time the mount request is accepted until the mount is completed. The mount time is accredited to the hour it was completed. See Note 1.
588	24C	S94OPM_STGMNTS2	2	binary	Physical mounts - stage (last hour). This two byte field contains the number of physical mount requests completed by the library in the last hour to satisfy stage mounts, of the device class indicated. See Note 1.
590	24E	S94OPM_MIGMNTS2	2	binary	Physical mounts - migrate (last hour). This two byte field contains the number of physical mount requests completed by the library in the last hour to satisfy migration mounts, of the device class indicated. See Note 1.
592	250	S94OPM_RECMNTS2	2	binary	Physical mounts - reclaim (last hour). This two byte field contains the number of physical mount requests completed by the library in the last hour to satisfy reclamation mounts, of the device class indicated. See Note 1.
594	252	S94OPM_SDEMNTS2	2	binary	This two byte field contains the number of physical mount requests completed by the library in the last hour to satisfy secure data erase mounts, of the device class indicated.
596	254	S94OPM_PPWRITN2	4	binary	Data Written to a Primary Pool (last hour). This four byte field contains the number of MBytes premigrated from the tape volume cache to a primary pool for the device class indicated during the last hour. Only the data for logical volumes that have completed premigration when statistics were calculated at the end of the last hour are included in this value. The value is reset and a new count begins after statistics are calculated. It is accumulated in bytes and reported in an integral multiple of 1,048,576 bytes (1 MByte). See Note 1.
600	258	S94OPM_SPWRITN2	4	binary	Data Written to a Secondary Pool (last hour). This four byte field contains the number of MBytes premigrated from the tape volume cache to a secondary pool for the device class indicated during the last hour. Only the data for logical volumes that have completed premigration when statistics were calculated at the end of the last hour are included in this value. The value is reset and a new count begins after statistics are calculated. It is accumulated in bytes and reported in an integral multiple of 1,048,576 bytes (1 MByte). See Note 1.
604	25C		4	binary	Reserved (set to X'00')
When F/C 4001 is installed and enabled, the following VTS Cache Usage Information array is included.					
608	260	S94OPM_ARRAY	512	binary	VTS Cache Usage Information Array. Each entry in the array is 64 bytes long and is mapped by S94OPM_ARRAY_ENTRY. Up to eight entries may be present.

Table 17. VTS enhanced library statistics (continued)

Offsets		Name	Length	Format	Description
1120	460	S94OPM_IARTAFRT	2	binary	IART Average Fast Ready Mount Time. This two byte field contains the average time, in seconds, that the Virtual Tape Server subsystem took to complete the execution of a fast-ready mount request for a virtual device. Mount time is accrued from the time the mount request is accepted until the mount is completed. The mount time is accredited to the hour it was completed.
1122	462	S94OPM_IARTFRM	2	binary	IART Fast-Ready Mounts. This two byte field contains the number of mount requests completed using the Fast-Ready facility by the Virtual Tape Server subsystem in the last hour. The Fast-Ready facility is used for PLF Library Mount orders where a category is specified and the specified category has the Fast-Ready attribute set or a VOLSER is specified and that VOLSER, at the time the mount request was received, is assigned to a category that has the Fast-Ready attribute set.
1124	464	S94OPM_IARTCHMT	2	binary	IART Average Cache Hit Mount Time. This two byte field contains the average time, in seconds, that the Virtual Tape Server subsystem took to complete the execution of a mount request for a virtual device where the requested volume was in the Tape Volume Cache. Mount time is accrued from the time the mount request is accepted until the mount is completed. The mount time is accredited to the hour it was completed.
1126	466	S94OPM_IARTCHM	2	binary	IART Cache Hit Mounts. This two byte field contains the number of mount requests that were completed by the Virtual Tape Server subsystem in the last hour because the required volume was resident in the Tape Volume Cache.
1128	468	S94OPM_IARTCMMT	2	binary	IART Average Cache Miss Mount Time. This two byte field contains the average time, in seconds, that the Virtual Tape Server subsystem took to complete the execution of a mount request for a virtual device where the requested volume had to be recalled from a stacked volume. Mount time is accrued from the time the mount request is accepted until the volume has been recalled and the mount completed. The mount time is accredited to the hour it was completed.
1130	46A	S94OPM_IARTCMM	2	binary	IART Cache Miss Mounts. This two byte field contains the number of mount requests that were completed by the Virtual Tape Server subsystem in the last hour that required a logical volume to be recalled from a stacked volume back into the Tape Volume Cache.

Note:

1. This field will be zero if the statistics are reported for a composite library(SMF94VNO=X'FF').
2. This field is a composite of all AX0's when reported for a composite library(SMF94VNO=X'FF').
3. This field is only valid when reported for a composite library(SMF94VNO=X'FF'). For other than a composite library the field will contain zero.
4. This field will be zero if the statistics are reported for a distributed library (SMF94VNO=X'01' or X'02')
5. This field will contain zero for F/C 4001

Array data section

Offsets	Name	Length	Format	Description
Start - S94OPM_ARRAY_ENTRY				

Offsets		Name	Length	Format	Description
0	0	S94OPM_PMC	4	binary	Preference Management Control. This four byte field contains information about how the preference level is managed. **Bit(s)** **Description** **0** Reserved (set to B'0') **1-3** Logical Volume Migration Algorithm **Value** **Description** **0** Least Recently Used (LRU) Managed. The logical volumes in this preference level are removed from the cache based on a least recently used algorithm. **1** Largest Size Managed. The logical volumes in this preference level are removed from the cache based on their size with the largest volumes being removed first. **2-7** Reserved **4-31** Reserved (set to B'0')
4	4	S94OPM_VVIC	4	binary	Virtual volumes in cache. This four byte field contains a count, that is a snapshot taken when statistics are calculated at the end of the hour, of the number of volume assigned to the preference level that are still cache resident. For volumes that are currently mounted and do not have a preference level established (that is done when a volume is unloaded), they are credited to the count for preference level 1.
8	8	S94OPM_DRIC	4	binary	Data resident in cache. This four byte field contains a count, that is a snapshot taken when statistics are calculated at the end of the hour, of the amount of cache space used by the volumes assigned to the preference level that are still cache resident. For volumes that are currently mounted and do not have a preference level established (that is done when a volume is unloaded), their size is credited to the count for preference level 1. The cache space is accumulated in bytes and reported in an integral multiple of 1,048,576 bytes (1 MByte).
12	C	S94OPM_TVCA4	4	binary	4 Hour Rolling average tape volume cache age. This four byte field contains a rolling average cache age, in minutes, of the logical volumes that were assigned to the preference level when the volume was migrated from the cache. The rolling average is calculated based on the cache age of the volumes that have been migrated from the cache over the last 4 hours. Cache age is measured from when a volume is first closed after being created or recalled into cache until it has been migrated from cache. Each volume's cache age is rounded up to the nearest minute. The value is calculated at the end of the hour.
16	10	S94OPM_VM4	4	binary	Volumes migrated last 4 hours. Contains the number of logical volumes assigned to the preference level that were migrated from the cache over the last 4 hours.

Offsets		Name	Length	Format	Description
20	14	S94OPM_TVCA48	4	binary	48 Hour Rolling average tape volume cache age. This four byte field contains a rolling average cache age, in minutes, of the logical volumes that were assigned to the preference level when the volume was migrated from the cache. The rolling average is calculated based on the cache age of the volumes that have been migrated from the cache over the last 48 hours. Cache age is measured from when a volume is first closed after being created or recalled into cache until it has been migrated from cache. Each volume's cache age is rounded up to the nearest minute. The value is calculated at the end of the hour.
24	18	S94OPM_VM48	4	binary	Volumes migrated last 48 hours. Contains the number of logical volumes assigned to the preference level that were migrated from the cache over the last 48 hours.
28	1C	S94OPM_TVCA35	4	binary	35 Day Rolling average tape volume cache age. This four byte field contains a rolling average cache age, in minutes, of the logical volumes that were assigned to the preference level when the volume was migrated from the cache. The rolling average is calculated based on the cache age of the volumes that have been migrated from the cache over the last 35 days. Cache age is measured from when a volume is first closed after being created or recalled into cache until it has been migrated from cache. Each volume's cache age is rounded up to the nearest minute. The value is calculated at the end of the hour.
32	20	S94OPM_VM35	4	binary	Volumes migrated last 35 days. Contains the number of logical volumes assigned to the preference level that were migrated from the cache over the last 35 days.
36	24	S94OPM_FRMT	2	binary	Average Fast Ready Mount Time. This two byte field contains the average time, in seconds, that the Virtual Tape Server subsystem took to complete the execution of a fast-ready mount request for a virtual device. Mount time is accrued from the time the mount request is accepted until the mount is completed. The mount time is accredited to the hour it was completed.
38	26	S94OPM_FRMNTS	2	binary	Fast-Ready Mounts. This two byte field contains the number of mount requests completed using the Fast-Ready facility by the Virtual Tape Server subsystem in the last hour. The Fast-Ready facility is used for PLF Library Mount orders where a category is specified and the specified category has the Fast-Ready attribute set or a VOLSER is specified and that VOLSER, at the time the mount request was received, is assigned to a category that has the Fast-Ready attribute set.
40	28	S94OPM_CHTIME	2	binary	Average Cache Hit Mount Time. This two byte field contains the average time, in seconds, that the Virtual Tape Server subsystem took to complete the execution of a mount request for a virtual device where the requested volume was in the Tape Volume Cache. Mount time is accrued from the time the mount request is accepted until the mount is completed. The mount time is accredited to the hour it was completed.
42	2A	S94OPM_CHMNTS	2	binary	Cache Hit Mounts. This two byte field contains the number of mount requests that were completed by the Virtual Tape Server subsystem in the last hour because the required volume was resident in the Tape Volume Cache.

Offsets		Name	Length	Format	Description
44	2C	S94OPM_CMTIME	2	binary	Average Cache Miss Mount Time. This two byte field contains the average time, in seconds, that the Virtual Tape Server subsystem took to complete the execution of a mount request for a virtual device where the requested volume had to be recalled from a stacked volume. Mount time is accrued from the time the mount request is accepted until the volume has been recalled and the mount completed. The mount time is accredited to the hour it was completed.
46	2E	S94OPM_CMMNTS	2	binary	Cache Miss Mounts. This two byte field contains the number of mount requests that were completed by the Virtual Tape Server subsystem in the last hour that required a logical volume to be recalled from a stacked volume back into the Tape Volume Cache.
48	30		16	binary	Reserved (set to X'00')
End - S94OPM_ARRAY_ENTRY					

Subtype 2

Header Section

Offsets		Name	Length	Format	Description
0	0	SMF94S2_LEN	2	binary	Record length.
2	2	SMF94S2_SEG	2	binary	Segment descriptor.
4	4	SMF94S2_FLG	1	binary	System indicator: **Bit** **Meaning when set** **0-3** Reserved. **4** Subsystem name follows. **5** Subtypes utilized. **6-7** Reserved.
5	5	SMF94S2_RTY	1	binary	Record type 94 — Subtype 2
6	6	SMF94S2_TME	4	binary	Time since midnight, in hundredths of a second, when the record was moved into the SMF buffer.
10	A	SMF94S2_DTE	4	packed	Date when the record was moved into the SMF buffer, in the form 0*cyydddF*.
14	E	SMF94S2_SID	4	EBCDIC	System identification (from SMFPRMxx parmlib member).
18	12	SMF94S2_WID	4	EBCDIC	Subsystem identification, worktype indicator.
22	16	SMF94S2_STP	2	binary	Record subtype ‘02’ — Volume pooling statistics

Self-defining Section (Subtype 2)

Offsets		Name	Length	Format	Description
24	18	SMF94S2_SDL	4	binary	Self-defining section length
28	1C	SMF94S2_POF	4	binary	Offset to product section
32	20	SMF94S2_PLN	2	binary	Length of product section

Offsets		Name	Length	Format	Description
34	22	SMF94S2_PON	2	binary	Number of product sections
36	24	SMF94S2_HOF	4	binary	Offset to header section
40	28	SMF94S2_HLN	2	binary	Length of header section
42	2A	SMF94S2_HON	2	binary	Number of header sections
44	2C	SMF94S2_SOF	4	binary	Offset to statistics section
48	30	SMF94S2_SLN	2	binary	Length of statistics section
50	32	SMF94S2_SON	2	binary	Number of statistics sections

Product Section

Offsets		Name	Length	Format	Description
0	0	SMF94S2_TYP	2	binary	Subtype for type 94 record.
2	2	SMF94S2_RVN	2	EBCDIC	Record version number C'01'.
4	4	SMF94S2_PNM	8	EBCDIC	Product name 'fmid '.
12	C	SMF94S2_MVS	8	EBCDIC	MVS operating system name.

Header Section

Offsets		Name	Length	Format	Description
0	0		32	binary	Reserved (set to zero).

Volume Pool Statistics (VPS) Section

Offsets		Name	Length	Format	Description
0	0		9	binary	VPS Message Header data
9	9	SMF94S2_LIBID	3	binary	Library Sequence Number
12	C		2	binary	Reserved (set to X'00').
14	E	SMF94S2_HHI	2	binary	Hour Index. The hour index is incremented once each hour by the library manager. It is used to prevent duplicate logged statistics from the same one hour period from being counted twice. The hour index for volume pooling statistics is the same as reported for library statistical data calculated for the same hour.
16	10	SMF94S2_LRTD	10	EBCDIC	Last Reconcile Time and Date. This 10 EBCDIC character field contains the last time and date a reconcile was automatically completed by the VTS. Some of the statistical fields are calculated at this point.
26	1A	SMF94S2_MNVP	2	binary	Maximum number of volume pools allowed in the partition This 2 byte hexadecimal field contains the maximum number of volume pools allowed in the partition. The number begins with 1. This field is used by the host to determine if there are more than 16 volume pools which would require additional requests for statistical data.
28	1C		1	binary	Reserved (set to X'00').
29	1D	SMF94S2_VPSET	1	binary	Volume Pool Set. This byte specifies which set of volume pools are being reported, based on the set requested in the preceding request. If the set specified is 0, the first 16 volume pools are reported, if 1, the next 16 and so on.
30	1E		2	binary	Reserved (set to X'00').
32	20		1	binary	Reserved (set to X'00').

Offsets		Name	Length	Format	Description
33	21	SMF94S2_BPMIO	1	binary	Common Scratch Pool Media Identifier 0. This one byte field contains the identifier for the media type associated with the following common scratch pool volume count. The following are the defined values for this field: **Value** **Description** **X'00'** No media type configured. **X'10'** 3590 'J' media **X'11'** 3590 'K' media **X'20'** 3592 'JA' media **X'21'** Reserved for 3592 JW media **X'22'** 3592 'JJ' media **X'23'** Reserved for 3592 JR media
34	22	SMF94S2_BPSVCO	2	binary	Common Scratch Pool Stacked Volume Count - Media Identifier 0 (Hourly Snapshot) This two byte field contains the number of scratch stacked volumes, of a type identified by Media Identifier 0, assigned to the common volume pool. The number is updated periodically within the VTS and the reported value is the snapshot of that count when statistics are calculated at the end of the last hour. Physical volumes are assigned to the common scratch pool upon entry into the library or when returned from being borrowed by another pool.
36	24		1	binary	Reserved (set to X'00').
37	25	SMF94S2_BPMI1	1	binary	Common Scratch Pool Media Identifier 1 This one byte field contains the identifier for the media type associated with the following common scratch pool volume count. See the Common Scratch Pool Media Identifier 0 field for the values defined for this field.
38	26	SMF94S2_BPSVC1	2	binary	Common Scratch Pool Stacked Volume Count - Media Identifier 1 (Hourly Snapshot) This two byte field contains the number of scratch stacked volumes, of a type identified by Media Identifier 1, assigned to the common volume pool. The number is updated periodically within the VTS and the reported value is the snapshot of that count when statistics are calculated at the end of the last hour. Physical volumes are assigned to the common scratch pool upon entry into the library or when returned from being borrowed by another pool.
40	28		1	binary	Reserved (set to X'00'
41	29	SMF94S2_BPMI2	1	binary	Common Scratch Pool Media Identifier 2 This one byte field contains the identifier for the media type associated with the following common scratch pool volume count. See the Common Scratch Pool Media Identifier 0 field for the values defined for this field.

Offsets		Name	Length	Format	Description
42	2A	SMF94S2_BPSVC2	2	binary	Common Scratch Pool Stacked Volume Count - Media Identifier 2 (Hourly Snapshot) This two byte field contains the number of scratch stacked volumes, of a type identified by Media Identifier 2, assigned to the common volume pool. The number is updated periodically within the VTS and the reported value is the snapshot of that count when statistics are calculated at the end of the last hour. Physical volumes are assigned to the common scratch pool upon entry into the library or when returned from being borrowed by another pool.
44	2C		1	binary	Reserved (set to X'00').
45	2D	SMF94S2_BPMI3	1	binary	Common Scratch Pool Media Identifier 3 This one byte field contains the identifier for the media type associated with the following common scratch pool volume count. See the Common Scratch Pool Media Identifier 0 field for the values defined for this field.
46	2E	SMF94S2_SVC3	2	binary	Common Scratch Pool Stacked Volume Count - Media ID 3 (Hourly Snapshot) This two byte field contains the number of scratch stacked volumes, of a type identified by Media Identifier 3, assigned to the common volume pool. The number is updated periodically within the VTS and the reported value is the snapshot of that count when statistics are calculated at the end of the last hour. Physical volumes are assigned to the common scratch pool upon entry into the library or when returned from being borrowed by another pool.
48	30	SMF92S2_ARRAY	1792	binary	Volume Pool Statistics array. Each entry contains information about the usage and characteristics of a volume pool. Each entry in the array is 112 bytes long and is mapped by SMF94S2_ARRAY_ENTRY. Up to 16 array entries may be present. SMF94S2_MNVP contains the maximum number of pools in the library partition. When there are more than 16 pools, additional Volume Pool Statistics sections will be recorded. The number of Volume Pool Statistics sections is indicated by SMF94S2_SON in the self-defining section.

Volume Pool Statistics (VPS) Array Section

Offsets		Name	Length	Format	Description
Start - SMF94S2_ARRAY_ENTRY					
0	0		1	binary	Reserved (set to X'00'
1	1	SMF94S2_VPN	1	binary	Pool Number. This one byte field contains the volume pool number. Pools are numbered starting with 1.
2	2		2	binary	Reserved (set to X'00'

Offsets		Name	Length	Format	Description
4	4	SMF94S2_ALVIP	4	binary	Active logical volumes in pool (Hourly Snapshot) This four byte field contains the number of logical volume images resident in the volume pool. The number is updated dynamically within the VTS and the reported value is the snapshot of that count when statistics are calculated at the end of the last hour. To be considered resident in a pool, the logical volume must be on one of the physical volumes assigned to the pool. Cache resident only volumes, although assigned to the pool, are not included. Programming Note: This field may indicate a larger number of active logical volumes then is expected in a pool because it contain old versions of a logical volume's image after its been reused, modified, or deleted since the last reconcile was completed. Reconcile removes the database references for old versions of logical volume images so that they are no longer included in the count.
8	8	SMF94S2_ADIVP	4	binary	Active data in volume pool (Hourly Snapshot). This four byte field contains the number of MBytes of logical volume image data managed by the virtual tape server in the volume pool. The number is updated dynamically within the VTS and the reported value is the snapshot of that count when statistics are calculated at the end of the last hour. To be considered resident in a pool, the logical volume must be on one of the physical volumes assigned to the pool. Cache resident only volumes, although assigned to the pool, are not included. It is accumulated in bytes and reported in an integral multiple of 1,048,576 bytes (1 MByte). **Note:** 1. This field may indicate a larger count of active data then is expected in a pool because it contain old versions of a logical volume's image after its been reused, modified, or deleted since the last reconcile was completed. Reconcile removes the database references for old versions of logical volume images so that their contents are no longer included in the count. 2. This field does not include the volumes that are currently mounted. Only volumes that have been premigrated are included in the count.
12	C	SMF94S2_DWTPLH	4	binary	Data written to the pool in the last hour This four byte field contains the number of MBytes premigrated from the tape volume cache to the pool during the last hour. Only the data for logical volumes that have completed premigration when statistics were calculated at the end of the last hour are included in this value. The value is reset and a new count begins after statistics are calculated. The count is accumulated in bytes and reported in an integral multiple of 1,048,576 bytes (1 MByte).

Offsets		Name	Length	Format	Description
16	10	SMF94S2_PDCI	1	binary	Pool Device Class Identifier. This one byte field contains the device class identifier for the volume pool. The following are the defined values for this field: **Value** **Description** **X'00'** There is no device class configured. **X'11'** 3590 Model B1A **X'13'** 3590 Model E1A **X'14'** 3590 Model H1A **X'20'** 3592 Model J1A
17	11	SMF94S2_MI0	1	binary	Media Identifier 0 This one byte field contains the identifier for one of two media compatible with the device class for the pool. Refer to the definition of the Common Scratch Pool Media Identifier 0 field for the values defined for this field.
18	12	SMF94S2_PSSSVC0	2	binary	Pool Static Scratch Stacked Volume Count - Media Identifier 0 (Hourly Snapshot) This two byte field contains the number of media identifier 0 volumes that were statically assigned to the volume pool and are in scratch status. The number is updated periodically within the VTS and the reported value is the snapshot of that count when statistics are calculated at the end of the last hour.
20	14	SMF94S2_PSPSVC0	2	binary	Pool Static Private Stacked Volume Count - Media Identifier 0 (Hourly Snapshot) This two byte field contains the number of media identifier 0 volumes that are statically assigned to the volume pool and contain active data. This includes volumes that have been marked full or those that are in the process of being filled. The number is updated periodically within the VTS and the reported value is the snapshot of that count when statistics are calculated at the end of the last hour.
22	16	SMF94S2_PBSSVC0	2	binary	Pool Borrowed Scratch Stacked Volume Count - Media Identifier 0 (Hourly Snapshot) This two byte field contains the number of media identifier 0 volumes that were assigned to the volume pool through borrowing and are in scratch status. The number is updated periodically within the VTS and the reported value is the snapshot of that count when statistics are calculated at the end of the last hour.
24	18	SMF94S2_PBPSVC0	2	binary	Pool Borrowed Private Stacked Volume Count - Media Identifier 0 (Hourly Snapshot) This two byte field contains the number of media identifier 0 volumes that are assigned to the volume pool through borrowing that contain active data. This includes volumes that have been marked full or those that are in the process of being filled. The number is updated periodically within the VTS and the reported value is the snapshot of that count when statistics are calculated at the end of the last hour.
26	1A		1	binary	Reserved (set to X'00'

Offsets		Name	Length	Format	Description
27	1B	SMF94S2_MI1	1	binary	Media Identifier 1. This one byte field contains the identifier for one of two media compatible with the device class for the pool. Refer to the definition of the Common Scratch Pool Media Identifier 0 field for the values defined for this field.
28	1C	SMF94S2_PSSSVC1	2	binary	Pool Static Scratch Stacked Volume Count - Media Identifier 1 (Hourly Snapshot) This two byte field contains the number of media identifier 1 volumes that were statically assigned to the volume pool and are in scratch status. The number is updated periodically within the VTS and the reported value is the snapshot of that count when statistics are calculated at the end of the last hour.
30	1E	SMF94S2_PSPSVC1	2	binary	Pool Static Private Stacked Volume Count - Media Identifier 1 (Hourly Snapshot) This two byte field contains the number of media identifier 1 volumes that are statically assigned to the volume pool and contain active data. This includes volumes that have been marked full or those that are in the process of being filled. The number is updated periodically within the VTS and the reported value is the snapshot of that count when statistics are calculated at the end of the last hour.
32	20	SMF94S2_PBSSVC1	2	binary	Pool Borrowed Scratch Stacked Volume Count - Media Identifier 1 (Hourly Snapshot) This two byte field contains the number of media identifier 1 volumes that were assigned to the volume pool through borrowing and are in scratch status. The number is updated periodically within the VTS and the reported value is the snapshot of that count when statistics are calculated at the end of the last hour.
34	22	SMF94S2_PBPSVC1	2	binary	Pool Borrowed Private Stacked Volume Count - Media Identifier 1 (Hourly Snapshot) This two byte field contains the number of media identifier 1 volumes that were assigned to the volume pool through borrowing that contain active data. This includes volumes that have been marked full or those that are in the process of being filled. The number is updated periodically within the VTS and the reported value is the snapshot of that count when statistics are calculated at the end of the last hour.
36	24		4	binary	Reserved (set to X'00'
40	28	SMF94S2_AAORD	2	binary	Average age of residual data (as of the last reconcile). This two byte field contains the average age, in days, of the residual data that resides on the stacked volumes assigned to the pool at the completion of the last reconcile. Statically assigned and borrowed volumes are included in this calculation. A physical volume has residual data on it if it is not full. This value is calculated based on the date a volume transitions to not full and the current date. When a logical volume's image on a physical volume no longer represents the most current version of the volume, after a reconcile, it has been removed from the database that manages the physical volumes and it is considered residual data.

Offsets		Name	Length	Format	Description
42	2A	SMF94S2_MAORD	2	binary	Maximum age of residual data (as of the last reconcile). This two byte field contains the maximum age, in days, of the residual data that resides on the stacked volumes assigned to the pool at the completion of the last reconcile. Statically assigned and borrowed volumes are included in this calculation. A physical volume has residual data on it if it is not full. This value is calculated based on the date a volume transitions to not full and the current date. When a logical volume's image on a physical volume no longer represents the most current version of the volume, after a reconcile, it has been removed from the database that manages the physical volumes and it is considered residual data.
44	2C	SMF94S2_AAOFPSV	2	binary	Average age of the full private stacked volumes (as of the last reconcile). This two byte field contains the average age, in days, of the private stacked volumes in the volume pool at the completion of the last reconcile. Statically assigned and borrowed volumes are included in this calculation. The age of a volume is measured from when the volume is marked as full until it is reclaimed.
46	2E	SMF94S2_MAOFPSV	2	binary	Maximum age of the full private stacked volumes (as of the last reconcile). This two byte field contains the maximum age, in days, of the private stacked volumes in the volume pool at the completion of the last reconcile. Statically assigned and borrowed volumes are included in this calculation. The age of a volume is measured from when the volume is marked as full until it is reclaimed.
48	30		1	binary	Reserved (set to X'00'
49	31	SMF94S2_VPRTP	1	binary	Volume pool reclaim threshold percentage (Current value). This one byte field contains the current reclaim threshold percentage set for the volume pool.
50	32	SMF94S2_ADD00	2	binary	0-5% Active Data Distribution The next twenty, two byte fields report the number of full private stacked volumes in the volume pool that contain active data by the percentage (5% granularity) of active data remaining on the volumes. The numbers are updated periodically within the VTS and the reported value is the snapshot taken when statistics are calculated at the end of the last hour. The percentage of active data is relative to the amount of data on a stacked volume when it was filled.
52	34	SMF94S2_ADD05	2	binary	>5-10% active data
54	36	SMF94S2_ADD10	2	binary	>10-15% active data
56	38	SMF94S2_ADD15	2	binary	>15-20% active data
58	3A	SMF94S2_ADD20	2	binary	>20-25% active data
60	3C	SMF94S2_ADD25	2	binary	>25-30% active data
62	3E	SMF94S2_ADD30	2	binary	>30-35% active data
64	40	SMF94S2_ADD35	2	binary	>35-40% active data
66	42	SMF94S2_ADD40	2	binary	>40-45% active data
68	44	SMF94S2_ADD45	2	binary	>45-50% active data
70	46	SMF94S2_ADD50	2	binary	>50-55% active data
72	48	SMF94S2_ADD55	2	binary	>55-60% active data
74	4A	SMF94S2_ADD60	2	binary	>60-65% active data
76	4C	SMF94S2_ADD65	2	binary	>65-70% active data
78	4E	SMF94S2_ADD70	2	binary	>70-75% active data

Offsets		Name	Length	Format	Description
80	50	SMF94S2_ADD75	2	binary	>75-80% active data
82	52	SMF94S2_ADD80	2	binary	>80-85% active data
84	54	SMF94S2_ADD85	2	binary	>85-90% active data
86	56	SMF94S2_ADD90	2	binary	>90-95% active data
88	58	SMF94S2_ADD95	2	binary	>95-100% active data
90	5A	SMF94S2_PPP	1	binary	Physical Pool Properties. This field contains the current settings of the pool's management controls when statistics were calculated at the end of the last hour. **Bit(s)** **Description** **0** Returns Allowed. This bit is active if borrowed volumes are to be returned to the common scratch pool when scratched. If inactive, borrowed volumes remain in the pool that borrowed them when scratched. This field is ignored if bit 2:7 are set to zero. **1** Reserved. **2-4** First Media Type To Borrow . If this field is non-zero, it specifies the media type that is to be borrowed first if additional physical scratch volumes are needed by the pool. **Value** **Description** **0** NoBorrowing **1** Media Identifier 0. Borrowing of the media identified by the Media Identifier 0 field is allowed. **2** Media Identifier 1. Borrowing of the media identified by the Media Identifier 1 field is allowed. **3** Either Media Identifier. Borrowing of the media identified by either Media Identifier field is allowed. **4–7** Reserved **5-7** Second Media Type To Borrow. If this field is non-zero, it specifies the media type that is to be borrowed if additional physical scratch volumes are needed by the pool and none of the media type specified by the First Media Type To Borrow field are available. **Value** **Description** **0** NoBorrowing **1** Media Identifier 0. Borrowing of the media identified by the Media Identifier 0 field is allowed. **2** Media Identifier 1. Borrowing of the media identified by the Media Identifier 1 field is allowed. **3–7** Reserved.
91	5B		1	binary	Reserved (set to X'00'

Offsets		Name	Length	Format	Description
92	5C	SMF94S2_RPN	1	binary	Reclamation Pool. Contains the pool number to be used for the target for data that is reclaimed. Pools are numbered starting with 1.
93	5D		1	binary	Reserved (set to X'00'
94	5E	SMF94S2_RPDSLA	2	binary	Reclaim policy - days since last accessed. A physical volume is eligible for reclaim when the number of days contained in this field has elapsed since any data on the volume has been accessed because of a recall. Supported values are 0 to 365. If this field contains a value of 0, it is not used as a criteria a for reclaim.
96	60	SMF94S2_RPDSLW	2	binary	Reclaim policy - days since last written. A physical volume is eligible for reclaim when the number of days contained in this field has elapsed since any data was written to the volume. Supported values are 0 to 365. If this field contains a value of 0, it is not used as a criteria for reclaim.
98	62	SMF94S2_RPDSLDI	2	binary	Reclaim policy - days since last data invalidation. A physical volume is eligible for reclaim when the number of days contained in this field has elapsed since any data was invalidated on the volume and the amount of active data on the volume falls below the threshold defined in the Minimum Active Data Percentage (byte 100) field. Supported values are 0 to 365. If this field contains a value of a 0, it is not used as a criteria for reclaim.
100	64	SMF94S2_RPMADP	1	binary	Reclaim policy - minimum active data percentage. This field contains the minimum active data threshold percentage a physical volume's active data must fall below before it can be reclaimed using the days since last data invalidation reclamation policy (non-zero value in bytes 98:99). Supported a values are 5 to 95.
101	65		11	binary	Reserved (set to X'00'
End - SMF94S2_ARRAY_ENTRY					

Record type 96 (X'60') — Cross Memory Service Provider Charge Back

Record type 96 is written whenever certain operator commands are issued. The record is created to provide user account information so that it may be sorted with other SMF records associated with the user. For accounting purposes, this record contains the amount of CPU time used by a user.

Note: If available, this time also includes VECTOR time.

The type 96 record can be used with the subtype selectivity function. The subtypes are:

1. Detail records
2. Summary records

The Detail records are produced during consultations with the Integrated Reasoning Shell's subsystem. One of these records is produced each time the subsystem replies or queries the requestor (user).

A Summary record is produced when the requestor issues an “INIT END” command. This record contains counts of the communications that occurred between the subsystem and the requestor, and the totals for CPU and Vector times.

Note: Since Vector times are not available for all systems, the Vector time fields contain zero on those systems not able to provide Vector accounting at the task level.

Offsets		Name	Length	Format	Description
0	0	SMF96LEN	2	binary	Record length. This field and the next field (total of four bytes) form the RDW (record descriptor word). See “Standard and Extended SMF record headers” on page 162 for a detailed description.

Offsets		Name	Length	Format	Description
02	02	SMF96SEG	2	binary	Segment descriptor (see record length field).
4	4	SMF96FLG	1	binary	System indicator: **Bit** **Meaning when set** **0-2** Reserved **3-6** Version indicators* **7** Reserved. *See "Standard and Extended SMF record headers" on page 162 for a detailed description.
5	5	SMF96RTY	1	binary	Record type 96 (X'60').
6	6	SMF96TME	4	binary	Time since midnight, in hundredths of a second, that the record was moved into the SMF buffer.
10	0A	SMF96DTE	4	packed	Date when the record was moved into the SMF buffer, in the form 0*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for a detailed description.
14	0E	SMF96SID	4	EBCDIC	System identification (from the SID parameter).
18	12	SMF96WID	4	EBCDIC	Subsystem identifier.
22	16	SMF96STP	4	binary	Record subtype.
24	18	SMF96JMR	2	binary	Displacement to the start of the requestor's JMR data. This includes the RDW. This is also the length of the standard SMF header.
28	1C	SMF96JL#	4	binary	Length of the JMR data.
32	20	SMF96PSI	2	binary	Displacement to start of the provider's data section (includes RDW).
36	24	SMF96PI#	2	binary	Length of provider's data.
40	28	SMF96RCS	4	binary	Displacement to start of the subtype data areas (includes RDW).
0	0	SMF96JBN	8	EBCDIC	Requestor's JMRJOB data including the record descriptor word (RDW).
8	8	SMF96RST	4	binary	Requestor's JMRENTRY.
12	0C	SMF96RDS	4	packed	Requestor's JMREDATE.
16	10	SMF96UIF	8	EBCDIC	Requestor's JMUSEID.

Provider's Information Section

This section contains user information.

Offsets		Name	Length	Format	Description
0	0	SMF96PID	8	EBCDIC	"Product" name within subsystem.
8	8	SMF96PNM	4	EBCDIC	Knowledge Application name.
16	10	SMF96TID	8	EBCDIC	User/terminal identifier.
28	1C	SMF96URT	4	EBCDIC	User environment.

Detail Section

Note: Date and Time are in the same format as TIME DEC.

Offsets		Name	Length	Format	Description
0	0	SMF96DL#	4	binary	Length of detail record.
4	4	SMF96CPU	4	binary	CPU time in .01 seconds.
8	8	SMF96DVF	4	binary	Vector time in .01 seconds.
12	0C	SMF96STM	4	binary	Time consultation started.

Offsets		Name	Length	Format	Description
16	10	SMF96ADT	4	packed	Date consultation started.
20	14	SMF96ETM	4	binary	Time consultation ended.
24	18	SMF96EDT	2	packed	Date consultation ended.

Summary Section

Note: Date and Time are in the same format as TIME DEC.

Offsets		Name	Length	Format	Description
0	0	SMF96SL#	4	binary	Length of detail record.
4	4	SMF96TPU	4	binary	CPU time in .01 seconds.
8	8	SMF96SVF	4	binary	Vector time in .01 seconds.
12	0C	SMF96TI	4	binary	Time session started.
16	10	SMF96DI	4	packed	Date session started.
20	14	SMF96TE	4	binary	Time session ended.
24	18	SMF96DE	2	packed	Date session ended.
28	1C	SMF96NOC	4	binary	Number of interactions with requestor during this session.
32	20	SMF96SAC	2	binary	System abend code, if any.
34	22	SMF96UAC	2	binary	User abend code, if any.

Record type 97 (X'61') — Foreign Enclave Resource Data

When an enclave is exported to one or more supporting systems, the CPU time consumed in those foreign enclaves is accumulated in SMF type 97 records. There will be one type 97 record on each supporting system that imported the enclave.

Type 97 records are written on an SMF interval basis. The CPU time is broken down by originating system — in other words, there is one section for each originating system that exported one or more enclaves that were then imported by this system during the interval. Note that this section will reflect the total CPU time consumed by all foreign enclaves imported from this one particular originating system.

To identify the specific jobs that consumed CPU time, you need to review the SMF type 30 records on the originating system. Note that for any specific SMF interval, the sum of the type 30 CPU time may not exactly match the type 97 CPU time, as the data for type 30 records is collected asynchronously.

Header/Self-defining Section

This section contains the common SMF record headers fields and the triplet fields (offset/length/number), if applicable, that locate the other sections on the record.

Offsets		Name	Length	Format	Description
Record Header Section:					
0	0	SMF97LEN	2	binary	Record Length.
2	2	SMF97SEG	2	binary	Segment descriptor.

Offsets		Name	Length	Format	Description
4	4	SMF97FLG	1	binary	Header flag byte. **Bit** **Meaning when set** **0** Subsystem identification follows system identification **1** Subtypes used **2-7** Reserved
5	5	SMF97RTY	1	binary	Record type: 97 (X'61').
6	6	SMF97TME	4	binary	Time since midnight, in hundredths of a second, that the record was moved into the SMF buffer.
10	A	SMF97DTE	4	packed	Date when record was written.
14	E	SMF97SID	4	EBCDIC	System identification (from the SID parameter).
18	12	SMF97SSI	4	EBCDIC	Subsystem identification – STC.
22	16	SMF97STP	2	binary	Record subtype.
24	18	SMF97SDL	4	binary	Length of self-defining section.
Self-Defining Section:					
28	1C	SMF97POF	4	binary	Offset to product section.
32	20	SMF97PLN	2	binary	Length of product section.
34	22	SMF97PON	2	binary	Number of product sections.
36	24	SMF97EOF	4	binary	Offset of enclave resource data section.
40	28	SMF97ELN	4	binary	Length of enclave resource data section section.
44	2C	SMF97EON	4	binary	Number of enclave resource data sections in this record.
48	30	SMF97EOS	4	binary	Number of enclave resource data sections in subsequent records.

Product Section

Offsets		Name	Length	Format	Description
0	0	SMF97RVN	2	EBCDIC	Record version number – ‘01’
2	2		2	EBCDIC	Reserved
4	4	SMF97PNM	8	EBCDIC	Product name –‘SCWLM’
12	C	SMF97OSL	8	EBCDIC	MVS product level
20	14	SMF97SYN	8	EBCDIC	Local system name (from SYSNAME PARMLIB option)
28	1C	SMF97IST	4	binary	Reporting interval start time (local, hundredths of a second from midnight). First record will report IPL time.
32	20	SMF97ISD	4	EBCDIC	Reporting interval start date in the form 0cyydddF, where F is the sign. First record will report IPL date.
36	24	SMF97IET	4	binary	Reporting interval end time (local, hundredths of a second from midnight).
40	28	SMF97IED	4	EBCDIC	Reporting interval end date in the form 0cyydddF, where F is the sign.
44	2C	SMF97CAF	4	binary	Copy of RmctAdjc when this SMF record was produced, measures the number of sixteenths of one microsecond of CPU time per CPU service unit.

Foreign Enclave Data Section

Offsets		Name	Length	Format	Description
0	0	SMF97FSN	8	EBCDIC	Name of the system that exported the enclaves which used services on the local system.
8	8	SMF97FCD	4	binary	CPU time used by foreign dependent enclaves, in hundredths of a second.
12	C	SMF97FCI	4	binary	CPU time used by foreign independent enclaves, in hundredths of a second.

Record type 98 (X'62') — Workload interaction correlator and high-frequency throughput statistics

z/OS provides the SMF type 98 record for High-Frequency Throughput Statistics (HFTS) and IBM z/OS Workload Interaction Correlator data generation. An analytics application, such as IBM z/OS Workload Interaction Navigator, uses type 98 records as input for data analysis.

The SMF type 98 record contains multiple subtypes that are assigned when a z/OS component or middleware product exploits HFTS or z/OS Workload Interaction Correlator data generation. Type 98 subtype records are synchronized to the top of the minute for an interval, measured in seconds, as follows:

- **HFTS:** Based on the active SMFPRMxx member of parmlib and the value specified for the HFTSINTVL keyword. See “HFTSINTVL — Specifying the high-frequency throughput statistics interval” on page 69, and see SMFPRMxx in *z/OS MVS Initialization and Tuning Reference*.
- **z/OS Workload Interaction Correlator:** Based on the active SMFPRMxx member of parmlib and the WIC keyword. The specification of the WIC keyword forces HFTS data collection to a 5-second interval. See “WIC — Specifying the generation of type 98 records for IBM z/OS Workload Interaction Correlator” on page 70, and see SMFPRMxx in *z/OS MVS Initialization and Tuning Reference*.

Each type 98 subtype that is being collected produces 1 record per interval. With type 98 subtype records being collected every 5 seconds, each subtype will generate 17,280 records per day.

The following table summarizes the SMF type 98 subtypes:

Table 18. Summary of SMF type 98 subtypes

Subtype	Record owner	Available with HFTS	Available with Correlator	Average record size per interval	Total average record data per day[1]
1	z/OS supervisor	Yes	Yes	32 KB	550 MB
1024	CICS	No	Yes	2 KB	35 MB
1024	IMS	No	Yes	2 KB	35 MB

Notes:

1. The "Total average record data per day" value is based on the "Average record size per interval" estimate and 5-second intervals.

IBM benchmarks did not detect additional measurable CPU overhead due to collecting SMF type 98 subtype records.

All SMF type 98 subtype records have a similar structure, as described in “Record mapping” on page 948. “Subtype data section” on page 951 contains different content for each subtype and is generally defined in “Subtypes for IBM z/OS Workload Interaction Correlator” on page 972.

- SMF type 98 subtype records that are owned by z/OS components have their data sections defined in “Record type 98 (X'62') — Workload interaction correlator and high-frequency throughput statistics” on page 947.
- SMF type 98 subtype records that are owned by middleware products have their data sections defined in the documentation for the middleware product.

Record environment

The following conditions exist for the generation of SMF type 98 records:

Subtype 1

Macro
SMFEWTM, BRANCH=YES (record exit: IEFU84)

Storage residency
31-bit

Record mapping

Record header

This section contains the common SMF record type 98 header fields.

Offsets		Name	Length	Format	Description
0	0	SMF98LEN	2	binary	Record length. This field along with the next form the record descriptor word (RDW). For a details, see "Standard and Extended SMF record headers" on page 162.
2	2	SMF98SEG	2	binary	Segment descriptor. (See SMF98LEN field.)
4	4	SMF98FLG	1	binary	Header flags: **Bit** **Meaning when set** **0** Subsystem identification follows system identification. **1** Subtypes are used. **2-7** Reserved.
5	5	SMF98RTY	1	binary	Record type 98 (X'62')
6	6	SMF98TME	4	binary	Time since midnight, in hundredths of a second, that the record was moved into the SMF buffer.
10	A	SMF98DTE	4	packed	Date that the record was moved into the SMF buffer, in the form 0*cyydddF*. For a details, see "Standard and Extended SMF record headers" on page 162.
14	E	SMF98SID	4	EBCDIC	System identification (from the SID parameter in the SMFPRMxx member of parmlib.
18	12	SMF98SSI	4	EBCDIC	Subsystem identifier for the SMF address space ('STC' for started task).
22	16	SMF98STY	2	binary	Record subtype: **Subtype** **Description** **1** Supervisor performance **1024** IBM CICS **1025** IBM IMS

Offsets		Name	Length	Format	Description
24	18	SMF98IND	1	binary	Additional record flags: **Bit** **Meaning when set** **0** This SMF record has multiple parts. There are more parts to come. • For a single part record, this bit is OFF. • On the first part of a multiple-part record, bit 0 is ON and bit 1 is OFF. • On subsequent parts for the same record, both bit 0 and bit 1 are ON. • On the last record part, bit 0 is OFF and bit 1 is ON. **1** This record is the continuation of the multiple-part record. This bit must be OFF on the first part of the multiple-part record. **2** Error: Storage was not available to generate more data in this SMF record. **3-7** Reserved.
25	19	SMF98PartSeqNo	1	binary	Record part sequence number, which identifies the order of the record part in a multiple-part SMF type 98 record. This value is meaningful only when a record has multiple parts (that is, SMF98IND bit 0 is ON for the first part of the record). The value is 0 for the first part, 1 for the next part, and so on.
26	1A	SMF98SDSLen	2	binary	Length of the self-defining section.
28	1C	SMF98SDSTripletsNum	2	binary	Number of triplets in the self-defining section.
30	1E	*	18	binary	Reserved.

Self-defining section

This section contains the triplet fields (offset, length, and number) that locate the other sections on the record. This triplet information should be checked prior to accessing a section of the record. The number triplet field is the primary indication of the existence of the field. This section is an extension of the header and physically follows it in the record. The offsets listed are from the start of the SMF record. The length of the self-defining section is described by SMF98SDSLen and the number of triplets is described by SMF98SDSTripletsNum.

Offsets		Name	Length	Format	Description
0	0	SMF98IOF	4	binary	Offset to the identification section
4	4	SMF98ILN	2	binary	Length of the identification section
6	6	SMF98ION	2	binary	Number of identification sections
8	8	SMF98CSOF	4	binary	Offset to the context summary section
12	C	SMF98CSLN	2	binary	Length of the context summary section
14	E	SMF98CSON	2	binary	Number of context summary sections
16	10	SMF98DOF	4	binary	Offset to the subtype data section
20	14	SMF98DLN	2	binary	Length of the subtype data section
22	16	SMF98DON	2	binary	Number of subtype data sections

Identification section

This section provides information to identify the source of the SMF type 98 records, including job name, step name, and start and stop times in SMF and TOD formats.

Triplet information:

You can locate this section in the record by using the following triplet fields which are found in the self-defining section:

Offset
SMF98IOF

Length
SMF98ILN

Number
SMF98ION

Offsets		Name	Length	Format	Description
0	0	SMF98JBN	8	EBCDIC	Job name.
8	8	SMF98RST	4	binary	Reporting interval start time (local time in hundredths of a second from midnight).
12	C	SMF98RSD	4	packed	Reporting interval start date, in the form 0*cyyddd*F.
16	10	SMF98STP	8	EBCDIC	Step name.
24	18	SMF98IntervalStart	8	TOD	Interval start time (local time in TOD format). You can convert to GMT by subtracting the value in the SMF98_CVTLDTO field.
32	20	SMF98IntervalEnd	8	TOD	Interval end time (local time in TOD format). You can convert to GMT by subtracting the value in the SMF98_CVTLDTO field.
40	28	SMF98SysName	8	EBCDIC	System Name when first byte not x'00'.
48	30	SMF98IntervalStart_ETOD	16	ETOD	The interval start time—local time in ETOD format. Can be converted to GMT by subtracting SMF98_ECVTLDTO from this value.
64	40	SMF98IntervalEnd_ETOD	16	ETOD	The interval end time—local time in ETOD format. Can be converted to GMT by subtracting SMF98_ECVTLDTO from this value.

Context summary section

This section contains fields that describe the source of the subtype data records, including the level of the subtype exit and when the exit was run.

Use the SMF98_ReleaseIndex, SMF98_WithinReleaseIndex, and SMF98_PrototypeIndex fields to determine the level of the macro you are using when traversing SMF type 98 records.

- SMF98_ReleaseIndex is incremented when a subtype record in a product is significantly changed (such as adding new sections and fields for a new release of z/OS).
- SMF98_WithinReleaseIndex is incremented when small changes are made to a subtype (such as adding a new field via an APAR).
- SMF98_PrototypeIndex is incremented for any temporary changes for a given SMF98_ReleaseIndex value and SMF98_WithinReleaseIndex value, such as to denote changes to the SMF record for different versions of a temporary APAR fix (++APAR). SMF98_PrototypeIndex is set to 0 for GA-level code.

Triplet information:

You can locate this section in the record by using the following triplet fields which are found in the self-defining section:

Offset
SMF98CSOF

Length
SMF98CSLN

Number
SMF98CSON

Offsets		Name	Length	Format	Description
0	0	SMF98_HftsInfo	8	binary	An 8-byte token that is equivalent across SMF 98 subtypes for the same interval.
8	8	SMF98_SubtypeInfo	24	binary	Subtype information.
8	8	SMF98_ReleaseIndex	2	binary	Release index. See the description earlier in this topic.
10	A	SMF98_WithinReleaseIndex	2	binary	Within-release index. See the description earlier in this topic.
12	C	SMF98_PrototypeIndex	2	binary	Prototype index. See the description earlier in this topic.
14	E	*	2	binary	Reserved.
16	10	SMF98_Prodlevel	16	EBCDIC	Product level information. (z/OS components use CVTPROD.)
32	20	SMF98_ExitSerialTOD	8	binary	Time, in TOD units, used by the exit routine holding serialization. May be 0 if information is not available. This is the CPU time that serialization is held. It is obtained by calculating the TimeUsed delta before obtaining and after releasing the serialization.
40	28	SMF98_ExitTimeUsed	8	binary	Time, in TOD units, used by the exit routine up to the point when the SMF record is written. This is the CPU time for the exit (including the time spent holding serialization). It is obtained by calculating the TimeUsed delta from when the exit is entered until the exit writes the record. For continuation records, the last record will have the total time used by the exit.
48	30	SMF98_CVTLDTO	8	TOD	Offset value needed to adjust the TOD value to the local date and time of day. Add this offset to a GMT value to get the local date/time value. Subtract this value from a local TOD value to get the GMT value.
56	38	SMF98_CVTLSO	8	TOD	Leap second offset value needed to adjust TOD values to and from a system clock time. Times in the SMF98 record are already incremented with leap seconds; however, other system times might not be adjusted. Add or subtract this offset to allow for time comparisons with TOD values that are not adjusted for leap seconds.
64	40	SMF98_ECVTLDTO	16	ETOD	Offset value needed to adjust the ETOD value to the local date and time of day. Add this offset to a GMT value to get the local date and time. Subtract this offset from a local ETOD value to get a GMT date and time.
80	50	SMF98_ECVTLSO	16	ETOD	Leap second offset value needed to adjust ETOD values to and from a system clock time. Times in the SMF type 98 record are already incremented with leap seconds; however, other system times may not be adjusted. Add or subtract this offset to allow for time comparisons with ETOD values not adjusted for leap seconds.

Subtype data section

This section provides the data for each subtype and is mapped according by subtype. (Refer to the mappings for each subtype.)

Triplet information:

You can locate this section in the record by using the following triplet fields which are found in the self-defining section:

Offset
SMF98DOF

Length
SMF98DLN

Number
SMF98DON

Subtype 1

SMF record type 98 subtype 1 records contain performance information for the z/OS supervisor component about the workload and its significant jobs, including metrics such as utilization, concurrency, efficiency, contention, and queuing.

IBM recommends configuring Hardware Instrumentation Services (HIS) to collect hardware counters as described in Collecting CPU MF (Counters) on z/OS (www.ibm.com/support/pages/system/files/inline-files/Detailed_CPU_MF_Counters_Enablement_Instructions_September_2019.pdf). Collecting hardware counters enriches the data collected in SMF type 98 subtype 1 records. To verify that the hardware counter sets (such as Basic, Problem, Crypto, Extended, and MT diagnostic (when configured for SMT)) are authorized and enabled, issue the DISPLAY HIS operator command as described in Displaying hardware event data collection status (HIS) in *z/OS MVS System Commands*. See the following sample output from the DISPLAY HIS command for an example of HIS hardware counter sets being authorized and enabled:

```
SY1  HIS015I 17.42.06 DISPLAY HIS 816
HISPROC  0032 ACTIVE
COMMAND: MODIFY HISPROC,BEGIN,CTR=HDWR,CNTFILE=NO,CTRONLY
START TIME:  2021/03/25 17:39:47
END TIME:    ----/--/-- --:--:--
COMPLETION STATUS: --------
COUNTER VERSION NUMBER 1: 1   COUNTER VERSION NUMBER 2: 4
COMMAND PARAMETER VALUES USED:
 TITLE=
 PATH=   .
 DURATION= NOLIMIT
 DATALOSS= IGNORE
 STATECHANGE= SAVE
 SMP= NO
 CNT= YES
 COUNTER SET= BASIC,PROBLEM-STATE,CRYPTO-ACTIVITY,EXTENDED,
             MT-DIAGNOSTIC
  CNTINTVAL= 15 (MINUTES)
 CNTFILE= NO
 MAP= NO
HISSERV STATUS: ACTIVE
 EVENT
  AUTHORIZED= BASIC,PROBLEM-STATE,CRYPTO-ACTIVITY,EXTENDED,
             MT-DIAGNOSTIC,ZOS
  ENABLED= BASIC,PROBLEM-STATE,CRYPTO-ACTIVITY,EXTENDED,
          MT-DIAGNOSTIC
 SAMPLE
  AUTHORIZED= BASIC
  ENABLED= NONE
  BUFCNT=    4 (PAGES/PROCESSOR)
  SAMPFREQ= 800000 (SAMPLES/MINUTE)
 PROFILER
  NAME      START                QUERY              SAMPLE  S F
  HISPROF   2021/03/25 17:39:47   00:00:00.000014   ------
HIS WIC STATUS: INACTIVE
 INMEM= *NONE*
 WICPATH= *NONE*
```

SMF type 98 subtype 1 records contain the following sections:

- Data section
- Environmental section
- Utilization section

- ECCC sections
- Spin lock sections
- Spin lock summary section
- Spin lock detail section
- Suspend lock sections
- Suspend lock summary section
- Suspend lock detail sections
- Address space information section
- Suspend lock detail section
- Local or CML lock detail section
- Work unit priority bucket section
- Address space consumption section
- Execution efficiency sections
- Execution efficiency details sections
- Work unit sections
- Work unit dispatch sections
- Address space spin lock section

Data section

The SMF type 98 subtype 1 data section begins with a number of triplets (SMF98_1_DataTripletsNum) for a length of SMF98_1_DataTripletsNum. Check this triplet information prior to accessing a section of the record. The "number" triplet field is the primary indication of the existence of a section.

All offsets are listed as from the start of the record.

Offsets		Name	Length	Format	Description
0	0	SMF98_1_DataTripletsNum	4	binary	Number of data triplets that follow
4	4	SMF98_1_DataTripletsLen	4	binary	Length of data triplets that follow
8	8	SMF98_1_EnvOF	4	binary	Offset to environmental section, mapped by SMF98_1_EnvInfo
12	C	SMF98_1_EnvLN	2	binary	Length of environmental section
14	E	SMF98_1_EnvON	2	binary	Number of environmental sections
16	10	SMF98_1_SIGPGRPOF	4	binary	For IBM use only
20	14	SMF98_1_SIGPGRPLN	2	binary	For IBM use only
22	16	SMF98_1_SIGPGRPON	2	binary	For IBM use only
24	18	SMF98_1_SIGPOF	4	binary	For IBM use only
28	1C	SMF98_1_SIGPLN	2	binary	For IBM use only
30	1E	SMF98_1_SIGPON	2	binary	For IBM use only
32	20	SMF98_1_OTHOF	4	binary	For IBM use only
36	24	SMF98_1_OTHLN	2	binary	For IBM use only
38	26	SMF98_1_OTHON	2	binary	For IBM use only
40	28	SMF98_1_TXOF	4	binary	For IBM use only
44	2C	SMF98_1_TXLN	2	binary	For IBM use only
46	2E	SMF98_1_TXON	2	binary	For IBM use only

Offsets		Name	Length	Format	Description
48	30	SMF98_1_ECCCOF	4	binary	Offset to ECCC counter sections, mapped by macro IHAECCC structure ECCC_Data
52	34	SMF98_1_ECCCLN	2	binary	Length of ECCC counter section
54	36	SMF98_1_ECCCON	2	binary	Number of ECCC counter sections
56	38	SMF98_1_MISCOF	4	binary	For IBM use only
60	3C	SMF98_1_MISCLN	2	binary	For IBM use only
62	3E	SMF98_1_MISCON	2	binary	For IBM use only
64	40	SMF98_1_UTOF	4	binary	Offset to utilization section, mapped by SMF98_1_UT
68	44	SMF98_1_UTLN	2	binary	Length of utilization section
70	46	SMF98_1_UTON	2	binary	Number of utilization sections
72	48	SMF98_1_LockSpinSumOF	4	binary	Offset to spin lock summary sections, mapped by SMF98_1_SpinLock_Sum
76	4C	SMF98_1_LockSpinSumLN	2	binary	Length of spin lock summary section
78	4E	SMF98_1_LockSpinSumON	2	binary	Number of spin lock summary sections
80	50	SMF98_1_LockSpinDetOF	4	binary	Offset to spin lock detail sections, mapped by SMF98_1_SpinLock_Det
84	54	SMF98_1_LockSpinDetLN	2	binary	Length of spin lock detail section
86	56	SMF98_1_LockSpinDetON	2	binary	Number of spin lock detail sections
88	58	SMF98_1_LockSuspendSumOF	4	binary	Offset to suspend lock summary sections, mapped by SMF98_1_SuspLock_Sum
92	5C	SMF98_1_LockSuspendSumLN	2	binary	Length of suspend lock summary section
94	5E	SMF98_1_LockSuspendSumON	2	binary	Number of suspend lock summary sections
96	60	SMF98_1_LockSuspendDetOF	4	binary	Offset to suspend lock detail sections, mapped by SMF98_1_SuspLock_Det
100	64	SMF98_1_LockSuspendDetLN	2	binary	Length of suspend lock detail section
102	66	SMF98_1_LockSuspendDetON	2	binary	Number of suspend lock detail sections
104	68	SMF98_1_LockLocalCMLDetOF	4	binary	Offset to local or CML lock detail sections, mapped by SMF98_1_LockLocalCml_Det
108	6C	SMF98_1_LockLocalCMLDetLN	2	binary	Length of local or CML lock detail section
110	6E	SMF98_1_LockLocalCMLDetON	2	binary	Number of local or CML lock detail sections
112	70	SMF98_1_PriorityBucketOF	4	binary	Offset to work unit priority bucket sections, mapped by SMF98_1_PB_Data
116	74	SMF98_1_PriorityBucketLN	2	binary	Length of work unit priority bucket section
118	76	SMF98_1_PriorityBucketON	2	binary	Number of work unit priority bucket sections
120	78	SMF98_1_ConsumeOF	4	binary	Offset to consumption sections, mapped by SMF98_1_Consume
124	7C	SMF98_1_ConsumeLN	2	binary	Length of consumption section
126	7E	SMF98_1_ConsumeON	2	binary	Number of consumption sections
128	80	SMF98_1_LockSuspendMaxDetOF	4	binary	Offset to suspend lock detail section for the suspend lock type with the most contention time, mapped by SMF98_1_SuspLock_Det
132	84	SMF98_1_LockSuspendMaxDetLN	2	binary	Length of maximum suspend lock detail section
134	86	SMF98_1_LockSuspendMaxDetON	2	binary	Number of maximum suspend lock detail sections, zero when no sections exist

Offsets		Name	Length	Format	Description
136	88	SMF98_1_LockSuspendMaxSumOF	4	binary	Offset to maximum suspend lock summary section for the suspend lock type with the most contention time, mapped by SMF98_1_SuspLock_Sum
140	8C	SMF98_1_LockSuspendMaxSumLN	2	binary	Length of maximum suspend lock summary section
142	8E	SMF98_1_LockSuspendMaxSumON	2	binary	Number of maximum suspend lock summary sections, zero when no sections exist

Environmental section

The SMF type 98 subtype 1 environmental section contains environmental and configuration information about the system and is mapped by SMF98_1_EnvInfo. Most of the environmental fields are expected to remain unchanged across data collection intervals. Special attention might be needed, if these fields change, when comparing other data across collection intervals. Small differences in the following fields can be considered normal:

SMF98_1_ENV_QDepthAnalysisDelta
SMF98_1_ENV_Num_VL_Unparked_cores_CP
SMF98_1_ENV_Num_VL_Unparked_cores_zAAP
SMF98_1_ENV_Num_VL_Parked_cores_zIIP
SMF98_1_ENV_Num_VL_Unparked_cores_CP
SMF98_1_ENV_Num_VL_Parked_cores_zAAP
SMF98_1_ENV_Num_VL_Parked_cores_zIIP
SMF98_1_ENV_SVT_Priority_Ranges_Area
SMF98_1_ENV_SVT_Priority_Ranges

Fields that are related to LPAR weight are only valid when HIPERDISPATCH=YES is specified in the IEAOPTxx member of parmlib. When bit 0 of SMF98_1_ENV_Flags is OFF, the SMF98_1_ENV_Num_VH*, SMF98_1_ENV_Num_VM*, and SMF98_1_ENV_Num_VL* fields have no meaning and contain zeros.

Triplet information: You can locate this section in the record by using the following triplet fields which are found in the self-defining section:

Offset
SMF98_1_EnvOF

Length
SMF98_1_EnvLN

Number
SMF98_1_EnvON

Offsets		Name	Length	Format	Description
0	0	SMF98_1_ENV_Flags	3	binary	Configuration flags: **Bit** **Meaning when set** **0** HiperDispatch=YES is specified. (Bit 0 OFF means HiperDispatch=NO is specified) **1-2** For IBM use only. **3-4** MT flags: **3** A processor resource is viewed as a CPU core. **4** When bit 3 is ON, indicates there are multiple CPUs defined within a CPU core (on MT hardware). **5** One or more CP cores is in mixed mode state. **6** One or more zAAP cores is in mixed mode state. **7** One or more zIIP cores is in mixed mode state. **8** An uncorrectable error was detected and z/OS supervisor forced the system to run with a thread density of 1. **9 - 23** Reserved.
3	3	SMF98_1_ENV_SVTCR	1	binary	For IBM use only.
4	4	SMF98_1_ENV_SvtCoreMode_Max	2	binary	Maximum MT mode. When SMF98_1_ENV_Flags bit 3 is ON, this value is the maximum number of CPUs that can be used on a core. When SMF98_1_ENV_Flags bit 3 is OFF, this value is set to 1.
6	6	SMF98_1_ENV_SvtCoreMode_CP	2	binary	Number of CPUs that are active on a CP core.
8	8	SMF98_1_ENV_SvtCoreMode_zAAP	2	binary	Number of CPUs that are active on a zAAP core.
10	A	SMF98_1_ENV_SvtCoreMode_zIIP	2	binary	Number of CPUs that are active on a zIIP core.
12	C	SMF98_1_ENV_AWMT_CP	4	binary	Operational value of the CP alternate wait management time. See the CCCAWMT parameter in the IEAOPTxx member of parmlib for more information.
16	10	SMF98_1_ENV_AWMT_ZAAP	4	binary	Operational value of the zAAP alternate wait management time. See the ZAAPAWMT parameter in the IEAOPTxx member of parmlib for more information.
20	14	SMF98_1_ENV_AWMT_ZIIP	4	binary	Operational value of the zIIP alternate wait management time. See the ZIIPAWMT parameter in the IEAOPTxx member of parmlib for more information.
24	18	SMF98_1_ENV_SVTMAXQL	2	binary	The maximum number of work units that one CP can dispatch in a timely manner.
26	1A	SMF98_1_ENV_SVT_zAAPMAXQL	2	binary	The maximum number of work units that one zAAP can dispatch in a timely manner.
28	1C	SMF98_1_ENV_SVT_zIIPMAXQL	2	binary	The maximum number of work units that one zIIP can dispatch in a timely manner.
30	1E	SMF98_1_ENV_SVTMINHL	2	binary	When a CP chooses another CPU for help, the minimum number of dispatches that will be done for help.
32	20	SMF98_1_ENV_SVT_zAAPMINHL	2	binary	When a zAAP chooses another CPU for help, the minimum number of dispatches that will be done for help.

Offsets		Name	Length	Format	Description
34	22	SMF98_1_ENV_SVT_zIIPMINHL	2	binary	When a zIIP chooses another CPU for help, the minimum number of dispatches that will be done for help.
36	24	SMF98_1_ENV_OptDebVal1	4	binary	For IBM use only.
40	28	SMF98_1_ENV_OptDebVal2	4	binary	For IBM use only.
44	2C	SMF98_1_ENV_OptDebVal3	4	binary	For IBM use only.
48	30	SMF98_1_ENV_OptDebVal4	4	binary	For IBM use only.
52	34	SMF98_1_ENV_Superval1	4	binary	For IBM use only.
56	38	SMF98_1_ENV_Superval2	4	binary	For IBM use only.
60	3C	SMF98_1_ENV_Superval3	4	binary	For IBM use only.
64	40	SMF98_1_ENV_Superval4	4	binary	For IBM use only.
68	44	SMF98_1_ENV_OnlineCores_CPs	4	binary	Number of online cores for CPs.
72	48	SMF98_1_ENV_OnlineCores_zAAPs	4	binary	Number of online cores for zAAPs.
76	4C	SMF98_1_ENV_OnlineCores_zIIPs	4	binary	Number of online cores for zIIPs.
80	50	SMF98_1_ENV_Num_VH_cores_CP	4	binary	Number of vertical high online CP cores.
84	54	SMF98_1_ENV_Num_VH_cores_zAAP	4	binary	Number of vertical high online zAAP cores.
88	58	SMF98_1_ENV_Num_VH_cores_zIIP	4	binary	Number of vertical high online zIIP cores.
92	5C	SMF98_1_ENV_Num_VM_cores_CP	4	binary	Number of vertical medium online CP cores.
96	60	SMF98_1_ENV_Num_VM_cores_zAAP	4	binary	Number of vertical medium online zAAP cores.
100	64	SMF98_1_ENV_Num_VM_cores_zIIP	4	binary	Number of vertical medium online zIIP cores.
104	68	SMF98_1_ENV_Num_VL_Unparked_cores_CP	4	binary	Number of vertical low unparked CP cores.
108	6C	SMF98_1_ENV_Num_VL_Unparked_cores_zAAP	4	binary	Number of vertical low unparked zAAP cores.
112	70	SMF98_1_ENV_Num_VL_Unparked_cores_zIIP	4	binary	Number of vertical low unparked zIIP cores.
116	74	SMF98_1_ENV_Num_VL_Parked_cores_CP	4	binary	Number of vertical low parked CP cores.
120	78	SMF98_1_ENV_Num_VL_Parked_cores_zAAP	4	binary	Number of vertical low parked zAAP cores.
124	7C	SMF98_1_ENV_Num_VL_Parked_cores_zIIP	4	binary	Number of vertical low parked zIIP cores.
128	80	SMF98_1_ENV_Num_Excluded_CP	4	binary	Number of CP CPUs excluded in delta calculations because of online TOD mismatch.
132	84	SMF98_1_ENV_Num_Excluded_zAAP	4	binary	Number of zAAP CPUs excluded in delta calculations because of online TOD mismatch.
136	88	SMF98_1_ENV_Num_Excluded_zIIP	4	binary	Number of zIIP CPUs excluded in delta calculations because of online TOD mismatch.
140	8C	SMF98_1_ENV_SVT_CPEngineSpeed	4	binary	Standard CP engine speed, in cycles per microsecond. A value of 0 means the speed is unavailable.
144	90	SMF98_1_ENV_SVT_SpecialtyEngineSpeed	4	binary	Specialty engine (zAAP and zIIP) speed, in cycles per microsecond. A value of 0 means the speed is unavailable.
148	94	SMF98_1_ENV_SVT_Priority_Ranges_Area SMF98_1_ENV_SVT_Priority_Ranges	3	binary	Array of priority range end (inclusive) for high, medium, and low priorities, 1 byte each.
151	97	SMF98_1_ENV_VcmCPsPerNode	1	binary	VCM option.
152	98	SMF98_1_ENV_QDepthAnalysisDelta	4	binary	Number of times that work unit queue depth analysis was done in this HFTS interval.
156	9C	SMF98_1_ENV_Num_Core_Excluded_CP	4	binary	Number of CP cores excluded in delta calculations because of online TOD mismatch.
160	A0	SMF98_1_ENV_Num_Core_Excluded_zAAP	4	binary	Number of zAAP cores excluded in delta calculations because of online TOD mismatch.
164	A4	SMF98_1_ENV_Num_Core_Excluded_zIIP	4	binary	Number of zIIP cores excluded in delta calculations because of online TOD mismatch.

Offsets		Name	Length	Format	Description
168	A8	SMF98_1_ENV_SVT_SubBucket_Ranges_Area SMF98_1_ENV_SVT_SubBucket_Ranges	3	binary	Ranges of CPU consumption percentages used to subdivide HFTS priority bucket output into sub-buckets. Values represent units of 0.5 percent CPU utilization and range from 1 (0.5%) to 199 (99.5%), 1 byte each. For example, 1 = 0.5%, 2 = 1.0%, 3 = 1.5%, and so on.
171	AB	*	1	binary	Reserved.
172	AC	SMF98_1_ENV_SVTXEGR	4	binary	For IBM use only.
176	B0	SMF98_1_ENV_SVTO_RelPriority_Ranges_Area SMF98_1_ENV_SVTO_RelPriority_Ranges	3	binary	For IBM use only.
179	B3	*	5	binary	Reserved.

Utilization section

The SMF type 98 subtype 1 utilization section contains utilization data, including the parked time and wait time delta on a per-CPU basis, and the average CP, zAAP, and zIIP CPU and core busy percentage statistics. This section is mapped by SMF98_1_UT.

Triplet information:

You can locate this section in the record by using the following triplet fields which are found in the self-defining section:

Offset
SMF98_1_UTOF

Length
SMF98_1_UTLN

Number
SMF98_1_UTON

Offsets		Name	Length	Format	Description
0	0	SMF98_1_UT_CPUs_Unparked_CP	4	binary	Number of CP CPUs that are unparked.
4	4	SMF98_1_UT_CPUs_Unparked_zAAP	4	binary	Number of zAAP CPUs that are unparked.
8	8	SMF98_1_UT_CPUs_Unparked_zIIP	4	binary	Number of zIIP CPUs that are unparked.
12	C	SMF98_1_UT_Avg_Num_UnparkedVLs_CP	4	binary	Average number of CP vertical low processors that are unparked.
16	10	SMF98_1_UT_Avg_Num_UnparkedVLs_zAAP	4	binary	Average number of zAAP vertical low processors that are unparked.
20	14	SMF98_1_UT_Avg_Num_UnparkedVLs_zIIP	4	binary	Average number of zIIP vertical low processors that are unparked.
24	18	SMF98_1_UT_Avg_CpuBusy_CP	4	binary	Average CPU busy percentage for overall CP.
28	1C	SMF98_1_UT_Avg_CpuBusy_zAAP	4	binary	Average CPU busy percentage for overall zAAP.
32	20	SMF98_1_UT_Avg_CpuBusy_zIIP	4	binary	Average CPU busy percentage for overall zIIP.
36	24	SMF98_1_UT_Avg_CpuBusy_VH_CP	4	binary	Average CPU busy percentage for vertical high CPs.
40	28	SMF98_1_UT_Avg_CpuBusy_VH_zAAP	4	binary	Average CPU busy percentage for vertical high zAAPs.
44	2C	SMF98_1_UT_Avg_CpuBusy_VH_zIIP	4	binary	Average CPU busy percentage for vertical high zIIPs.
48	30	SMF98_1_UT_Avg_CpuBusy_VM_CP	4	binary	Average CPU busy percentage for vertical medium CPs.
52	34	SMF98_1_UT_Avg_CpuBusy_VM_zAAP	4	binary	Average CPU busy percentage for vertical medium zAAPs.
56	38	SMF98_1_UT_Avg_CpuBusy_VM_zIIP	4	binary	Average CPU busy percentage for vertical medium zIIPs.
60	3C	SMF98_1_UT_Avg_CpuBusy_VL_CP	4	binary	Average CPU busy percentage for vertical low CPs.
64	40	SMF98_1_UT_Avg_CpuBusy_VL_zAAP	4	binary	Average CPU busy percentage for vertical low zAAPs.
68	44	SMF98_1_UT_Avg_CpuBusy_VL_zIIP	4	binary	Average CPU busy percentage for vertical low zIIPs.

Offsets		Name	Length	Format	Description
72	48	SMF98_1_UT_AvgCoreBusyArea	48	binary	Average core busy percentage area. These fields are only populated when SMF98_1_ENV_Flags3 bit 3 is ON; otherwise, they are set to 0.
72	48	SMF98_1_UT_Avg_CoreBusy_CP	4	binary	Average core busy percentage for overall CP.
76	4C	SMF98_1_UT_Avg_CoreBusy_zAAP	4	binary	Average core busy percentage for overall zAAP.
80	50	SMF98_1_UT_Avg_CoreBusy_zIIP	4	binary	Average core busy percentage for overall zIIP.
84	54	SMF98_1_UT_Avg_CoreBusy_VH_CP	4	binary	Average core busy percentage for vertical high CPs.
88	58	SMF98_1_UT_Avg_CoreBusy_VH_zAAP	4	binary	Average core busy percentage for vertical high zAAPs.
92	5C	SMF98_1_UT_Avg_CoreBusy_VH_zIIP	4	binary	Average core busy percentage for vertical high zIIPs.
96	60	SMF98_1_UT_Avg_CoreBusy_VM_CP	4	binary	Average core busy percentage for vertical medium CPs.
100	64	SMF98_1_UT_Avg_CoreBusy_VM_zAAP	4	binary	Average core busy percentage for vertical medium zAAPs.
104	68	SMF98_1_UT_Avg_CoreBusy_VM_zIIP	4	binary	Average core busy percentage for vertical medium zIIPs.
108	6C	SMF98_1_UT_Avg_CoreBusy_VL_CP	4	binary	Average core busy percentage for vertical low CPs.
112	70	SMF98_1_UT_Avg_CoreBusy_VL_zAAP	4	binary	Average core busy percentage for vertical low zAAPs.
116	74	SMF98_1_UT_Avg_CoreBusy_VL_zIIP	4	binary	Average core busy percentage for vertical low zIIPs.
120	78	SMF98_1_UT_Avg_MTTW_CP_TimeTOD	8	binary	Average mean time to wait for CP cores, in TOD format; 0 when no CPU enters a wait.
128	80	SMF98_1_UT_Avg_MTTW_zAAP_TimeTOD	8	binary	Average mean time to wait for zAAP cores, in TOD format; 0 when no CPU enters a wait.
136	88	SMF98_1_UT_Avg_MTTW_zIIP_TimeTOD	8	binary	Average mean time to wait for zIIP cores, in TOD format; 0 when no CPU enters a wait.
144	90	SMF98_1_UT_Avg_TasksPerWakeUp_CP	4	binary	Average TCB dispatches per wait for CP CPUs; 0 when no CPU enters a wait.
148	94	SMF98_1_UT_Avg_TasksPerWakeUp_zAAP	4	binary	Average TCB dispatches per wait for zAAP CPUs; 0 when no CPU enters a wait.
152	98	SMF98_1_UT_Avg_TasksPerWakeUp_zIIP	4	binary	Average TCB dispatches per wait for zIIP CPUs; 0 when no CPU enters a wait.
156	9C	SMF98_1_UT_Avg_SrbsPerWakeUp_CP	4	binary	Average SRB dispatches per wait for CP CPUs; 0 when no CPU enters a wait.
160	A0	SMF98_1_UT_Avg_SrbsPerWakeUp_zAAP	4	binary	Average SRB dispatches per wait for zAAP CPUs; 0 when no CPU enters a wait.
164	A4	SMF98_1_UT_Avg_SrbsPerWakeUp_zIIP	4	binary	Average SRB dispatches per wait for zIIP CPUs; 0 when no CPU enters a wait.
168	A8	SMF98_1_UT_Avg_HelpsPerWakeUp_CP	4	binary	Average help requests per 16 waits for CP CPUs; 0 when no CPU enters a wait.
172	AC	SMF98_1_UT_Avg_HelpsPerWakeUp_zAAP	4	binary	Average help requests per 16 waits for zAAP CPUs; 0 when no CPU enters a wait.
176	B0	SMF98_1_UT_Avg_HelpsPerWakeUp_zIIP	4	binary	Average help requests per 16 waits for zIIP CPUs; 0 when no CPU enters a wait.
180	B4	SMF98_1_UT_Sig_NumCPUs_CP	4	binary	Number of CP CPUs that had a significantly higher than average MTTW value.
184	B8	SMF98_1_UT_Sig_NumCPUs_zAAP	4	binary	Number of zAAP CPUs that had a significantly higher than average MTTW value.
188	BC	SMF98_1_UT_Sig_NumCPUs_zIIP	4	binary	Number of zIIP CPUs that had a significantly higher than average MTTW value.
192	C0	SMF98_1_UT_Sig_Avg_MTTW_CP_TimeTOD	8	binary	Average mean time to wait for CP cores that had significantly higher than average MTTW values, in TOD units.
200	C8	SMF98_1_UT_Sig_Avg_MTTW_zAAP_TimeTOD	8	binary	Average mean time to wait for zAAP cores that had significantly higher than average MTTW values, in TOD units.
208	D0	SMF98_1_UT_Sig_Avg_MTTW_zIIP_TimeTOD	8	binary	Average mean time to wait for zIIP cores that had significantly higher than average MTTW values, in TOD units.
216	D8	SMF98_1_UT_Sig_Avg_TasksPerWakeUp_CP	4	binary	Average TCB dispatches per wait for CP CPUs that had significantly higher than average MTTW values.

Offsets		Name	Length	Format	Description
220	DC	SMF98_1_UT_Sig_Avg_TasksPerWakeUp_zAAP	4	binary	Average TCB dispatches per wait for zAAP CPUs that had significantly higher than average MTTW values.
224	E0	SMF98_1_UT_Sig_Avg_TasksPerWakeUp_zIIP	4	binary	Average TCB dispatches per wait for zIIP CPUs that had significantly higher than average MTTW values.
228	E4	SMF98_1_UT_Sig_Avg_SrbsPerWakeUp_CP	4	binary	Average SRB dispatches per wait for CP CPUs that had significantly higher than average MTTW values.
232	E8	SMF98_1_UT_Sig_Avg_SrbsPerWakeUp_zAAP	4	binary	Average SRB dispatches per wait for zAAP CPUs that had significantly higher than average MTTW values.
236	EC	SMF98_1_UT_Sig_Avg_SrbsPerWakeUp_zIIP	4	binary	Average SRB dispatches per wait for zIIP CPUs that had significantly higher than average MTTW values.
240	F0	SMF98_1_UT_Sig_Avg_HelpsPerWakeUp_CP	4	binary	Average help requests per 16 waits for CP CPUs that had significantly higher than average MTTW values.
244	F4	SMF98_1_UT_Sig_Avg_HelpsPerWakeUp_zAAP	4	binary	Average help requests per 16 waits for zAAP CPUs that had significantly higher than average MTTW values.
248	F8	SMF98_1_UT_Sig_Avg_HelpsPerWakeUp_zIIP	4	binary	Average help requests per 16 waits for zIIP CPUs that had significantly higher than average MTTW values.
252	FC	SMF98_1_UT_Sig_Avg_CPUBusy_CP	4	binary	Average CPU Busy percentage for CP CPUs with significantly higher MTTW values. Valid only when SMF98_1_UTLN is at least 328 (X'148').
256	100	SMF98_1_UT_Sig_Avg_CPUBusy_zAAP	4	binary	Average CPU Busy percentage for zAAP CPUs with significantly higher MTTW values.
260	104	SMF98_1_UT_Sig_Avg_CPUBusy_zIIP	4	binary	Average CPU Busy percentage for zIIP CPUs with significantly higher MTTW values.
264	108	SMF98_1_UT_Sig_Avg_FDispsPerWakeUp_CP	4	binary	Average Foreign TCP + SRB dispatches per wait for CP CPUs with significantly higher MTTW values.
268	10C	SMF98_1_UT_Sig_Avg_FDispsPerWakeUp_zAAP	4	binary	Average Foreign TCB + SRB dispatches per wait for ZAAP CPUs with significantly higher MTTW values.
272	110	SMF98_1_UT_Sig_Avg_FDispsPerWakeUp_zIIP	4	binary	Average Foreign TCB + SRB dispatches per wait for ZIIP CPUs with significantly higher MTTW values.
276	112	SMF98_1_UT_Sig_Top_CPU_CP	2	binary	CP CPU with the largest MTTW value. Set to X'FFFF' when SMF98_1_UT_Sig_NumCPUs_CP is 0.
278	114	SMF98_1_UT_Sig_Top_CPU_zAAP	2	binary	zAAP CPU with the largest MTTW value. Set to X'FFFF' when SMF98_1_UT_Sig_NumCPUs_zAAP is 0.
280	116	SMF98_1_UT_Sig_Top_CPU_zIIP	2	binary	zIIP CPU with the largest MTTW value. Set to X'FFFF' when SMF98_1_UT_Sig_NumCPUs_zIIP is 0.
282	118	SMF98_1_UT_Sig_2nd_CPU_CP	2	binary	CP CPU with the second largest MTTW value. Set to X'FFFF' when SMF98_1_UT_Sig_NumCPUs_CP is 0 or 1.
284	11A	SMF98_1_UT_Sig_2nd_CPU_zAAP	2	binary	zAAP CPU with the second largest MTTW value. Set to X'FFFF' when SMF98_1_UT_Sig_NumCPUs_zAAP is 0 or 1.
286	11C	SMF98_1_UT_Sig_2nd_CPU_zIIP	2	binary	zIIP CPU with the second largest MTTW value. Set to X'FFFF' when SMF98_1_UT_Sig_NumCPUs_zIIP is 0 or 1.
288	120	SMF98_1_UT_Sig_Top2_MTTW_CP_TimeTOD	8	binary	Average MTTW value for top CP CPUs. Set to 0 when SMF98_1_UT_Sig_NumCPUs_CP is 0. Set to MTTW value for top CPU when SMF98_1_UT_Sig_NumCPUs_CP is 1. Set to average of top two CPUs when SMF98_1_UT_Sig_NumCPUs_CP is 2 or greater.
296	128	SMF98_1_UT_Sig_Top2_MTTW_zAAP_TimeTOD	8	binary	Average MTTW value for top zAAP CPUs. Set to 0 when SMF98_1_UT_Sig_NumCPUs_zAAP is 0. Set to MTTW value for top CPU when SMF98_1_UT_Sig_NumCPUs_zAAP is 1. Set to average of top two CPUs when SMF98_1_UT_Sig_NumCPUs_zAAP is 2 or greater.
304	130	SMF98_1_UT_Sig_Top2_MTTW_zIIP_TimeTOD	8	binary	Top Average MTTW value for top zIIP CPUs. Set to 0 when SMF98_1_UT_Sig_NumCPUs_zIIP is 0. Set to MTTW value for top CPU when SMF98_1_UT_Sig_NumCPUs_zIIP is 1. Set to average of top two CPUs when SMF98_1_UT_Sig_NumCPUs_zIIP is 2 or greater.
312	138	SMF98_1_UT_Avg_FDispsPerWakeUp_CP	4	binary	Average Foreign TCB+ SRB dispatches per wait for CP CPUs.

Offsets		Name	Length	Format	Description
316	13C	SMF98_1_UT_Avg_FDispsPerWakeUp_zAAP	4	binary	Average Foreign TCB + SRB dispatches per wait for ZAAP CPUs.
320	140	SMF98_1_UT_Avg_FDispsPerWakeUp_zIIP	4	binary	Average Foreign TCB + SRB dispatches per wait for ZIIP CPUs.
324	144	*	4	binary	Reserved.

ECCC sections

The SMF type 98 subtype 1 external CPU configuration counters (ECCC) sections contain CPU configuration-related data and are mapped by module IHAECCC structure ECCC_Data. ECCC data in the SMF type 98 subtype 1 record is the sum of ECCC data for all CPUs on the system.

Triplet information:

You can locate this section in the record by using the following triplet fields which are located in the self-defining section:

Offset
SMF98_1_ECCCOF

Length
SMF98_1_ECCCLN

Number
SMF98_1_ECCCON

Spin lock sections

There are two types of spin lock sections:

- A summary section that contains spin lock data for all spin locks during the interval
- Detail sections that contain spin lock data for the spin locks that spent the most time spinning during the interval

Spin lock summary section

The SMF type 98 subtype 1 spin lock summary section contains the sum of all spin lock contention data for the system and is mapped by SMF98_1_SpinLock_Sum.

Triplet information:

You can locate this section in the record by using the following triplet fields which are located in the self-defining section:

Offset
SMF98_1_LockSpinSumOF

Length
SMF98_1_LockSpinSumLN

Number
SMF98_1_LockSpinSumON

Offsets		Name	Length	Format	Description
0	0	SMF98_1_SpinLockSum_Count	4	binary	Number of times that a CPU spun for the lock
4	4	*	4	binary	Reserved
8	8	SMF98_1_SpinLockSum_TimeTOD	8	binary	Time spend spinning, in TOD units
16	10	SMF98_1_SpinLockSum_AvgTimeTOD	8	binary	Average spin time, in TOD units

Spin lock detail section

The SMF type 98 subtype 1 spin lock detail section contains the spin lock contention data for the top spin locks, identified by SMF98_1_SpinLockDet_ID, that spent the most time spinning. These appear in descending order of time spent spinning.

Triplet information:

You can locate this section in the record by using the following triplet fields which are located in the self-defining section:

Offset
SMF98_1_LockSpinDetOF

Length
SMF98_1_LockSpinDetLN

Number
SMF98_1_LockSpinDetON

Offsets		Name	Length	Format	Description
0	0	SMF98_1_SpinLockDet_ID	4	binary	Lock ID of the spin lock. See SMF98_1_SpinLockID_*xxxx* for the spin lock name for this lock ID.
4	4	SMF98_1_SpinLockDet_Count	4	binary	Number of times a CPU requested a spin lock and resulted in spinning for the lock
8	8	SMF98_1_SpinLockDet_TimeTOD	8	binary	Time spent spinning, in TOD units
16	10	SMF98_1_SpinLockDet_AvgTimeTOD	8	binary	Average spin time, in TOD units

Suspend lock sections

There are three types of suspend lock sections:

- A summary section that contains suspend lock data from all activity during the interval
- Two types of suspend lock detail sections that contain suspend lock data for the suspend locks that spent the most time suspended during the interval

Each suspend lock section contains one or more suspend lock information sections (SMF98_1_SuspLock_Info), mapped as follows:

Offsets		Name	Length	Format	Description
0	0	SMF98_1_SuspLock_Info_Count	8	binary	Number of times suspended on the lock
8	8	SMF98_1_SuspLock_Info_Already_Susp	8	binary	Number of times suspended when another work unit was already suspended.
16	10	SMF98_1_SuspLock_Info_Cont_TimeTOD	8	binary	Time suspended, in TOD units
24	18	SMF98_1_SuspLock_Info_AvgTimeTOD	8	binary	Average time suspended, in TOD units

Suspend lock summary section

The SMF type 98 subtype 1 suspend lock summary section contains the sum of all contention for a given lock type (SMF98_1_SuspLock_Sum_Type), mapped by SMF98_1_SuspLock_Sum.

Triplet information:

You can locate this section in the record by using the following triplet fields which are located in the self-defining section:

Offset
SMF98_1_LockSuspendSumOF

Length
SMF98_1_LockSuspendSumLN

Number
SMF98_1_LockSuspendSumON

You can also locate the section containing the suspend lock type with the most contention time in the record by using the following triplet fields, which are located in the self-defining section:

Offset
SMF98_1_LockSuspendMaxSumOF

Length
SMF98_1_LockSuspendMaxSumLN

Number
SMF98_1_LockSuspendMaxSumON

Offsets		Name	Length	Format	Description
0	0	SMF98_1_SuspLock_Sum_Type	2	binary	Type of suspend lock: **Value** **Meaning** **X'FFFF'** All **1** CMSSMF **2** CMSEQDQ **3** CMSLATCH **4** CMS **5** LOCAL **6** CML **7** LOCAL + CML When located from the offset, SMF98_1_LockSuspendMaxSumOF, the type of suspend lock is not All (X'FFFF') or LOCAL + CML (7).
2	2	SMF98_1_SuspLock_Sum_Stats	32	binary	Suspend lock contention statistics, mapped by SMF_1_SuspLock_Info

Suspend lock detail sections

The SMF type 98 subtype 1 suspend lock detail sections contain the suspend lock data for the top address spaces that spend the most time suspended during the interval. There are two types of suspend lock detail sections:

- SMF98_1_SuspLock_Det sections contain suspend lock data details about CMS suspend locks (SMF, ENQDEQ, LATCH, and CMS).
- SMF98_1_LockLocalCml_Det sections contain the same data about LOCAL or CML locks, as well as data about the associated lock (LOCAL for CML, CML for LOCAL) and a summary section that adds LOCAL and CML data. The associated and summary section contains zeroes if there is no associated count.

Address space information section

Each suspend lock detail section contains identifying information about each address space, mapped by SMF98_1_AsidInfo. Address space information also appears in consumption sections.

Offsets		Name	Length	Format	Description
0	0	SMF98_1_AsidInfo_ASID	2	binary	ASID of the address space
2	2	SMF98_1_AsidInfo_DP	1	binary	Dispatching priority of the work unit

Offsets		Name	Length	Format	Description
3	3	SMF98_1_AsidInfo_Flags	1	binary	Address space flags: **Bit** **Meaning when set** **0** Address space was broken up. **1-7** Reserved.
4	4	SMF98_1_AsidInfo_Seqnum	4	binary	Address space sequence / instance number
8	8	SMF98_1_AsidInfo_JobName	8	EBCDIC	Job name
16	10	SMF98_1_AsidInfo_CP_AllTaskSRB_TimeTOD	8	binary	Total CP CPU time used by this address space, in TOD units
24	16	SMF98_1_AsidInfo_zIIP_AllTaskSRB_TimeTOD	8	binary	Total zIIP CPU time used by this address space, in TOD units
32	20	SMF98_1_AsidInfo_CP_All_TD1EQ_CPI	4	binary	Thread density 1 equivalent (includes sum of TD=1 and TD=2) cycles per 4096 instructions executed in the CP processor class. Divide by 4096 to get cycles per 1 instruction.
36	24	SMF98_1_AsidInfo_zIIP_All_TD1EQ_CPI	4	binary	Thread density 1 equivalent (includes sum of TD=1 and TD=2) cycles per 4096 instructions executed in the zIIP processor class. Divide by 4096 to get cycles per 1 instruction.
40	28	*	16	binary	Reserved.

Suspend lock detail section

The SMF type 98 subtype 1 suspend lock detail section contains the suspend lock data details about CMS suspend locks (SMF, ENQDEQ, LATCH, and CMS). These are mapped by SMF98_1_SuspLock_Det. It is also part of the SMF98_1_LockLocalCml_Det section that maps LOCAL or CML lock data.

Triplet information:

You can locate this section in the record by using the following triplet fields which are located in the self-defining section:

Offset
SMF98_1_LockSuspendDetOF

Length
SMF98_1_LockSuspendDetLN

Number
SMF98_1_LockSuspendDetON

You can also locate this section containing the suspend lock type with the most contention time in the record by using the following triplet fields, which are located in the self-defining section:

Offset
SMF98_1_LockSuspendMaxDetOF

Length
SMF98_1_LockSuspendMaxDetLN

Number
SMF98_1_LockSuspendMaxDetON

Offsets		Name	Length	Format	Description
0	0	SMF98_1_SuspLock_Det_Type	2	binary	Type of suspend lock: **Value** **Meaning** **1** CMSSMF **2** CMSEQDQ **3** CMSLATCH **4** CMS **5** LOCAL **6** CML
2	4	SMF98_1_SuspLock_Det_Pos	2	binary	Position of this address space as a top address space for the lock type. For instance, 1 = first, 2 = second, and so on.
8	8	SMF98_1_SuspLock_Det_AsidInfo	56	binary	ASID information, including ASID, DP, and job name, mapped by SMF98_1_AsidInfo.
64	10	SMF98_1_SuspLock_Det_Stats	32	binary	Suspend lock contention statistics, mapped by SMF_1_SuspLock_Info.

Local or CML lock detail section

LOCAL and CML lock data is mapped by SMF98_1_LockLocalCml_Det. The SMF98_1_LockLocalCml_Det_AssocStat and SMF98_1_LockLocalCml_Det_All fields contain zeros if there is no associated count.

Triplet information:

You can locate this section in the record by using the following triplet fields which are located in the self-defining section:

Offset
SMF98_1_LockLocalCMLDetOF

Length
SMF98_1_LockLocalCMLDetLN

Number
SMF98_1_LockLocalCMLDetON

Offsets		Name	Length	Format	Description
0	0	SMF98_1_LockLocalCML_SuspLockCommon	96	binary	Common lock detail section, mapped by SMF98_1_SuspLock_Det
96	60	*	24	binary	Reserved
120	78	SMF98_1_LockLocalCML_Det_AssocStat	32	binary	Associated entry from the address space with the top LOCAL or CML lock contention. Contains CML lock statistics, for an address space with a top LOCAL lock hold time. Likewise, it holds LOCAL lock statistics for a top CML lock hold time. Mapped by SMF98_1_SuspLock_Info.
152	98	*	24	binary	Reserved
176	B0	SMF98_1_LockLocalCML_Det_All	32	binary	Sum of LOCAL and CML lock contention statistics for this top address space, mapped by SMF98_1_SuspLock_Info

Work unit priority bucket section

The SMF type 98 subtype 1 work unit priority bucket section contains data about work unit priority buckets.

A priority bucket is a collection of work aggregated across a range of dispatch priorities that is defined in SMF98_1_ENV_SVT_Priority_Ranges. The following table lists the priority buckets and their associated ranges:

Priority bucket	Dispatch priority range
High	X'FF' to SMF98_1_ENV_SVT_Priority_Ranges(1)
Medium	(SMF98_1_ENV_SVT_Priority_Ranges(1) – 1) to SMF98_1_ENV_SVT_Priority_Ranges(2)
Low	(SMF98_1_ENV_SVT_Priority_Ranges(2) – 1) to SMF98_1_ENV_SVT_Priority_Ranges(3)
Discretionary	(SMF98_1_ENV_SVT_Priority_Ranges(3) – 1) to X'C0'

For sampling related fields, SMF98_1_ENV_QDepthAnalysisDelta contains the number of samples.

Work unit priority bucket instrumentation data is reported for queue depth, dispatch delay, and work unit preemption counts on a major time slice and minor time slice.

This section is mapped by SMF98_1_PB_Data.

Triplet information:

You can locate this section in the record by using the following triplet fields which are located in the self-defining section:

Offset
SMF98_1_PriorityBucketOF

Length
SMF98_1_PriorityBucketLN

Number
SMF98_1_PriorityBucketON

Offsets		Name	Length	Format	Description
0	0	SMF98_1_PB_ProcClass	2	binary	Processor class of the grouped work unit statistics: **Value** **Meaning** **0** PSAProcClass_CP **2** PSAProcClass_zAAP **4** PSAProcClass_zIIP
2	2	SMF98_1_PB_ContributingWUQs	2	binary	Number of the work unit queues that contributed a non-zero delta (or a maximum) to the sum. Meaningful only for HD=Y affinity work unit queue.
4	4	SMF98_1_PB_SigDelayWUQs	2	binary	Number of contributing WUQs that encountered significant dispatch delays.
6	6	*	2	binary	Reserved
8	8	SMF98_1_PB_Stats	*	binary	Priority bucket statistics. **Note:** The following fields consist of arrays of four values (each of the stated length), indexed by priority bucket (1=High, 2=Med, 3=Low, 4=Discretionary).
8	8	SMF98_1_PB_MaxQDepth	4	binary	Maximum number of work units queued during a single sample from a single work unit queue.
24	18	SMF98_1_PB_QDepthDelta	4	binary	Total number of work units queued from all work unit queues from all samples. See SMF 98_1_ENV_QDepthAnalysisDelta for number of samples.
40	28	SMF98_1_PB_AvgQDepthPerSample	4	binary	Average queue depth per sample
56	38	SMF98_1_PB_AvgQDepthPerSamplePerWuq	4	binary	Average queue depth per sample per work unit queue

Offsets		Name	Length	Format	Description
72	48	SMF98_1_PB_MaxDispDelay	8	binary	Maximum dispatch delay a work unit experienced across all dispatches, in TOD units
104	68	SMF98_1_PB_TotDispDelayDelta	8	binary	Sum of dispatch delays from all work units, in TOD units
136	88	SMF98_1_PB_WorkUnitDispDelta	4	binary	Number of work units dispatched from all work unit queues
152	98	SMF98_1_PB_AvgDispDelay	8	binary	Average dispatch delay per work unit, in TOD units
184	B8	SMF98_1_PB_MajorTimeSliceDelta	4	binary	Number of work units preempted on a major time slice
200	C8	SMF98_1_PB_MinorTimeSliceDelta	4	binary	Number of work units preempted on a minor time slice
216	D8	SMF98_1_PB_SD_MaxDispDelay	8	binary	Max dispatch delay a work unit experienced across all dispatches from WUQs with significant dispatch delays, in TOD units
248	F8	SMF98_1_PB_SD_TotDispDelayDelta	8	binary	Sum of dispatch delays from work units on WUQs with significant dispatch delays, in TOD units
280	118	SMF98_1_PB_SD_WorkUnitDispDelta	4	binary	Number of work units dispatched from work unit queues with significant dispatch delays
296	128	SMF98_1_PB_SD_AvgDispDelay	8	binary	Average dispatch delay per work unit from WUQs with significant dispatch delays, in TOD units
328	148	SMF98_1_PB_SD_MajorTimeSliceDelta	4	binary	Number of work units preempted on a major time slice from WUQs with significant dispatch delays
344	158	SMF98_1_PB_SD_MinorTimeSliceDelta	4	binary	Number of work units preempted on a minor time slice from WUQs with significant dispatch delays

Address space consumption section

The SMF type 98 subtype 1 address space consumption section contains address space information about work unit dispatch times, dispatch counts, execution efficiency, and spin lock data for a given priority bucket and sub-bucket. It also provides "top ASID" information for the user of the most system resource (such as dispatch time, spin lock, instruction execution, and so on).

A priority bucket is a collection of work aggregated across a range of dispatch priorities that is defined in SMF98_1_ENV_SVT_Priority_Ranges. The following table lists the priority buckets and their associated ranges:

Priority bucket	Dispatch priority range
High	X'FF' to SMF98_1_ENV_SVT_Priority_Ranges(1)
Medium	(SMF98_1_ENV_SVT_Priority_Ranges(1) – 1) to SMF98_1_ENV_SVT_Priority_Ranges(2)
Low	(SMF98_1_ENV_SVT_Priority_Ranges(2) – 1) to SMF98_1_ENV_SVT_Priority_Ranges(3)
Discretionary	(SMF98_1_ENV_SVT_Priority_Ranges(3) – 1) to X'C0'

A sub-bucket is a collection of address spaces that consume similar CPU times relative to the total CPU time from the processor class. Table 19 on page 967 lists the sub-bucket values.

Table 19. Address space sub-bucket values, constants, and percent CPU time ranges

Address space sub-bucket value	Constant	Percent ProcClass CPU time
FFFF	SMF98_1_kConsume_SubBucket_ALL	0 to 100
1	SMF98_1_kConsume_SubBucket_1	SVT_SubBucket_Ranges(1) to 100
2	SMF98_1_kConsume_SubBucket_2	SVT_SubBucket_Ranges(2) to SVT_SubBucket_Ranges(1)
3	SMF98_1_kConsume_SubBucket_3	SVT_SubBucket_Ranges(3) to SVT_SubBucket_Ranges(2)

Address space sub-bucket value	Constant	Percent ProcClass CPU time
4	SMF98_1_kConsume_SubBucket_4	0 to SVT_SubBucket_Ranges(3)

Table 19. Address space sub-bucket values, constants, and percent CPU time ranges (continued)

Example: Suppose there are 8 address spaces spread across all priority buckets with CPU time deltas of 100, 70, 13, 7, 6, 1.5, 1, and 0.5 seconds (200 seconds total). If the SVT_SubBucket_Ranges are 8 (4.0%), 4 (2.0%) and 1 (0.5%), then the CPU time of the address space determines its sub-bucket, as follows:

- Sub-bucket 1 (4.0-100.0%) contains address spaces from 8 to 200 seconds: 100, 70, 13
- Sub-bucket 2 (2.0-4.0%) contains address spaces from 4 to under 8 seconds: 7, 6
- Sub-bucket 3 (0.5-2.0%) contains address spaces from 1 to under 4 seconds: 1.5, 1
- Sub-bucket 4 (0.0-0.5%) contains address spaces from 0 to under 1 second: 0.5

This section is mapped by SMF98_1_PB_Consume.

Triplet information:

You can locate this section in the record by using the following triplet fields which are located in the self-defining section:

Offset
SMF98_1_ConsumeOF

Length
SMF98_1_ConsumeLN

Number
SMF98_1_ConsumeON

Offsets		Name	Length	Format	Description
0	0	SMF98_1_Consume_ProcClass	2	binary	Processor class of this output: **Value** **Meaning** **0** PSAProcClass_CP **2** PSAProcClass_zAAP **4** PSAProcClass_zIIP
2	2	SMF98_1_Consume_PriorityBucket	2	binary	Priority bucket of this output: **Value** **Meaning** **FFFF** kSMF98_1_PriorityBucket_All **1** SVT_kHiPriorityBucketIndex **2** SVT_kMedPriorityBucketIndex **3** SVT_kLowPriorityBucketIndex **4** SVT_kDiscPriorityBucketIndex
4	4	SMF98_1_Consume_SubBucket	2	binary	Consumption sub-buckets are segregated by the aggregate dispatch time of this processor class and priority bucket. Address space data is grouped by percentage of time used versus the aggregate. See Table 19 on page 967 for the values.

Offsets		Name	Length	Format	Description
6	6	*	2	binary	Reserved
8	8	SMF98_1_Consume_ExEffOff	4	binary	Offset to related execution efficiency (ExEff) sections from beginning of the record, mapped by SMF98_1_ExEff
12	C	SMF98_1_Consume_ExEffLen	2	binary	Length of a related execution efficiency (ExEff) section
14	E	SMF98_1_Consume_ExEffNum	2	binary	Number of related execution efficiency (ExEff) sections
16	10	SMF98_1_Consume_WorkUnitOff	4	binary	Offset to related work unit sections from beginning of the record, mapped by SMF98_1_WorkUnit
20	14	SMF98_1_Consume_WorkUnitLen	2	binary	Length of a related work unit section
22	16	SMF98_1_Consume_WorkUnitNum	2	binary	Number of related work unit sections
24	18	SMF98_1_Consume_SpinLockOff	4	binary	Offset to related spin lock sections from beginning of the record, mapped by SMF98_1_AS_SpinLock
28	1C	SMF98_1_Consume_SpinLockLen	2	binary	Length of a related spin lock section
30	1E	SMF98_1_Consume_SpinLockNum	2	binary	Number of related spin lock sections

Execution efficiency sections

Each SMF type 98 subtype 1 execution efficiency section contains statistics about cycles and instructions executed for the given processor class, priority bucket, and sub-bucket. SMF98_1_ExEff_Total_ExEffInfo contains data about all the contributing address spaces, and SMF98_1_ExEff_Top_ExEffInfo contains information about the top contributing address space. SMF98_1_ExEff_Top_AsidInfo describes the top contributing address space.

The top contributing address space is chosen according to the following logic:

1. The address space last chosen as top contributing, if both of the following conditions are true:
   - The CPI is significantly larger than the previous interval.
   - The address space consumes a significant portion of processor class total CPU time. (SMF98_1_ExEff_Top_As_SigWorse is ON.)
2. An address space that was found to have both the following conditions true:
   - The CPI is significantly larger than the processor class average.
   - The address space consumes a significant portion of processor class total CPU time. (SMF98_1_ExEff_Top_As_SigCpuHighCpi is ON.)
3. Otherwise, the address space that consumed the most cycles during the interval

Triplet information:

You can locate this section in the record by using the following triplet fields which are located in the self-defining section:

Offset
SMF98_1_Consume_ExEffOff

Length
SMF98_1_Consume_ExEffLen

Number
SMF98_1_ConsumeExEffNum

Offsets		Name	Length	Format	Description
0	0	SMF98_1_ExEff_ThreadDensity	2	binary	Thread density of this output: **Value** **Meaning** **0** All ExEff data (sum of TD = 1 and TD = 2) **1** TD = 1 **2** TD = 2
2	2	SMF98_1_ExEff_NumAS_Contribute	2	binary	Number of address spaces that contributed to total section for this output
4	4	SMF98_1_ExEff_NumAS_BrokenUp	2	binary	Number of address spaces in this analysis that were broken up.
6	6	SMF98_1_ExEff_Flags	1	binary	Execution efficiency flags: **Bit** **Meaning when set** **0** SMF98_1_ExEff_Top_AsidInfo and SMF98_1_ExEff_Top_ExEffInfo fields are from the address space last chosen as most significant, has a CPI that is significantly larger than the previous interval, and consumes a significant portion of the processor classes total CPU time. **1** SMF98_1_ExEff_Top_AsidInfo and SMF98_1_ExEff_Top_ExEffInfo fields are from the address space that has a CPI that is significantly larger than the processor class average and consumes a significant portion of the processor class total CPU time. **2-7** Reserved.
7	7	*	1	binary	Reserved
8	8	SMF98_1_ExEff_Total_ExEffInfo	24	binary	Total instructions and cycles for all address spaces in this analysis, mapped by SMF98_1_ExEffInfo
32	20	SMF98_1_ExEff_Top_AsidInfo	56	binary	Identification information about the address space that had the highest CPI or executed the most cycles, mapped by SMF98_1_AsidInfo (See “Address space information section” on page 963.)
88	58	SMF98_1_ExEff_Top_ExEffInfo	24	binary	Instructions and cycles executed by the address space identified by SMF98_1_ExEff_Top_AsidInfo, mapped by SMF98_1_ExEffInfo

Execution efficiency details sections

The SMF type 98 subtype 1 execution efficiency details section maps the information attached to execution efficiency pointed to by SMF98_1_ExEff_Total_ExEffInfo and SMF98_1_ExEff_Top_ExEffInfo.

Cycles from thread density 2 (TD=2) are converted to thread density 1 (TD=1) equivalent cycles.

Offsets		Name	Length	Format	Description
0	0	SMF98_1_ExEffInfo_Instr	8	binary	Number of instructions executed
8	8	SMF98_1_ExEffInfo_TD1EQ_Cycle	8	binary	Number of TD=1 equivalent cycles executed
16	10	SMF98_1_ExEffInfo_TD1EQ_IPC	4	binary	Instructions per 4096 TD=1 equivalent cycles executed. Divide by 4096 to get instructions per 1 cycle.

Offsets		Name	Length	Format	Description
20	14	SMF98_1_ExEffInfo_TD1EQ_CPI	4	binary	TD=1 equivalent cycles per 4096 instructions executed. Divide by 4096 to get cycles per 1 instruction.

Work unit sections

The SMF type 98 subtype 1 work unit sections contain data about time dispatched and number of dispatches for various types of work on the system. SMF98_1_WorkUnit_Total_DispInfo contains these statistics for all contributing address spaces in the processor class, priority bucket, and sub-bucket. SMF98_1_WorkUnit_Top_DispInfo contains these statistics for the address space that spent the most time dispatched for the given work unit type. SMF98_1_WorkUnit_Top_AsidInfo describes the top contributing address space.

Triplet information:

You can locate this section in the record by using the following triplet fields which are located in the self-defining section:

Offset
SMF98_1_Consume_WorkUnitOff

Length
SMF98_1_Consume_WorkUnitLen

Number
SMF98_1_Consume_WorkUnitNum

Offsets		Name	Length	Format	Description
0	0	SMF98_1_WorkUnit_Type	2	binary	Work unit type: **Value** **Meaning** **1** All tasks and SRBs **2** Non-enclave task **3** Enclave task and SRB **4** Non-enclave, pre-emptible SRB **5** Non-pre-emptible SRB (CP only)
2	2	SMF98_1_WorkUnit_NumAS_Contribute	2	binary	Number of address spaces that contributed to total section for this output.
4	4	SMF98_1_WorkUnit_NumAS_BrokenUp	2	binary	Number of address spaces in this analysis that were broken up.
6	6	*	2	binary	Reserved
8	8	SMF98_1_WorkUnit_Total_DispInfo	24	binary	Total time and dispatch count of all address spaces in this analysis, mapped by SMF98_1_DispInfo
32	20	SMF98_1_WorkUnit_Top_AsidInfo	56	binary	Identification info about the address space that used the most CPU time in this analysis, mapped by SMF98_1_AsidInfo (See “Address space information section” on page 963.)
88	58	SMF98_1_WorkUnit_Top_DispInfo	24	binary	Time and dispatch count of the address space identified by SMF98_1_WorkUnit_Top_AsidInfo, mapped by SMF98_1_DispInfo

Work unit dispatch sections

The SMF type 98 subtype 1 work unit dispatch section maps information for SMF98_1_WorkUnit_Total_DispInfo and SMF98_1_WorkUnit_Top_DispInfo.

Offsets		Name	Length	Format	Description
0	0	SMF98_1_DispInfo_TimeTOD	8	binary	Total CPU time dispatched
8	8	SMF98_1_DispInfo_Disps	4	binary	Number of dispatches
12	C	*	4	binary	Reserved
16	10	SMF98_1_DispInfo_AvgTimeTOD	7	binary	Average time per dispatch

Address space spin lock sections

The SMF type 98 subtype 1 address space spin lock sections contain information about the time spun and count of spins for all spin locks in an address space. SMF98_1_AS_SpinLock_Total_SpinInfo contains this data for all address spaces in the priority bucket and sub-bucket. SMF98_1_AS_SpinLock_Top_SpinInfo contains this data for the address space that spent the most time spinning and is described in SMF98_1_AS_SpinLock_Top_AsidInfo.

Although spin lock sections are listed in the CP processor class, spin lock data is not segregated by processor class and the data is for all processor classes.

Address space spin lock data and global spin lock data (pointed to by SMF98_1_LockSpinSumOF) might differ even though they were collected during the same interval. The global spin lock data and address space spin lock data are pulled from different control blocks in the supervisor HFTS exit. Also, for consistency, the exit might exclude from analysis address spaces that have recently started or stopped during the interval. Because of this, total data can differ slightly in both summaries.

Triplet information:

You can locate this section in the record by using the following triplet fields which are located in the self-defining section:

Offset
SMF98_1_Consume_SpinLockOff

Length
SMF98_1_Consume_SpinLockLen

Number
SMF98_1_Consume_SpinLockNum

Offsets		Name	Length	Format	Description
0	0	SMF98_1_AS_SpinLock_NumAS_Contribute	2	binary	Number of address spaces in this analysis
2	2	SMF98_1_AS_SpinLock_NumAS_BrokenUp	2	binary	Number of address spaces in this analysis that were broken up
4	4	*	4	binary	Reserved
8	8	SMF98_1_AS_SpinLock_Total_SpinInfo	24	binary	Spin lock summary data. It is the sum of all spin lock data from all address spaces in this analysis, mapped by SMF98_1_SpinLock_Sum (See "Spin lock summary section" on page 961.)
32	20	*	24	binary	Reserved
56	38	SMF98_1_AS_SpinLock_Top_AsidInfo	56	binary	Identification information about the address space that spent the most time spinning for this analysis, mapped by SMF98_1_AsidInfo (See "Address space information section" on page 963.)
112	70	SMF98_1_AS_SpinLock_Top_SpinInfo	24	binary	Spin lock summary data across all spin locks for the address space identified by SMF98_1_AS_SpinLock_Top_AsidInfo, mapped by SMF98_1_SpinLock_Sum (See "Spin lock summary section" on page 961.)

Subtypes for IBM z/OS Workload Interaction Correlator

IBM z/OS Workload Interaction Correlator produces SMF type 98 records for subtypes that are registered with the IFAWIC service. These mappings are incomplete and depend on the particular data to be recorded for each exploiter. Use the mapping produced by the subtype holder to complete each record section.

Data section

The SMF type 98 data section for WIC subtypes begins with the number of triplets (SMF98WicData_TripletsNum) and the length of the data triplets area (SMF98WicData_TripletsLen). Check this triplet information prior to accessing a section of the record. The SMF98WicData_TripletsNum field is the primary indication of the existence of a section.

All offset values are from the start of the record.

Offsets		Name	Length	Format	Description
0	0	SMF98WicData_TripletsNum	4	binary	Number of data triplets
4	4	SMF98WicData_TripletsLen	4	binary	Length of the data triplets area (SMF98WicData_TripletsArea)
8	8	SMF98WicData_TripletsArea	32	binary	Data triplet area
8	8	SMF98WicData_AggBucket1	8	binary	First aggregate bucket triplet
8	8	SMF98WicData_AggBucketOF1	4	binary	Offset to the first aggregate bucket section from the beginning of the record
12	C	SMF98WicData_AggBucketLN1	2	binary	Length of the first aggregate bucket section
14	E	SMF98WicData_AggBucketON1	2	binary	Number of first aggregate bucket sections
16	10	SMF98WicData_AggBucket2	8	binary	Second aggregate bucket triplet
16	10	SMF98WicData_AggBucketOF2	4	binary	Offset to the second aggregate bucket section from the beginning of the record
20	14	SMF98WicData_AggBucketLN2	2	binary	Length of the second aggregate bucket section
22	16	SMF98WicData_AggBucketON2	2	binary	Number of second aggregate bucket sections
24	18	SMF98WicData_JobIndex	8	binary	Job index triplet: contains indexes that reference jobs within the job list data
24	18	SMF98WicData_JobIndexOF	4	binary	Offset to the first job index section from the beginning of the record
28	1C	SMF98WicData_JobIndexLN	2	binary	Length of each job index section
30	1E	SMF98WicData_JobIndexON	2	binary	Number of job index sections
32	20	SMF98WicData_JobList	8	binary	Job list triplet: list of unique ASIDs and job names
32	20	SMF98WicData_JobListOF	4	binary	Offset to the first job list section from the beginning of the record
36	24	SMF98WicData_JobListLN	2	binary	Length of each job list section
38	26	SMF98WicData_JobListON	2	binary	Number of job list sections

Aggregate bucket sections

The aggregate buckets contain summary data about an IFAWIC exploiter's use of shared resources across multiple address spaces. The aggregate bucket is created from data that an IFAWIC exploiter's exit routine passes to an SMF service to generate SMF type 98 records.

Every IFAWIC exploiter instruments activities in its address space specific buffer. At the end of every 5 second interval, each address space is assigned a job priority (based on its WLM policy importance level) and a job size for each CPU type (relative to the total CPU time for each CPU type). Each IFAWIC exploiter's exit routine is called where the job activity is aggregated by CPU type, job priority, and job size into the aggregate bucket that matches the job attributes. The aggregate bucket summarizes activity for similar jobs.

Note: The SMF 98 records contain buckets that have more than one contributor (SMF98AggBucketEA_Contributors > 0).

You can locate this section in the record by using the following triplet fields which are found in the SMF98WicData section:

Offset
SMF98WicData_AggBucketOF1 or SMF98WicData_AggBucketOF2

Length
SMF98WicData_AggBucketLN1 or SMF98WicData_AggBucketLN2

Number
SMF98WicData_AggBucketON1 orSMF98WicData_AggBucketON2

Note that there are two possible aggregate bucket sections per WIC subtype.

Offsets		Name	Length	Format	Description
0	0	SMF98AggBucket	*	binary	Aggregate bucket.
0	0	SMF98AggBucketHdr	6	binary	Aggregate bucket header.
0	0	SMF98AggBucketHdr_CPUType	2	binary	CPU type for this bucket. Valid values are: **Value (Constant)** **Meaning** **0 (PSAProcClass_CP)** CP **4 (PSAProcClass_zIIP)** zIIP
2	2	SMF98AggBucketHdr_JobPriority	2	binary	Job priority. Valid values are: **Value (Constant)** **Meaning** **FFFF (SMF98_kPriorityBucket_All)** All **1 (SMF98_kPriorityBucket_1)** Critical **2 (SMF98_kPriorityBucket_2)** High **3 (SMF98_kPriorityBucket_3)** Low **4 (SMF98_kPriorityBucket_4)** Discretionary
4	4	SMF98AggBucketHdr_JobSize	2	binary	Job size relative to other jobs in this system for this job priority, for this CPU type. Valid values are: **Value (Constant)** **Meaning** **FFFF (SMF98_kConsume_SubBucket_All)** All **1 (SMF98_kConsume_SubBucket_1)** Large **2 (SMF98_kConsume_SubBucket_2)** Medium **3 (SMF98_kConsume_SubBucket_3)** Small **4 (SMF98_kConsume_SubBucket_4)** Tiny

Offsets		Name	Length	Format	Description
6	6	SMF98AggBucketExpArea	*	binary	Aggregate bucket exploiter area.
6	6	SMF98AggBucketEA_Contributors	2	binary	Number of address spaces contributing to this bucket entry.
8	8	SMF98AggBucketEA_Data	*	binary	Exploiter data. See the exploiter of the IFAWIC service for their data mapping.

Exceptional job sections

For each aggregate bucket activity, an IFAWIC exploiter may provide an exceptional job with its corresponding activities and job name.

Exceptional job index section

The SMF 98 exceptional job index section consists of buckets (by CPU type, job priority, and job size) with an activity-specific exceptional job index that locates the most exceptional job in the job list.

The SMF98JobIdxActivityArea field is a list of 2-byte fields that represent activity-specific indices into the SMF 98 job list section. These indices start at 1. The offset for this exceptional job is calculated as follows:

```
SMF98WicData_JobListOF + (SMF98WicData_JobListLN * (n - 1))
```

where *n* is the index number.

Offsets		Name	Length	Format	Description
0	0	SMF98JobIdx	*	binary	Job index data area.
0	0	SMF98JobIdxHdr	6	binary	Job index header.
0	0	SMF98JobIdxHdr_CPUType	2	binary	CPU type for this bucket. Valid values are: **Value (Constant)** **Meaning** **0 (PSAProcClass_CP)** CP **4 (PSAProcClass_zIIP)** zIIP
2	2	SMF98JobIdxHdr_JobPriority	2	binary	Job priority. Valid values are: **Value (Constant)** **Meaning** **FFFF (SMF98_kPriorityBucket_All)** All **1 (SMF98_kPriorityBucket_1)** Critical **2 (SMF98_kPriorityBucket_2)** High **3 (SMF98_kPriorityBucket_3)** Low **4 (SMF98_kPriorityBucket_4)** Discretionary

Offsets		Name	Length	Format	Description
4	4	SMF98JobIdxHdr_JobSize	2	binary	Job size relative to other jobs in this system for this job priority, for this CPU type. Valid values are: **Value (Constant)** **Meaning** **FFFF (SMF98_kConsume_SubBucket_All)** All **1 (SMF98_kConsume_SubBucket_1)** Large **2 (SMF98_kConsume_SubBucket_2)** Medium **3 (SMF98_kConsume_SubBucket_3)** Small **4 (SMF98_kConsume_SubBucket_4)** Tiny
6	6	SMF98JobIdxActivityArea	*	binary	Exploiter activity index area. Each exploiter activity is assigned a 2-byte index. This area is an array of 2-byte indices. These indices start at 1 and describe the entry number into the SMF 98 job list section (SMF98JobList) with which to find the exceptional job corresponding to the exploiter-defined activity. See the exploiter's subtype definition for details.

Exceptional job list section

The SMF 98 exceptional job list section, mapped by SMF98JobList, contains the job name, address space ID number, and activity data for exceptional jobs.

Offsets		Name	Length	Format	Description
0	0	SMF98JobList	*	binary	Job list data area.
0	0	SMF98JobListHdr	10	binary	Job list header.
0	0	SMF98JobListHdr_ASID	2	binary	Address space ID (ASID).
2	2	SMF98JobListHdr_JobName	8	EBCDIC	Job name.
10	A	SMF98JobListActivityArea	*	binary	Exploiter job activity area. See the exploiter of the IFAWIC service for their data mapping.

Record Type 99 (63) — System Resource Manager Decisions

This record type is written by the SRM component. The records contain:

- Performance data for each service class period
- Trace codes representing the SRM actions
- The data which SRM used to decide which actions to take
- The controls SRM is using to manage work.

In addition, subtypes 1 and 9 will be written by the SRM component when running in compatibility mode.

The mapping macro, IRASMF99, for this record is supplied in SYS1.AMODGEN.

Record 99 has the following subtypes:

Subtype 1
Contains system level data, the trace of SRM actions, and data about resource groups. The SRM actions are recorded in trace codes. All trace codes are described in *z/OS MVS Programming: Workload Management Services*. A subtype 1 record is written every policy interval.

Subtype 2
Contains data for service classes. A subtype 2 record is written every policy interval for each service class if any period in the service class had recent activity.

Subtype 3
Contains service class period plot data. A subtype 3 record is written every policy interval for each service class if any period in the service class had recent activity and plot data.

Subtype 4
Contains information about a device cluster. A device cluster is a set of service classes that compete to use the same non-paging DASD devices. A subtype 4 record is written every policy interval for each device cluster in the system.

Subtype 5
Contains data about monitored address spaces. A subtype 5 record is written each policy interval for each swapped in monitored address space.

Subtype 6
Contains summary information about each service class period, including the resource control settings for the next policy interval. A subtype 6 record is written each policy interval.

Subtype 7
Contains summary information for the Enterprise Storage Server® (ESS) with Parallel Access Volume (PAV) feature. A subtype 7 record is written every third policy interval.

Subtype 8
Contains summary information for LPAR CPU management. A subtype 8 record is written each policy interval, when in LPAR mode.

Subtype 9
Contains summary information for dynamic channel path management. A subtype 9 record is written each policy interval.

Subtype 10
Contains information about dynamic processor speed changes. A subtype 10 record is written for every processor speed change.

Subtype 11
Contains information about Group Capacity Limits. A subtype 11 record is written every 5 minutes.

Subtype 12
Contains HiperDispatch interval data. A set of subtype 12 records is written each policy interval.

Subtype 13
Contains information about HiperDispatch. This information is for IBM internal use only.

Subtype 14
Contains HiperDispatch topology data. Subtype 14 records are written every 5 minutes, or in the current policy interval, if a HiperDispatch topology change happened.

For information about how to use type 99, see *z/OS MVS Programming: Workload Management Services*. For information about workload management, see *z/OS MVS Planning: Workload Management*.

Starting SMF Record Type 99

You specify the type 99 record in the SMFPRMxx parmlib member under SUBSYS STC. Because SMF type 99 records are written approximately every 10 seconds, you should write them only for certain time periods. If you use NOTYPE in your SMFPRMxx parmlib member, you should include type 99 in your NOTYPE list. For example:

```
SUBSYS(STC,NOTYPE(99))
```

If you use TYPE in your SMFPRMxx parmlib member, make sure you add TYPE 99 only when you want this level of detail. For example, add:

```
SUBSYS(STC,TYPE(99))
```

You should have an SMFPRMxx parmlib member for general audit information that does not specify type 99, and another for detailed audit information that specifies type 99. This way, you can set the proper SMFPRMxx member and write SMF type 99 records only when you need them.

Record mapping

Header/Self-defining Section

This section contains the common SMF record headers fields and the triplet fields (offset/length/number), if applicable, that locate the other sections on the record.

Offsets		Name	Length	Format	Description
0	0	SMF99LEN	2	binary	Record length. This field and the next field (total of four bytes) form the RDW (record descriptor word). See "Standard and Extended SMF record headers" on page 162 for a detailed description.
2	2	SMF99SEG	2	binary	Segment descriptor (see record length field).
4	4	SMF99FLG	1	binary	System indicator: **Bit** **Meaning when set** **0-2** Reserved. **3-6** Version indicators* **7** Reserved. *See "Standard and Extended SMF record headers" on page 162 for a detailed description.
5	5	SMF99RTY	1	binary	Record type 99
6	6	SMF99TME	4	binary	Time since midnight, in hundredths of a second, that the record was moved into the SMF buffer.
10	0A	SMF99DTE	4	packed	Date when the record was moved into the SMF buffer, in the form 0*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for a detailed description.
14	0E	SMF99SID	4	EBCDIC	System identification (from the SID parameter).
18	12	SMF99SSID	4	EBCDIC	Sub system identification
22	16	SMF99TID	2	binary	Record subtype (must be at offset X'16' x).
24	18	SMF99 _SDEF_LEN	4	binary	Length of the self definition section.

Self-Defining Section

Offsets		Name	Length	Format	Description
0	4	SMF99POF	4	binary	Offset to the product section from the beginning of the record (including RDW).
4	4	SMF99PLN	2	binary	Length of the product section.
6	6	SMF99PON	2	binary	Number of the product section.

Offsets		Name	Length	Format	Description
8	8	SMF99DOF	4	binary	Offset to data section from beginning of the record (including RDW).
12	C	SMF99DLN	2	binary	Length of the data section.
14	E	SMF99DON	2	binary	Number of the data section.

SMF 99 Product Information

Offsets		Name	Length	Format	Description
0	2	SMF99VN2	2	binary	Record sub-version. Use to identify changes to the record in the service stream.
2	2	SMF99RVN	2	binary	Record version number.
4	4	SMF99PNM	8	EBCDIC	Product name - SRM
12	C	SMF99SLV	8	EBCDIC	System level from which record was cut (Copied from CVTPRODN).
20	14	SMF99SNM	8	EBCDIC	System name from which record was cut (Copied from CVTSNAME)
28	1C	SMP99FLG	1	binary	Record Flags: **Bit** **Meaning when set** **0** Only a subset of the available data was written to avoid that this record gets larger than 32 KByte **1** Only a subset of the available data is written to this record. The rest follows in subsequent records. This record contains a reassembly area. **2–7** Reserved.
29	1D		3	EBCDIC	Reserved.

Subtype 1

Header/Self-defining Section

Offsets		Name	Length	Format	Description
0		SMF99TOF	4	binary	Offset to trace section from beginning of record (including RDW).
4	4	SMF99TLN	2	binary	Length of a trace table entry.
6	6	SMF99TON	2	binary	Number of trace table entries. There is one trace table entry per action or contemplated action.
8	8	SMF99SSOF	4	binary	Offset to system state section from beginning of record (including RDW).
12	C	SMF99SSLN	2	binary	Length of system state section.
14	E	SMF99SSON	2	binary	Number of system state sections (always 1).
16	10	SMF99PPOF	4	binary	Offset to paging plot section from beginning of the record (including RDW).
20	14	SMF99PPLN	2	binary	Length of the paging plot section.

Offsets		Name	Length	Format	Description
22	16	SMF99PPON	2	binary	Number of paging plot sections (always 1).
24	18	SMF99PTOF	4	binary	Offset to priority table entries from beginning of record (including RDW).
28	1C	SMF99PTLN	2	binary	Length of a priority table entry.
30	1E	SMF99PTON	2	binary	Number of priority table entries. There is one priority table entry per dispatching priority.
32	20	SMF99RGOF	4	binary	Offset to resource group entries from beginning of record (including RDW). This field is zero when there are no resource groups defined in the service policy.
36	24	SMF99RGLN	2	binary	Length of a resource group entry. This field is zero when there are no resource groups defined in the service policy.
38	26	SMF99RGON	2	binary	Number of resource group entries. There is one resource group entry per resource group in the service policy. This field is zero when there are no resource groups defined in the service policy.
40	28	SMF99GROF	4	binary	Offset to the generic resource section from the beginning of the record (including RDW).
44	2C	SMF99GRLN	2	binary	Length of the generic resource section.
46	2E	SMF99GRON	2	binary	Number of generic resource sections. There is one generic resource group entry per generic resource group in the service policy. This field is zero when there are no generic resource groups defined in the service policy.
48	30	SMF99SLOF	4	binary	Offset to the software licensing service table section from the beginning of the record (including RDW).
52	34	SMF99SLLN	2	binary	Length of the software licensing section.
54	36	SMF99SLON	2	binary	Number of software licensing sections.
56	38	SMF99SLTOF	4	binary	Offset to the software licensing service table section from the beginning of the record (including RDW).
60	3C	SMF99SLTLN	2	binary	Length of the software licensing service table section.
62	3E	SMF99SLTON	2	binary	Number of software licensing service table sections.
64	40	SMF99PIOF	4	binary	Offset to priority table entries (zAAP) from the beginning of the record (including RDW).
68	44	SMF99PILN	2	binary	Length of a priority table entry.
70	46	SMF99PION	2	binary	Number of priority table entries (zAAP). There is one priority table entry per dispatching priority.
72	48	SMF99ZEOF	4	binary	Offset of internal use section.
76	4C	SMF99ZELN	2	binary	Length of internal use section.
78	4E	SMF99ZEON	2	binary	Number of internal use section.
80	50	SMF99PSOF	4	binary	Offset to priority table entries (zIIP) from the beginning of the record (including RDW).
84	54	SMF99PSLN	2	binary	Length of a priority table entry.
86	56	SMF99PSON	2	binary	Number of priority table entries (zIIP). There is one priority table entry per dispatching priority.
88	58	SMF99BPOF	4	binary	Offset of internal use section
92	5C	SMF99BPLN	2	binary	Length of internal use section

Offsets		Name	Length	Format	Description
94	5E	SMF99BPON	2	binary	Number of internal use sections

Trace Table Entry Section

Offsets		Name	Length	Format	Description
0		SMF99_TPID	1	binary	Policy adjustment interval identifier
1	1	SMF99_TRID	1	binary	Resource adjustment interval identifier.
2	2	SMF99_TCOD	2	binary	Trace code.
4	4	SMF99_TJOB	8	EBCDIC	Name of the address space affected by the trace code. This field is blank when the trace code does not apply to a specific address space.
12	C	SMF99_TLPI	4	binary	Projected local performance index scaled by 100.
16	10	SMF99_TSPI	4	binary	Projected sysplex performance index scaled by 100.
20	14	SMF99_TGSR	4	binary	Projected resource group service rate in unweighted CPU service units per second.
24	18	SMF99_TDT1	4	binary	Reserved for system use.
28	1C	SMF99_TDT2	4	binary	Reserved for system use.
32	20	SMF99_TDT3	4	binary	Reserved for system use.
36	24	SMF99_TRGN	8	EBCDIC	Resource group name. This field is blank if the service class is not assigned to a resource group.
44	2C	SMF99_TCNM	8	EBCDIC	Service class name relating to action.
52	34	SMF99_TPER	2	binary	Service class period number relating to action.
54	36	SMF99_TASID	2	binary	Address space ID.
56	38	SMF99_TDT4	4	binary	Reserved for system use.
60	3C	SMF99_TFLG	4	binary	Reserved for system use.

System State Information Section

Offsets		Name	Length	Format	Description
0		SMF99_CPUA	2	binary	Processor utilization scaled by 16.
2	2	SMF99_UMP	2	binary	Recent unmanaged paging and swap cost percentage scaled by 10.
4	4	SMF99_UIC1	4	binary	Page frames in UIC bucket 1, see SMF99_FRV1 for bucket 1 delimiter.
8	8	SMF99_UIC2	4	binary	Page frames in UIC bucket 2, see SMF99_FRV2 for bucket 2 delimiter.
12	C	SMF99_UIC3	4	binary	Page frames in UIC bucket 3, see SMF99_FRV3 for bucket 3 delimiter.
16	10	SMF99_UIC4	4	binary	Page frames in UIC bucket 4.
20	14	SMF99_EUIC1	4	binary	Expanded storage page frames in expanded UIC bucket 1; see SMF99_ESTB1 for bucket 1 delimiter.
24	18	SMF99_EUIC2	4	binary	Expanded storage page frames in expanded UIC bucket 2. See SMF99_ESTB2 for bucket 2 delimiter.
28	1C	SMF99_EUIC3	4	binary	Page frames in expanded UIC bucket 3. See SMF99_ESTB3 for bucket 3 delimiter.
32	20	SMF99_EUIC4	4	binary	Page frames in expanded UIC bucket 4.
36	24	SMF99_FRV1	2	binary	UIC delimiter value 1. The delimiter is inclusive (<=).

Offsets		Name	Length	Format	Description
38	26	SMF99_FRV2	2	binary	UIC delimiter value 2. The delimiter is inclusive (<=).
40	28	SMF99_FRV3	2	binary	UIC delimiter value 3. The delimiter is inclusive (<=).
42	2A	SMF99 _ESTB1	2	binary	Expanded storage UIC delimiter value 1. The delimiter is inclusive (<=).
44	2C	SMF99_ESTB2	2	binary	Expanded storage UIC delimiter value 2, The delimiter is inclusive (<=).
46	2E	SMF99_ESTB3	2	binary	Expanded storage UIC delimiter value 3. The delimiter is inclusive (<=).
48	30	SMF99_W2MIG	4	binary	Expanded storage writes to migrate percentage.
52	34	SMF99_PTAVAIL	4	binary	Total processor time available, including captured time plus wait time, in unweighted CPU service units per second.
56	38	SMF99_SHORT_FLAGS	1	binary	Shortage flags **Bit** **Meaning when set** **0** Central storage shortage exists. **1** First level auxiliary storage shortage exists. **2** Critical auxiliary storage shortage exists. **3** First level SQA storage shortage exists. **4** Critical SQA storage shortage exists. **5-7** Reserved.
57	39	SMF99_STATUS_FLAGS	1	binary	Status flags **Bit** **Meaning when set** **0** Dynamic channel path management is active (in balance mode if next bit is off). **1** Dynamic channel path management goal algorithm is active. **2** COMPAT mode indication. **3-7** Reserved.
58	3A	SMF99_TOTAL_PAG _COST	2	binary	Recent total paging and swap cost percentage, scaled by 10.
60	3C	SMF99_CPPS	4	binary	Common protective processor storage target, measured in frame counts.
64	40	SMF99_ILSU_ARRAY	32	binary	Array of importance level service units. The first entry contains service units pertaining to importance level zero, the second entry contains service units pertaining to importance level one, and so on. The last entry contains service units pertaining to unused service.
96	60	SMF99_SUIC1	4	binary	Shared central UIC bucket 1, measured in frame counts.
100	64	SMF99_SUIC2	4	binary	Shared central UIC bucket 2, measured in frame counts.
104	68	SMF99_SUIC3	4	binary	Shared central UIC bucket 3, measured in frame counts.
108	6C	SMF99_SUIC4	4	binary	Shared central UIC bucket 4, measured in frame counts.

Offsets		Name	Length	Format	Description
112	70	SMF99_SEUC1	4	binary	Shared expanded UIC, bucket 1, measured in frame counts.
116	74	SMF99_SEUC2	4	binary	Shared expanded UIC, bucket 2, measured in frame counts.
120	78	SMF99_SEUC3	4	binary	Shared expanded UIC, bucket 3, measured in frame counts.
124	7C	SMF99_SEUC4	4	binary	Shared expanded UIC, bucket 4, measured in frame counts.
128	80	SMF99_STWSS	4	binary	Shared protective processor storage target, measured in frame counts.
132	84	SMF99_NUM_EXT_SC	4	binary	Number of external service classes.
136	88	SMF99_DEFAULT_IO_VELOCITY	4	binary	Default I/O velocity. Calculated by IOS at the beginning of each measurement interval during data gathering.
140	8C	SMF99_SU_IFACTOR	4	binary	Service unit inflation factor.
144	90	SMF99_StgCrit_Hsk_Skip_Clock	2	binary	Storage critical housekeeping skip clock counter for each importance level.
158	9E	*	2	EBCDIC	Reserved.
160	A0	SMF99_LS_DISC	4	binary	Frames owned by logically swapped spaces in non-short response time periods that are discretionary.
164	A4	SMF99_CAPWS	4	binary	CAP work area - working set size accumulator.
168	A8	SMF99_SECWS	4	binary	Number of secondary working set pages for which swap-ins have been started.
172	AC	SMF99_PGINS	4	binary	Page-ins rate count used for calculating the system paging rate.
176	B0	SMF99_IFA_NORMALIZATION	4	binary	Normalization factor for assist processors.
180	B4	SMF99_CPUS_ONLINE	2	binary	Number of regular CPs online.
182	B6	SMF99_IFAS_ONLINE	2	binary	Number of online assist processors.
184	B8	SMF99_IFAA	2	binary	Average utilization of assist processors, scaled by 16.
186	BA	SMF99_PROA	2	binary	Average utilization of all processors, regular CPs and assist processors, scaled by 16.
188	BC	SMF99_IFA_FLAGS	1	binary	Assist processors related flags: **Bit** **Meaning when set** **0** Assist processor work may be executed on regular CPs **1** Assist processor work may run on regular CPs at priority **2–7** Reserved.
189	BD	*	3	EBCDIC	Reserved.
192	C0	SMF99_FREE_LPAR_CAPACITY_WT_ RELATED	4	binary	Free LPAR capacity based on the accumulated logical CPU wait times.
196	C4	SMF99_FREE_LPAR_CAPACITY_GUARANTEED	4	binary	Free LPAR capacity which is always available based on the LPAR weight.
200	C8	SMF99_FREE_LPAR_CAPACITY_CEC_ RELATED	4	binary	Free LPAR capacity which is the total of what is always available to the LPAR and the portion of the unused capacity of the CEC.
204	CC	SMF99_FREE_LPAR_CAPACITY_LCP_CONFIG	4	binary	Free LPAR capacity based on the configured LCPs.
208	D0	SMF99_ITAVAIL	4	binary	Total zAAP time.
212	D4	SMF99_SUP_NORMALIZATION	4	binary	Normalization factor for zIIPs.
216	D8	SMF99_SUPS_ONLINE	2	binary	Number of online zIIPs.

Offsets		Name	Length	Format	Description
218	DA	SMF99_SUPA	2	binary	Average utilization of zIIPs, scaled by 16.
220	DC	SMF99_GUARANTED_IMAGE_CAPACITY	4	binary	Guaranteed image capacity available to MVS image in service units per minute.
224	E0	SMF99_ZAAP_ILSU_ARRAY	32	binary	Array of importance level service units of zAAPs.
256	100	SMF99_ZIIP_ILSU_ARRAY	32	binary	Array of importance level service units of zIIPs.
288	120	SMF99_CCTINTHD	2	binary	OPT parameter BLWLINTHD for starvation threshold.
290	122	SMF99_CCTTRPCT	2	binary	OPT parameter BLWLTRPCT for percentage of CP trickling.
292	124	SMF99_CCTTRATE	4	binary	Maximum number of trickles per second.
296	128	SMF99_CCCTTSH	4	binary	Length of major time slice, which is also the length of trickle.
300	12C	SMF99_CCTRC100	4	binary	Number of times that CP utilization is 100 % in the current interval.
304	130	SMF99_CCTRCDSP	4	binary	Number of times that dispatcher was called to do trickle in the current interval.
308	134	SMF99_CCTRCUSE	4	binary	Number of trickles used in the current interval.
312	138	SMF99_CCTRCWTR	4	binary	Number of address spaces or enclaves waiting longer than the threshold.
316	13C	SMF99_CCCITTSH	4	binary	Length of initial task time slice.
320	140	SMF99_STAVAIL	4	binary	Total zIIP processor time available.
324	144	SMF99_FREE_LPAR_CAPACITY_WT_RELATED_ZAAP	4	binary	Free zAAP LPAR capacity based on the accumulated logical zAAP wait times.
328	148	SMF99_FREE_LPAR_CAPACITY_GUARANTEED_ZAAP	4	binary	Free zAAP LPAR capacity which is always available based on the zAAP LPAR weight.
332	14C	SMF99_FREE_LPAR_CAPACITY_CEC_RELATD_ZAAP	4	binary	Free zAAP LPAR capacity which is the total of what is always available to the LPAR and the portion of the unused zAAP capacity of the CEC.
336	150	SMF99_FREE_LPAR_CAPACITY_LCP_CONFIG_ZAAP	4	binary	Free zAAP LPAR capacity based on the configured logical zAAPs.
340	154	SMF99_FREE_LPAR_CAPACITY_WT_RELATED_ZIIP	4	binary	Free zIIP LPAR capacity based on the accumulated logical zIIP wait times.
344	158	SMF99_FREE_LPAR_CAPACITY_GUARANTEED_ZIIP	4	binary	Free zIIP LPAR capacity which is always available based on the zIIP LPAR weight.
348	15C	SMF99_FREE_LPAR_CAPACITY_CEC_RELATD_ZIIP	4	binary	Free zIIP LPAR capacity which is the total of what is always available to the LPAR and the portion of the unused zIIP capacity of the CEC.
352	160	SMF99_FREE_LPAR_CAPACITY_LCP_CONFIG_ZIIP	4	binary	Free zIIP LPAR capacity based on the configured logical zIIPs.
356	164	SMF99_SVTWTSS	4	binary	Short wait time slice.
360	168	*	284	binary	Internal use by IBM.

Offsets		Name	Length	Format	Description
644	284	SMF99_BOOSTINFO	1	binary	WLM view of boost information. **Bit** **Meaning when set** **0** zIIP boost was active at some point within the interval. **1** Speed boost was active at some point within the interval. **2** IPL boost has been activated. Once set, this flag never gets reset. **3** Shutdown boost has been activated. Once set, this flag never gets reset. **4** Reserved. **5 - 7** Boost class: 001: IPL 010: Shutdown 011: Recovery process **Note:** The boost class value is valid only when one or more boosts is active; that is, a boost active bit is also on.
645	285	*	3	binary	Reserved.
648	288	SMF99_MMT_DIAGNOSE_V1	96	EBCDIC	For IBM use only.

System Paging Plot Information Section

Offsets		Name	Length	Format	Description
0		SMF99_PAGP_BW	4	binary	Size of each x bucket width. X is the system wide page fault rate in page faults per second.
4	4	SMF99_PAGP_LSTX	4	binary	Last plotted x bucket index.
		*	4	binary	Reserved.
12	C	SMF99_PAGP_POINTS _OF	4	binary	Offset of plot point entries from beginning of the record (including RDW).
16	10	SMF99_PAGP_POINTS _ON	2	binary	Number of plot point entries.
18	12	SMF99_PAGP_POINTS _LN	2	binary	Length of a plot point entry.

Priority Table Entry Section

Offsets		Name	Length	Format	Description
0		SMF99_PTPRTY	2	binary	Dispatching priority, after policy adjustment.
2	2	SMF99_PTNP	2	binary	New dispatching priority, after unbunching.
4	4	SMF99_PTIMDP	4	binary	Initial maximum percentage of processor demanded at priority, initial value before any priority moves.
8	8	SMF99_PTPMDP	4	binary	Projected maximum percentage of processor demanded at priority.
12	C	SMF99_PTCPUU	4	binary	CPU using samples at priority found in the last 10 seconds.
16	10	SMF99_PTCPUD	4	binary	CPU delay samples at priority found in the last 10 seconds.
20	14	SMF99_PTW2UR	4	binary	Wait-to-using ratio at priority scaled by 16.
24	18	SMF99_PTAPU	4	binary	Actual measured processor used at priority in unweighted CPU service units per second.

Offsets		Name	Length	Format	Description
28	1C	SMF99_PTPPU	4	binary	Projected processor time to be used at priority in unweighted CPU service units per second.
32	20	SMF99_PTACMD	4	binary	Achievable cumulative maximum demand percentage scaled by 10.
		*	4	binary	Reserved.
40	28	SMF99_PTIMAXD	4	binary	Initial cumulative maximum demand percentage scaled by 10.
44	2C	SMF99_PTWMAXD	4	binary	Projected cumulative maximum demand percentage scaled by 10.
48	30	SMF99_PTIAMTW	4	binary	Initial average mean time to wait in unweighted CPU service units per second scaled by 1000.
52	34	SMF99_PTWAMTW	4	binary	Projected average mean time to wait in unweighted CPU service units per second scaled by 1000.
56	38	SMF99_PTSCPUU	4	binary	Sample based CPU using samples at priority.
60	3C	SMF99_PTSCPUD	4	binary	Sample based CPU delay samples at priority.

Resource Group Entry Section

Offsets		Name	Length	Format	Description
0		SMF99_RGNAME	8	EBCDIC	Resource group name
8	8	SMF99_MIN_SR	4	binary	Minimum service rate for the resource group in unweighted CPU service units per second. When there is no minimum defined, this field is 0.
12	C	SMF99_MAX_SR	4	binary	Maximum service rate for the resource group in unweighted CPU service units per second. When there is no maximum defined, this field is X'7FFFFFFF'.
16	10	SMF99_ACT_SR	4	binary	Service rate received in the last policy adjustment interval on the local system in unweighted CPU service units per second.
20	14	SMF99_SPAS	4	binary	Service per non-capped slice in unweighted CPU service units per second.
24	18	SMF99_SLICES	2	binary	The number of cap slices in which work in this resource group was capped.
26	1A	SMF99_RHELPCNT0	2	binary	A count of the systems that can help special system address spaces (work at importance 0). The count can include any systems in the sysplex running in goal mode other than the local system.
28	1C	SMF99_RHELPCNT1	2	binary	A count of the systems that can help work at importance 1. The count can include any systems in the sysplex running in goal mode other than the local system.
30	1E	SMF99_RHELPCNT2	2	binary	A count of the systems that can help work at importance 2. The count can include any systems in the sysplex running in goal mode other than the local system.
32	20	SMF99_RHELPCNT3	2	binary	A count of the systems that can help work at importance 3. The count can include any systems in the sysplex running in goal mode other than the local system.
34	22	SMF99_RHELPCNT4	2	binary	A count of the systems that can help work at importance 4. The count can include any systems in the sysplex running in goal mode other than the local system.
36	24	SMF99_RHELPCNT5	2	binary	A count of the systems that can help work at importance 5. The count can include any systems in the sysplex running in goal mode other than the local system.
38	26	SMF99_RHELPCNT6	2	binary	A count of the systems that can help discretionary work (work at importance 6). The count can include any systems in the sysplex running in goal mode other than the local system.

Offsets		Name	Length	Format	Description
40	28	SMF99_LHELP_FLGS	1	binary	Flag indicating whether the local system can help work at each importance level. 1 indicates it can help, 0 indicates it cannot help. **Bit** **Meaning when set** **0** Reserved. **1** Local system can help work at importance 0. **2** Local system can help work at importance 1. **3** Local system can help work at importance 2. **4** Local system can help work at importance 3. **5** Local system can help work at importance 4. **6** Local system can help work at importance 5. **7** Local system can help work at importance 6.
41	29	SMF99_RG_FLAGS	1	binary	Resource group flags **Bit** **Meaning when set** **0** Indicates that the resource group is dynamic **1** Indicates that the resource group capacity is specified in percentage of the total LPAR capacity **2** Indicates that the resource group capacity is specified in percentage of a single processor capacity **3** Indicates that the resource group capacity is specified in MSU/h **4** Indicates that the resource group capacity is specified in raw service units **5** Indicates that specialty processor consumption is included in the group consumption **6** Indicates that the resource group is a tenant resource group **7** Reserved.
42	2A	*	2	EBCDIC	Reserved.
44	2C	SMF_RG_PERC_MIN	4	binary	Percentage min value, if min/max are specified in percentages, or MSU min value if min/max are specified in MSU.
48	30	SMF_RG_PERC_MAX	4	binary	Percentage max value, if min/max are specified in percentages, or MSU max value if min/max are specified in MSU.
56	38	SMF99_RG_ MEM_LIMIT	4	binary	Maximum memory limit, in GB.
105	69	*	3	EBCDIC	Reserved.
108	6C	SMF99_RG_LACS	4	binary	Tenant resource group long-term average of CPU service in MSUs per hour. Only valid if Bit 6 of SMF99_RG_FLAGS is ON

Offsets		Name	Length	Format	Description
112	70	SMF99_RG_SUsIFA	8	binary	Tenant resource group's aggregated IFA service units. Only valid if Bit 6 of SMF99_RG_FLAGS is ON
120	78	SMF99_RG_SUsSUP	8	binary	Tenant resource group's aggregated SUP service units. Only valid if Bit 6 of SMF99_RG_FLAGS is ON
128	80	*	4	binary	Internal use by IBM
132	84	SMF99_RG_MEMSMPCNT	4	binary	Number of times storage frames were sampled in SMF99_RG_FRAMECNT
136	88	SMF99_RG_FRAMECNT	8	binary	Tenant resource group's aggregated amount of storage frames (4K + 1M + 2G, normalized to 4K). Only valid if tenant resource group.

Generic Resource Entry Section

Offsets		Name	Length	Format	Description
0		SMF99_GR _SYSNAME	8	EBCDIC	Name of the system where the sessions were routed.
8	8	SMF99_GR_TSO _SESSIONS _ROUTED	4	binary	Number of TSO sessions that were routed in the last 10 seconds to the system named by SMF99_GR_SYSNAME.
12	C	SMF99_GR_NONTSO _SESSIONS _ROUTED	4	binary	Number of non-TSO sessions that were routed in the last 10 seconds to the system named by SMF99_GR_SYSNAME.
16	10	SMF99_GR_TSO _AVG_COST	4	binary	Average cost of a TSO session in raw CPU service units on the system named by SMF99_GR_SYSNAME.
20	14	SMF99_GR_ _TSO_PI	4	binary	Weighted average of PI of service class periods running TSO work on the system named by SMF99_GR_SYSNAME.
24	18	SMF99_GR _FLAGS	4	binary	Generic resource flags. **Bit** **Meaning when set** **0** The system named by SMF99_GR_SYSNAME had a shortage that may have caused a session to not be routed to it. **1-31** Reserved.
28	1C	SMF99_GR_SERVICE _BY_IMPORTANCE	32	binary	A single entry in the array of Importance Level Service Units, containing the number of raw CPU service units consumed by work at this importance level (or unused) over the last 10 seconds. The entries are indexed with an origin of zero so that the index matches the importance level to which the entry pertains. An index of zero indicates system work and an index of 7 indicates unused capacity.

Software licensing information

Offsets		Name	Length	Format	Description
0		SMF99_SLConfigFlags	1	binary	Configuration flags: **Bit** **Meaning when set** **0** Indicates that the machine supports the store system information instruction. **1** Indicates that MVS is running in a logical partition **2** Indicates that MVS is running in a virtual machine **3** Indicates that the logical CPUs are shared with other partitions **4** Indicates that the logical partition is configured to be capped (as opposed to being capped by WLM) **5-7** Reserved.
1	1	SMF99_SLStateFlags	1	binary	State flags: **Bit** **Meaning when set** **0** Indicates that the logical partition is capped by WLM **1-7** Reserved.
		*	2	binary	Reserved.
4	4	SMF99_SLImgCapacity	4	binary	Capacity available to MVS image in millions of service units per hour, when not running as VM guest. If running as VM guest, capacity available to VM.
8	8	SMF99_SLCecCapacity	4	binary	Capacity of CEC in millions of service units per hour.
12	C	SMF99_SLCecCpuCount	2	binary	Number of available CPUs in the CEC. This includes online and offline CPUs. It does not include reserved CPUs (CPUs that can be added through Capacity Upgrade on Demand).
14	E	SMF99_SLLogicalCpuCount	2	binary	Number of available CPUs in the logical partition. This includes online and offline CPUs. It does not include reserved CPUs (CPUs that can be added through Capacity Upgrade on Demand).
16	10	SMF99_SLCecServiceUnits PerSecToShare	4	binary	The CEC capacity in basic-mode service units per second that is available for sharing among partitions using shared logical processors.
20	14	SMF99_SLImgMsuAt CurrentWeight	4	binary	MVS image capacity in millions of service units per hour that is represented by the partition's current weight.
24	18	*	4	EBCDIC	Reserved.
28	1C	SMF99_SLAvgMsu	4	binary	Average service rate in millions of service units per hour. This is a long-term average.
32	20	SMF99_SLAvgMsuCapped	4	binary	Average service rate in millions of service units per hour while the partition was capped. This is a short-term average.
36	24	SMF99_SLAvgMsuUncapped	4	binary	Average service rate in millions of service units per hour while the partition was uncapped. This is a short-term average.

Offsets		Name	Length	Format	Description
40	28	SMF99_SLIntervalService	4	binary	Service units over last policy adjustment interval. NOTE: The service units are calculated using the MP factor for the number of physical CPUs, not the number of logical CPUs. This is consistent with how capacity is measured for software licensing. These service units cannot be directly compared to other service units calculated by SRM.
44	2C	SMF99_SLIntervalTime	4	binary	Elapsed time over last policy adjustment interval in 1.024 milliseconds.
48	30	*	4	EBCDIC	Reserved.
52	34	SMF99_SLRollInterval	2	binary	Number of policy adjustment intervals between computation of average service rate.
54	36	SMF99_SLService TableIntervals	2	binary	Number of consecutive policy adjustment intervals that have passed since the last time that the service table was updated.
56	38	SMF99_SLIntervalsToCap	2	binary	Number of consecutive policy adjustment intervals to cap the partition.
58	3A	SMF99_SLIntervalsToUncap	2	binary	Number of consecutive policy adjustment intervals to uncap the partition.
60	3C	SMF99_SLPattern IntervalCount	2	binary	Number of consecutive policy adjustment intervals that have passed in the current cap/uncap state indicated by SMF99_SLCap - pedByWlm.
62	3E	*	2	binary	Reserved.
64	40	SMF99_SL_Query _Response_Code	4	binary	Response code from the last 'query' for LPAR information.
68	44	SMF99_SL_Setcap _Response_Code	4	binary	Response code from the last attempt to set capping flags.
72	48	*	8	binary	Reserved.
80	50	SMF99_SLUnusedScaling	1	binary	Scaling factor of unused group capacity which is stored in 48 buckets in the service table.
81	51	*	3	binary	Reserved.
84	54	SMF99_HardwareGroupname	8	EBCDIC	Hardware group name.
92	5C	SMF99_HardwareGroupCpuTypeCapCp	4	binary	Hardware group is capped by PR/SM to a limit which is defined in hundredths of processor units.
96	60	SMF99_HardwareGroupCpuTypeCapZaap	4	binary	Hardware Group is capped by PR/SM to a limit which is defined in hundredths of processor units.
100	64	SMF99_HardwareGroupCpuTypeCapZiip	4	binary	Hardware Group is capped by PR/SM to a limit which is defined in hundredths of processor units.
104	68	SMF99_RTCapLeadTime	2	binary	Current value of IEAOPT*xx* parameter RTCAPLEADTIME (minutes).
106	6A	SMF99_Time_To_Cap	2	binary	Estimated remaining time, in seconds, before the system is capped due to the defined capacity limit.
108	6C	SMF99_Time_To_Cap_Group	2	binary	Estimated remaining time, in seconds, before the system is capped due to the group capacity limit.
110	6E	*	82	binary	Reserved.

Software Licensing Table Information

Offsets	Name	Length	Format	Description
0	SMF99_SLTServiceUncapped	4	binary	Basic-mode service units accumulated while the partition was uncapped. NOTE: The service units are calculated using the MP factor for the number of physical CPUs, not the number of logical CPUs. This is consistent with how capacity is measuredfor software licensing. These service units cannot be directly compared to other service units calculated in SRM.

Offsets		Name	Length	Format	Description
4	4	SMF99_SLTServiceCapped	4	binary	Basic-mode service units accumulated while the partition was capped. NOTE: The service units are calculated using the MP factor for the number of physical CPUs, not the number of logical CPUs. This is consistent with how capacity is measured for software licensing. These service units cannot be directly compared to other service units calculated in SRM.
8	8	SMF99_SLTService UncappedCount	2	binary	Number of seconds that the partition was uncapped
10	A	SMF99_SLTService CappedCount	2	binary	Number of seconds that the partition was capped
12	C	SMF99_SLTServiceLast UpdateInterval	1	binary	Policy adjustment interval ID when this entry was last updated. This field is set in goal mode only. Since the ID is only 1 byte, it will wrap multiple times over the course of the table. (That is, the time span of the table is greater than 255 intervals so the interval IDs will wrap around.)
13	D	*	3	EBCDIC	Reserved.
16	10	SMF99_SLTService UnusedGroupCapacity	4	binary	Service units allowed by the group capacity limit but not consumed by the members of the group

Subtype 2

Self Defining Section

Offsets		Name	Length	Format	Description
0		SMF992COF	4	binary	Offset to class data sections from beginning of the record.
4	4	SMF992CLN	2	binary	Length of class data sections.
6	6	SMF992CON	2	binary	Number of class data sections. There is one per service class.
8	8	SMF992CPOF	4	binary	Offset to period data section from beginning of record (including RDW).
12	C	SMF992CPLN	2	binary	Length of period data section.
14	E	SMF992CPON	2	binary	Number of period data sections.
16	10	SMF992ECOF	4	binary	Offset to EWLM class section from beginning of record (including RDW).
20	14	SMF992ECLN	2	binary	Length of EWLM class section.
22	16	SMF992ECON	2	binary	Number of EWLM class section.

Class data section

Offsets		Name	Length	Format	Description
0		SMF99_CNAM	8	EBCDIC	Service class name.
8	8	SMF99_CGRN	8	EBCDIC	Resource group name associated with the service class. This field is blank when there is no assigned resource group.
16	10	SMF99_CNUMP	2	binary	The number of periods in this service class.
18	12	SMF99_CINDEX	2	binary	Service class index.

EWLM Class Data Section

Offsets		Name	Length	Format	Description
0		SMF99_EWLM_CNAM	64	EBCDIC	Long EWLM service class name from EWLM domain policy.
64	40	SMF99_EWLM_CKEY	2	binary	EWLM service class key.

Period Data Section

Offsets		Name	Length	Format	Description
0		SMF99_PCNM	8	EBCDIC	Service class name associated with the service class period.
8	8	SMF99_PNUM	2	binary	Period number.
10	A	SMF99_PGOALTYP	1	binary	Goal type **Value** **Meaning** **0** System component address space, SYSSTC, or server goal **1** Short response time (less than or equal to 20 seconds) **2** Long response time (greater than 20 seconds) **3** Velocity **4** Discretionary If the goal type is a response time goal, you should check the response-time percentage field (SMF99_PRTP). If the field is zero, then the response time goal is an average response time type. If there is a percentage filled in, then the response time goal is a percentage response time type.
		*	1	binary	Reserved.
12	C	SMF99_PGOALVAL	4	binary	Goal value: For a response time goal, this is in milliseconds. For a velocity goal, this is a number from 1 to 99. For a discretionary goal, this is zero.
16	10	SMF99_PIMPOR	2	binary	Importance.
18	12	SMF99_PBDP	1	binary	Base dispatching priority.
		*	1	binary	Reserved.
20	14	SMF99_PMPLI	2	binary	MPL in-target.
22	16	SMF99_PMPLO	2	binary	MPL out-target.
24	18	SMF99_PAMTA	4	binary	Average maximum MPL target achieved.
28	1C	SMF99_PRUA	4	binary	Average number of ready users.
32	20	SMF99_PLRUA	4	binary	Long term ready user average scaled by 16.
36	24	SMF99_PPSPT	4	binary	Length of time swapped address spaces are protected in processor storage in milliseconds.
40	28	SMF99_PPSITAR	4	binary	Protective processor storage target for each address space in the period. This is valid only for periods with short response time goals. For all other work, it is zero.

Offsets		Name	Length	Format	Description
44	2C	SMF99_PESPOL	1	binary	Expanded storage policy for demand pages. **Value** **Meaning** **1** Protected **2** Least recently used (LRU) **3** Space available This is valid only for periods with short response time goals.
45	2D	SMF99_PESVIO	1	binary	Expanded storage policy for VIO pages. **Value** **Meaning** **1** Protected **2** Least recently used (LRU) **3** Space available This is valid only for periods with short response time goals.
46	2E	SMF99_PESHSP	1	binary	Expanded storage policy for hiperspace pages. **Value** **Meaning** **1** Protected **2** Least recently used (LRU) **3** Space available This is valid only for periods consisting of short response time goals.
47	2F	SMF99_PESSWAP	1	binary	Expanded storage policy for swap pages. **Value** **Meaning** **1** Protected **2** Least recently used (LRU) **3** Space available
48	30	SMF99_PPROT	2	binary	Number of address spaces with demand pages protected in processor storage. This is valid for all periods except those with short response time goals.
50	32	SMF99_PLRU	2	binary	Number of address spaces with demand pages subject to LRU expanded storage policy. This is valid for all periods except those with short response time goals.
52	34	SMF99_PSPAV	2	binary	Number of address spaces with demand pages subject to space available expanded storage policy. This is valid for all periods except those with short response time goals.

Offsets		Name	Length	Format	Description
54	36	SMF99_PVIOL	2	binary	Number of address spaces with VIO pages subject to LRU expanded storage policy. This is valid for all periods except those with short response time goals.
56	38	SMF99_PVIOS	2	binary	Number of address spaces with VIO pages subject to space available expanded storage policy. This is valid for all periods except those with short response time goals.
58	3A	SMF99_PHSPL	2	binary	Number of address spaces with hiperspace pages subject to LRU expanded storage policy. This is valid for all periods except those with short response time goals.
60	3C	SMF99_PHSPS	2	binary	Number of address spaces with hiperspace pages subject to space available expanded storage policy. This is valid for all periods except those with short response time goals.
62	3E	SMF99_PESCS	2	binary	Number of explicit storage critical classified address spaces.
64	40	SMF99_PLPI	4	binary	Local performance index achieved scaled by 100.
68	44	SMF99_PSPI	4	binary	Sysplex performance index achieved scaled by 100.
72	48	SMF99_PSERV	4	binary	Service accumulated during policy adjustment interval in unweighted CPU service units.
76	4C	SMF99_PMDP	4	binary	Maximum percentage of processor time demanded.
80	50	SMF99_PLCPUU	4	binary	CPU using samples during last policy adjustment interval.
84	54	SMF99_PLCPUD	4	binary	CPU delay samples during last policy adjustment interval.
88	58	SMF99_PMTTWA	4	binary	Mean time to wait adjusted by the maximum mean time to wait.
92	5C	SMF99_PADP	4	binary	Working variable for achievable demand percentage.
96	60	SMF99_PASERC	4	binary	Average service accumulated over management window in unweighted CPU service units per second.
100	64	SMF99_PPRSER	4	binary	Projected service in unweighted CPU service units per second.
104	68	SMF99_PIDLE	4	binary	Idle samples. The samples are collected over an interval long enough to collect a representative number of samples.
108	6C	SMF99_POTHR	4	binary	Unknown state samples.
112	70	SMF99_PCPUU	4	binary	CPU using samples. The samples are collected over an interval long enough to collect a representative number of samples.
116	74	SMF99_PCPUD	4	binary	CPU delay samples. The samples are collected over an interval long enough to collect a representative number of samples.
120	78	SMF99_PAUXP	4	binary	Primary private area paging from auxiliary storage delay samples. The samples are collected over an interval long enough to collect a representative number of samples.

Offsets		Name	Length	Format	Description
124	7C	SMF99_PAUXC	4	binary	Common area paging from auxiliary storage delay samples. The samples are collected over an interval long enough to collect a representative number of samples.
128	80	SMF99_PVIO	4	binary	VIO from auxiliary storage delay samples. The samples are collected over an interval long enough to collect a representative number of samples.
132	84	SMF99_PHSS	4	binary	Scroll hiperspace from auxiliary storage delay samples. The samples are collected over an interval long enough to collect a representative number of samples.
136	88	SMF99_PHSC	4	binary	Cache hiperspace from auxiliary storage delay samples. The samples are collected over an interval long enough to collect a representative number of samples.
140	8C	SMF99_PASWP	4	binary	Swap from auxiliary storage delay samples. The samples are collected over an interval long enough to collect a representative number of samples.
144	90	SMF99_PMPLD	4	binary	MPL delay samples. The samples are collected over an interval long enough to collect a representative number of samples.
148	94	SMF99_PCAPD	4	binary	CPU capping delay samples. The samples are collected over an interval long enough to collect a representative number of samples.
152	98	SMF99_PXMO	4	binary	Other cross memory address spaces paging from auxiliary storage delay samples not included in the samples listed in subtype 2 cross memory data. The samples are collected over an interval long enough to collect a representative number of samples.
156	9C	SMF99_PXMEM_OF	4	binary	Offset to cross memory delay entries from beginning of record (including RDW).
160	A0	SMF99_PXMEM_LN	2	binary	Length of each cross memory delay entry.
160	A0	SMF99_AS_BA_BrkLoc	18	binary	HiperDispatch breakup location information
160	A0	SMF99_AS_BA_BrkLocElm(3)	6	binary	Location element for each processor type which describes the breakup environment or 0
162	A2	SMF99_PXMEM_ON	2	binary	Number of cross memory delay entries. There is one entry per address space responsible for cross memory delays.
164	A4	SMF99_PSERV_OF	4	binary	Offset to server data entries from beginning of record (including RDW).
168	A8	SMF99_PSERV_LN	2	binary	Length of each server data entry.
170	AA	SMF99_PSERV_ON	2	binary	Number of server data entries. There is one server data entry for each server service class, and one for each service class being served.
172	AC	SMF99_PESP_OF	4	binary	Offset to address space expanded storage policy section from beginning of record (including RDW).
176	B0	SMF99_PESP_LN	2	binary	Length of each address space expanded storage policy entry.
178	B2	SMF99_PESP_ON	2	binary	Number of address space expanded storage policy entries
178	B2	SMF99_AS_A_Loc	18	binary	HiperDispatch processor topology location information

Offsets		Name	Length	Format	Description
178	B2	SMF99_AS_BA_LocElm(3)	6	binary	Location element for each processor type or 0
180	B4	SMF99_PCDCLOCK	2	binary	Policy adjustment count down clock. No policy action is taken until the clock is zero or less.
182	B6	SMF99_PNH	1	binary	The performance period experienced processor access delay.
183	B7	SMF99_PRTP	1	binary	Service class response time percentage. This field indicates whether the response time goal in SMF99_PGOALTYP is a percentage response time type. This field is zero when the response time goal in SMF99_PGOALTYP is an average response time.
184	B8	SMF99_PAUXS	4	binary	Shared paging samples from Aux. The samples are collected over an interval long enough to collect a representative number of samples.
188	BC	SMF99_PIOU	4	binary	DASD I/O using samples. The samples are collected over an interval long enough to collect a representative number of samples.
192	C0	SMF99_PIOD	4	binary	DASD I/O delay samples. The samples are collected over an interval long enough to collect a representative number of samples.
196	C4	SMF99_PIO_MDP	4	binary	Maximum percentage of time a period could demand DASD I/O. The percentage is scaled by 10.
196	C4	SMF99_As_BA_Flag_area	3	binary	HiperDispatch status flags
196	C4	SMF99_AS_BA_Flags(3)	1	binary	HiperDispatch flag area **Bit** **Meaning** **0** Address space is a high storage consumer. **1-7** Reserved.
199	C7	*	1	binary	Reserved
200	C8	SMF99_PIODP	1	binary	I/O priority.
200	C8	SMF99_AS_BA_MemScore	8	binary	Memory score

Offsets		Name	Length	Format	Description
201	C9	SMF99_FLAGS	1	binary	Flags. **Bit** **Meaning when set** **0** Period experienced some type of delay within the sysplex during last policy adjustment interval. **1** Period is CPU critical. **2** Period belongs to a service class that was assigned storage protection (storage critical) in the active service policy. The service class was used in subsystem type CICS or IMS and the rule specified storage critical = yes. Also on for transaction server DISPs serving protected service classes. **3** Indicates that the period is non-z/OS (Linux®). **4** Indicates that the period has an address space that is close to being blocked. **5** Period is managed by EWLM performance data. **6** Period belongs to a service class which was assigned to I/O priority group. **7** Processor consumption data for transactions with special reporting provided
202	CA	SMF99_Per_IO_Mgmt_Support_Data	2	binary	I/O management support data.
204	CC	SMF99_PDEVCL	4	binary	Identifier of the device cluster associated with this period. This identifier can be used to associate the period with device cluster information in the subtype 4 record. This field will be zero if the period is not associated with a device cluster.
208	D0	SMF99_PSERVER_TYPE	4	binary	Server type flags. All bits will be zero if the period is not a server. Flags indicate what type of server is associated with the record. **Bit** **Meaning when set** **0** Server is a transaction server. **1** Server is an enclave server. **2** Server is a queue server. **3-31** Reserved.
212	D4	SMF99_PSDATA_OF	4	binary	Offset to server samples section from the beginning of the record (including RDW).
216	D8	SMF99_PSDATA_LN	2	binary	Length of each server samples entry.
218	DA	SMF99_PSDATA_ON	2	binary	Number of server samples entries.

Offsets		Name	Length	Format	Description
220	DC	SMF99_PQDATA_OF	4	binary	Offset to the queue server section from the beginning of the record (including RDW).
224	E0	SMF99_PQDATA_LN	2	binary	Length of each queue server entry.
226	E2	SMF99_PQDATA_ON	2	binary	Number of queue server entries.
228	E4	SMF99_PAVG_SIZE	4	binary	Average size in processor storage (frame count) of the address spaces in the period.
232	E8	SMF99_PGRN	8	EBCDIC	Group name, or blank if period doesn't belong to a group.
240	F0	SMF99_PSYS_CPUU	4	binary	Sysplex wide CPU using samples.
244	F4	SMF99_PSYS_NONIDLE	4	binary	Sysplex wide non-idle samples.
248	F8	SMF99_PSYS_IDLE	4	binary	Sysplex wide idle samples.
252	FC	SMF99_PSYS_OTHER	4	binary	Sysplex wide other samples.
256	100	SMF99_IOSUBSAMOF	4	binary	Offset to I/O subsystem samples data from beginning of record (including RDW).
260	104	SMF99_IOSUBSAMLN	2	binary	Length of an I/O subsystem samples data section.
262	106	SMF99_IOSUBSAMON	2	binary	Number of I/O subsystem samples data sections.
264	108	SMF99_SPMDP	4	binary	Saved copy of maximum percentage of processor time demanded.
268	10C	SMF99_AVG_NUM_TASKS	4	binary	Average number of tasks.
272	110	SMF99_PBPD	4	binary	Buffer pool delay samples
276	114	SMF99_SWCT	4	binary	Short wait count accumulator.
280	118	SMF99_FLAGS2	2	binary	Flags **Bit** **Meaning when set** **0** Specialty engine work in this period is ineligible for Honor Priority Processing; it will not be offloaded to CPs for help processing. **1 - 2** Reserved. **3** Service class period implicitly designated CPU critical. **4 - 15** Reserved.
282	11A	SMF99_NUM_SAMP_HIST_ROWS_USED	2	binary	Number of sample history rows used to build sample set.
284	11C	SMF99_CADP	4	binary	Current achievable demand percentage.
288	120	SMF99_SBCPUU	4	binary	Sample based CPU usings.
292	124	SMF99_SBCPUD	4	binary	Sample based CPU delays.
296	128	SMF99_PSYS_IO_DLY	4	binary	Sysplex wide I/O delay.
300	12C	SMF99_PSYS_NON_IO_DLY	4	binary	Sysplex wide non-I/O delay.
304	130	SMF99_PIFAU	4	binary	IBM zEnterprise Application Assist Processor (zAAP) using samples.
308	134	SMF99_PIFAD	4	binary	zAAP delay samples.
312	138	SMF99_PISERV	4	binary	zAAP service accumulated during interval.

Offsets		Name	Length	Format	Description
316	13C	SMF99_PIMDP	4	binary	Maximum percentage of zAAP processor time demanded.
320	140	SMF99_PIMTTWA	4	binary	Mean time to wait adjusted (zAAP).
324	144	SFM99_PIADP	4	binary	Working variable for acheivable demand percentage (zAAP).
328	148	SMF99_PIASERC	4	binary	Average service consumed over window (zAAP).
332	14C	SMF99_PIPRSER	4	binary	Projected service (zAAP).
336	150	SMF99_ICADP	4	binary	Current® achievable demand percentage (zAAP).
340	154	SMF99_PIFAONCP	4	binary	zAAP on CP using samples.
344	158	SMF99_PLIFAU	4	binary	zAAP using samples during last interval.
348	15C	SMF99_PLIFAD	4	binary	zAAP delay samples during last interval.
352	160	SMF99_PSUPU	4	binary	SUP using samples.
356	164	SMF99_PSUPD	4	binary	SUP delay samples.
360	168	SMF99_PSUPONCP	4	binary	SUP_On_CP using samples.
364	16C	SMF99_PLSUPU	4	binary	SUP using samples during last interval.
368	170	SMF99_PLSUPD	4	binary	SUP delay samples during last interval.
372	174	SMF99_PSSERV	4	binary	Accumulated SUP service.
376	178	SMF99_Time_at_PDP_Using	4	binary	Time at PDP using samples during last interval.
380	17C	SMF99_Time_at_PDP	4	binary	Time at PDP accumulator during last interval.
384	180	SMF99_EWLM_LOCAL_PI	4	binary	EWLM local PI.
388	184	SMF99_EWLM_GLOBAL_PI	4	binary	EWLM global PI.
392	188	SMF99_PSMDP	4	binary	Maximum percentage of IBM z Integrated Information Processor (zIIP) time demanded.
396	18C	SMF99_PSMTTWA	4	binary	Mean time to wait adjusted (zIIP).
400	190	SFM99_PSADP	4	binary	Working variable for achievable demand percentage (zIIP).
404	194	SMF99_PSASERC	4	binary	Average service consumed over window (zIIP).
408	198	SMF99_PSPRSER	4	binary	Projected service (zIIP).
412	19C	SMF99_SCADP	4	binary	Current achievable demand percentage (zIIP).
416	1A0	SMF99_HdLockPromotion_Time_at_PDP	4	binary	HD lock time at PDP accumulator during last interval.
420	1A4	SMF99_HdLock_Time_at_PDP_Using	4	binary	HD lock time at PDP using samples during last interval.
424	1A8	SMF99_PNS_PSERV	4	binary	Service of enclave servers' non enclave work, which was accumulated during policy adjustment interval in unweighted CPU service units.
428	1AC	SMF99_PNS_IPSERV	4	binary	IBM zEnterprise Application Assist Processor (zAAP) service of enclave servers' non enclave work, which was accumulated during policy adjustment interval in unweighted CPU service units.
432	1B0	SMF99_PNS_SPSERV	4	binary	SUP service of enclave servers' non enclave work, which was accumulated during policy adjustment interval in unweighted CPU service units.

Offsets		Name	Length	Format	Description
436	1B4	SMF99_VARTIME_AT_PDP	4	binary	Time at variable DP promoted by supervisor.
440	1B8	SMF99_VARTIME_AT_PDP_USING	4	binary	Usings at variable DP promoted by supervisor.
444	1BC	SMF99_VARWEIGHTED_TIME_AT_PDP	4	binary	Time at variable DP promoted by supervisor weighted by DP.
448	1C0	SMF99_RT_DISTRI_MID_POINT	4	binary	Response time distribution mid-point (milliseconds).
452	1C4	SMF99_RT_DISTRI_TIME_STAMP	8	EBCDIC	Response time distribution time stamp.
460	1CC	SMF99_RT_DISTRI_AVG_RESP_TIME	4	binary	Response time distribution average response time.
464	1D0	SMF99_RT_DISTRI_NUM_ROWS	4	binary	Response time distribution number of rows used to build.
468	1D4	SMF99_RT_DISTRI_SUM_TRANS	4	binary	Response time distribution total number of transactions completed.
472	1D8	SMF99_RT_DISTRI_NUM_TRANS(28)	4	binary	Response time distribution, 28 buckets.
584	248	SMF99_RT_DISTRI_RUNNING_COUNT	4	binary	Response time distribution total number of times the mid-point was changed.
588	24C	SMF99_RT_DISTRI_INT_SUM_TRANS	4	binary	Response time distribution total number of transactions completed during last interval.
592	250	SMF99_GAV_AREA	6	EBCDIC	
592	250	SMF99_GAV_ARRAY(6)	1	EBCDIC	Goal achievement array.
598	256	*	2	binary	Reserved. Skip 2 bytes for alignment.
600	258	SMF99_VELO_USING_STATES	4	binary	Total velocity using states.
604	25C	SMF99_USING_IOSM_CURR	4	binary	DASDI/O using samples for the current interval.
608	260	SMF99_DELAY_IOSM_CURR	4	binary	DASD I/O delay samples for the current interval.
612	264	SMF99_DISC_IOSM_CURR	4	binary	DASD I/O disconnect samples for the current interval.
616	268	SMF99_DISC_IOSM_ACCUM	4	binary	DASD I/O disconnect samples accumulated over SMF99_Num_Samp_Hist_Rows_Used.
620	26C	SMF99_CUQT_IOSM_CURR	4	binary	DASD I/O control unit queue samples for the current interval.
624	270	SMF99_CUQT_IOSM_ACCUM	4	binary	DASD I/O control unit queue samples accumulated over SMF99_Num_Samp_Hist_Rows_Used.
628	274	Smf99_Thro_IOSM_curr	4	binary	DASD I/O induced throttle samples for the current interval.
632	278	Smf99_Thro_IOSM_accum	4	binary	DASD I/O induced throttle samples accumulated over SMF99_Num_Samp_Hist_Rows_Used.
636	27C	Smf99_CntD_IOSM_curr	4	binary	DASD I/O contention delta samples for the current interval.
640	280	Smf99_CntD_IOSM_accum	4	binary	DASD I/O contention delta samples accumulated over SMF99_Num_Samp_Hist_Rows_Used.
644	284	Smf99_Pend_IOSM_curr	4	binary	DASD I/O pending samples for the current interval.
648	288	Smf99_Pend_IOSM_accum	4	binary	DASD I/O pending samples accumulated over SMF99_Num_Samp_Hist_Rows_Used.
652	28C	*	4	binary	Reserved to align to double word.

Offsets		Name	Length	Format	Description
656	290	SMF99_SpecRpt(4)	24	binary	Special reporting data: **Value** **Meaning** **1** All transactions **2** Mobile transactions **3** CategoryA transactions **4** CategoryB transactions
656	290	SMF99_ SpecCP	8	binary	Transaction service units on standard CP for all transactions.
656	290	SMF99_ SpecCP1	4	binary	Word 1 of SMF99_ SpecCP.
660	294	SMF99_ SpecCP2	4	binary	Word 2 of SMF99_ SpecCP.
664	298	SMF99_SpecOffload	8	binary	Transaction service units on offload engines for all transactions.
664	298	SMF99_SpecOffload1	4	binary	Word 1 of SMF99_Spec Offload.
668	29C	SMF99_SpecOffload2	4	binary	Word 2 of SMF99_Spec Offload.
672	2A0	SMF99_SpecOffloadOnCP	8	binary	Transaction service units on standard CP that were offload eligible for all transactions.
672	2A0	SMF99_SpecOffloadOnCP1	4	binary	Word 1 of SMF99_SpecOffloadOnCP.
676	2A4	SMF99_SpecOffloadOnCP2	4	binary	Word 2 of SMF99_SpecOffloadOnCP.
680	2A8	*	16	binary	Internal use by IBM
696	2B8	SMF99_TRG_NAME	8	EBCDIC	Name of tenant resource group if bit 2 of SMF99_FLAGS2 is set

Cross Memory Delay Entry Section

Offsets		Name	Length	Format	Description
0	0	SMF99_XMEM_JOBN	8	EBCDIC	Name of the address space causing the cross memory delay.
8	8	SMF99_XMEM_SAMPS	4	binary	Number of cross memory samples.

Server Data Entry Section

Offsets		Name	Length	Format	Description
0		SMF99_SERVER_CNM	8	EBCDIC	Service class name. If the service class (SMF99_PCNM) is a server, then this is the name of the service class being served. If the service class (SMF99_PCNM) is being served, then this is the name of the server service class.
8	8	SMF99_SERVER_PNUM	4	binary	Service period number.
12	C	SMF99_SERVER_OBS	4	binary	If the service class (SMF99_PCNM) is a server, then this is the number of times SMF99_SERVER_CNM was being served in this period. If the service class (SMF99_PCNM) is being served, then this is the number of times SMF99_SERVER_CNM was seen serving in this period.

Server Sample Data Entry Section

Offsets		Name	Length	Format	Description
0		SMF99_SDATA_WQDEL	4	binary	Delay samples waiting for WLM-managed work queue. The samples are collected over an interval long enough to collect a representative number of samples.
4	4	SMF99_SDATA_ENC _AUXP	4	binary	Aux private paging delay samples experienced by enclave work units known to be associated with an address space. The samples are collected over an interval long enough to collect a representative number of samples.
8	8	SMF99_SDATA_ENC _VIO	4	binary	Aux VIO paging delay samples experienced by enclave work units known to be associated with an address space. The samples are collected over an interval long enough to collect a representative number of samples.
12	C	SMF99_SDATA_ENC _HSP	4	binary	Aux standard hiperspace paging delay samples experienced by enclave work units known to be associated with an address space. The samples are collected over an interval long enough to collect a representative number of samples.
16	10	SMF99_SDATA_ENC _MPLD	4	binary	MPL delay samples experienced by enclave work units known to be associated with an address space. The samples are collected over an interval long enough to collect a representative number of samples.
20	14	SMF99_SDATA_ENC _ASWP	4	binary	Aux swap delay samples experienced by enclave work units known to be associated with an address space. The samples are collected over an interval long enough to collect a representative number of samples.
24	18	SMF99_SDATA_SERVER _CLASS_NAME	8	EBCDIC	Service class name of the server serving this period.
32	20	SMF99_SDATA _SERVER_TYPE	1	binary	Server type: **Bit** **Meaning when set** **0** Server is an enclave or queue server. **1** Server is a batch work server. **2-7** Reserved.
33	21	*	3	EBCDIC	Reserved.
36	24	SMF99_SDATA _SUBSYS_TYPE	4	EBCDIC	Subsystem type of the owner of the queue. (Applies only to batch queue servers.)
40	28	SMF99_SDATA _SUBSYS_NAME	8	EBCDIC	Subsystem name of the owner of the queue. (Applies only to batch queue servers.)

Queue Server Data Entry Section

Offsets		Name	Length	Format	Description
0		SMF99_QDATA _ENV_NAME	32	EBCDIC	Application environment name associated with the work queue.
32	20	SMF99_QDATA_SERVER _CLASS_NAME	8	EBCDIC	Service class name of the server serving the period represented by this subtype 2 record. (Applies only to queue manager type servers.)
40	28	SMF99_QDATA _SERVER_WANT	4	binary	Number of server instances needed to address queue delay according to policy adjustment. This is a queue-wide count.
44	2C	SMF99_QDATA _SERVER_HAVE	4	binary	Number of server instances bound to the queue. This is a queue-wide count.

Offsets		Name	Length	Format	Description
48	30	SMF99_QDATA _SERVER_ACTIVE	4	binary	Number of server instances bound to the queue and between IWMSTBGN and IWMSTEND. This is a subset of the HAVE count. (HAVE minus ACTIVE equals IDLE.)
52	34	SMF99_QDATA _AS_CAPACITY	4	binary	Address space server instance capacity.
56	38	SMF99_QDATA _ACHIEVED_QMPL	4	binary	Average number (over policy interval) of server instances that are swapped in spaces in the server service class. Only server instances serving the external service class associated with the queue are counted. The count is scaled by 16. (Not used for batch queue servers.)
60	3C	SMF99_QDATA _ACTIVE_QMPL	4	binary	Average of number of server instances between IWMSTBGN and IWMSTEND during the policy interval. The count is scaled by 16. (For batch queue servers, this is the number of initiators with active jobs sysplex-wide.)
64	40	SMF99_QDATA _QMPL_IN_TAR	4	binary	Number of server address spaces suggested to be started in the server service class on behalf of the period represented by this subtype 2 record. (Does not apply to batch queue servers.)
68	44	SMF99_QDATA_AVG _QUEUED _REQUESTS	4	binary	Average number of queued requests over a policy interval. The count is scaled by 16.
72	48	SMF99_QDATA_LT _TOTAL_REQUESTS	4	binary	Long term average total work requests for the work queue.
76	4C	SMF99_QDATA _SERVER_IDLE	4	binary	Average idle server instances over the policy period.
80	50	SMF99_QDATA_Q_TYPE	1	binary	Work queue type: **Bit** **Meaning when set** **0** Queue manager type work queue. **1** Batch type work queue. **2-7** Reserved.
81	51	SMF99_QDATA _Q_QUALIFIER	1	binary	Work queue qualifier **Bit** **Meaning when set** **0** Server instances are managed by WLM **1** Address spaces have been moved from this work queue to enforce the minimum number of servers of another work queue of the same application environment **2** Address spaces have been moved during policy adjustment because the maximum number of servers has been already started for the application environment **3** Minimum number of address spaces must be ditributed across all work queues of the application environment **4-7** Reserved.
82	52	SMF99_QDATA _ACTIVE_RGNWORK	2	binary	Active number of server processing work requests that have been routed directly to the server region. This number is not included in either the QDATA_SERVER_IDLE count or the QDATA_SERVER_ACTIVE count.
84	54	SMF99_QDATA _RQDATA_OF	4	binary	Offset to remote queue data section from beginning of record, including RDW. (Applies only to batch queue servers.)

Offsets		Name	Length	Format	Description
88	58	SMF99_QDATA _RQDATA_LN	2	binary	Length of remote queue data entries.
90	5A	SMF99_QDATA _RQDATA_ON	2	binary	Number of remote queue data entries.
92	5C	SMF99_QDATA _SUBSYS_TYPE	4	EBCDIC	Subsystem type of the owner of the queue. (Applies only to batch queue servers.)
96	60	SMF99_QDATA _SUBSYS_NAME	8	EBCDIC	Subsystem name of the owner of the queue. (Applies only to batch queue servers.)
104	68	SMF99_QDATA _INST_PER_SERVER	2	binary	Number of server instances per server. Only applies if SMF99_QDATA_TASKS_MANAGED is set.
106	6A	SMF99_QDATA _SPACES_MOVED	2	binary	Number of server address spaces moved away from this queue.
108	6C	SMF99_QDATA _AE_MAXLIMIT	2	binary	Maximum number of servers for the application environment.
110	6E	SMF99_QDATA _AE_MINLIMIT	2	binary	Minimum number of servers for the application environment.
112	70	SMF99_QDATA_AVG _INELIGIBLE_REQUESTS	4	binary	Average number of ineligible queued requests over a policy interval scaled by * 16. Currently applies to batch queues only.

Remote Queue Server Data Entry Section

Offsets		Name	Length	Format	Description
0	0	SMF99_RQDATA _SYS_NAME	8	EBCDIC	Name of the system this RQDATA section represents.
8	8	SMF99_RQDATA_FLAGS	4	binary	System flags: **Bit** **Meaning when set** **0** System started at least one server for this work queue in the policy interval that this data represents. **1** System cannot start any servers for this work due to some constraint. **2** System intended to add servers for this work queue on the just-completed policy interval, but deferred because another system appears to be a better candidate. **3** Work queue is managed on this system. **4** Originator sent valid assess data. **5-31** Reserved.
12	C	SMF99_RQDATA _ACTIVE_SERVERS	4	binary	Ten-second average number of active servers, scaled by 16.
16	10	SMF99_RQDATA _TOTAL_SERVERS	4	binary	Ten-second average total servers, including active and idle.
20	14	SMF99_RQDATA _AVG_TOTAL_REQ	4	binary	Average total requests for the queue eligible to run on the system represented by this RQDATA entry. This corresponds to the last point plotted on the queue delay plot. Scaled by 16.
24	18	SMF99_RQDATA _#_SERVERS	4	binary	Number of servers required for receiver value. (Valid only if remote system deferred starting servers.)
28	1C	SMF99_RQDATA _PI_DELTA	4	binary	PI delta for donor period of highest importance if servers are started. (Valid only if remote system deferred starting servers.)
32	20	SMF99_RQDATA _HIGHEST_IMP	2	binary	Highest importance of donor periods negatively affected if servers are started. (Valid only if remote system deferred starting servers.)
34	22	*	2	EBCDIC	Reserved.

Offsets		Name	Length	Format	Description
36	24	SMF99_RQDATA _WAITING_FOR _SYSNAME	8	EBCDIC	System name sender is deferring to. Blank if deferring only to collect data from other systems. (Valid only if remote system deferred starting servers.)
44	2C	SMF99_RQDATA _DONOR_CLASS	8	EBCDIC	Service class name for donor period most impacted by starting servers. (Valid only if remote system deferred starting servers.)
52	34	SMF99_RQDATA _PER#	4	binary	Donor's service class period number. (Valid only if remote system deferred starting servers.)
56	38	SMF99_RQDATA _DONOR_RGROUP	8	EBCDIC	Resource group name for donor period most impacted by starting servers.
64	40	SMF99_RQDATA_PA_SKIP	2	binary	Policy adjustment skip clock.
66	42	SMF99_RQDATA_Q_SKIP	1	binary	Defer processing skip clock.
67	43	SMF99_RQDATA_Q_SKIP_REASON	1	binary	Reason defer processing skip clock was set.
68	44	SMF99_RQDATA_AVG _QUEUED_REQUESTS	4	binary	Average number of queued requests over a policy interval scaled by * 16.
72	48	SMF99_RQDATA_AVG _INELIGIBLE_REQUESTS	4	binary	Average number of ineligible queued requests over a policy interval scaled by * 16.
76	4C	SMF99_RQDATA_AVG _CONSTRAINT _REQUESTS	4	binary	Average number of queued requests with affinity to constraint systems only scaled by * 16.

Address space expanded storage access policy section

Offsets		Name	Length	Format	Description
0		SMF99_AS_ESP_ANAM	8	EBCDIC	Address space name.
8	8	SMF99_AS_ESP_AP	1	binary	Expanded storage access policy for demand pages. **Value** **Meaning** **1** protected **2** least recently used (LRU) **3** space available
9	9	SMF99_AS_ESP_VP	1	binary	Expanded storage access policy for VIO pages. **Value** **Meaning** **1** protected **2** least recently used (LRU) **3** space available
10	A	SMF99_AS_ESP_HP	1	binary	Expanded storage access policy for hiperspace pages. **Value** **Meaning** **1** protected **2** least recently used (LRU) **3** space available
11	B	SMF99_AS_ESP_ASID	2	binary	Address space ID.

Offsets		Name	Length	Format	Description
13	D	SMF99_AS_ESP_FLAGS	1	binary	Flags. **Bit** **Meaning when set** **0** Storage is protected at this instant. **1** Storage protection assigned to space by classification rule. **2** Address space is currently managed to region's goal rather than transaction server's goal. **3** Address space is non swappable. **4** Address space is currently managed to both region's and transaction server's goal. **5** When on, specialty engine work in this address space is ineligible for “Honor Priority Processing”, i.e., it will not be offloaded to CPs for help processing. **6-7** Reserved.
14	E	*	2	binary	Reserved.
16	10	SMF99_AS_ESP_CS_FMCT	4	binary	Number of central storage frames the address spaces owns.
20	14	SMF99_AS_ESP_ES_FMCT	4	binary	Number of expanded storage frames the address spaces own.
24	18	SMF99_AS_ESP_PPS_TAR	4	binary	Address space protective process storage target. See subtype 5 for other targets. This is the only target non-monitor address spaces can have.
28	1C	SMF99_AS _FULL_PREEMPTION	6	EBCDIC	Full Preemption Counts.
28	1C	SMF99_AS _CPSRP_SAMP	2	binary	One sample per IRACPSRP invocation.
30	1E	SMP99_AS _CPSRP_CUR_FP_SAMP	2	binary	Amount of IRACPSRP samples running with full preemption.
32	20	SMP99_AS _CPSRP_PREV_FP_SAMP	2	binary	Previous value of FULL_PRE1.
34	22	SMF99_AS_HealthInd	1	binary	Health indicator.
35	23	*	1	binary	Reserved to align to WORD boundary.
36	24	SMF99_AS_TOTAL_SERVICE	4	binary	Total service units for the address space - OUCBWMS.
40	28	SMF99_AS_CPU_SERVICE	4	binary	Total CPU service units for the address space - OUCBCPU.
44	2C	SMF99_AS_SRB_SERVICE	4	binary	Total SRB service units for the address space - OUCBSRB.
48	30	SMF99_AS_MSO_SERVICE	4	binary	Total MSO service units for the address space - OUCBMSO.
52	34	SMF99_AS_TRN_SERVICE	4	binary	Accumulated transaction service for the address space - OUCBTRS.
56	38	SMF99_AS_IO_SERVICE	4	binary	Total IO service units for the address space - OUCBIOC.
60	3C	SMF99_AS_DISP_COUNT	2	binary	Dispatchable count: the number of times that this address space has been found in subroutine CPUTLCK to be dispatchable yet no CPU time has accumulated for it - OUXBDSCN.

Offsets		Name	Length	Format	Description
62	3E	*	2	binary	Reserved to align to DWORD boundary.
64	40	SMF99_AS_IFA_SERVICE	8	binary	Total IFA service units for the address space – Oucbx_Time_On_Pro(pro_ifa) descaled.
72	48	SMF99_AS_IFACP_SERVICE	8	binary	Total IFA service units spent on CP for the address space - Oucbx_Time_Pro_On_CP(pro_ifa) descaled.
80	50	SMF99_AS_SUP_SERVICE	8	binary	Total SUP service units for the address space – Oucbx_Time_On_Pro(pro_sup) descaled.
88	58	SMF99_AS_SUPCP_SERVICE	8	binary	Total SUP service units spent on CP for the address space - Oucbx_Time_Pro_On_CP(pro_sup) descaled.
96	60	SMF99_AS_PB_SERVICE	8	binary	Transaction service units on standard CP reported for PBs running in this address space - OucbxPBCP.
104	68	SMF99_AS_PB_OFFLOAD _SERVICE	8	binary	Transaction service units on offload engines reported for PBs running in this address space - OucbxPBOffload.
112	70	SMF99_AS_PB _OFFLOADONCP_SERVICE	8	binary	Transaction service units on standard CP that were offload eligible reported for PBs running in this address space – OucbxPBOffloadOnCP.
120	78	SMF99_AS_ENCLAVE _TIME	4	binary	Accumulate tx active time of completed enclaves owned by this space - OUCBETIM.
124	7C	SMF99_AS_ENCLAVE_CPU _SERVICE	4	binary	Accumulated CPU service of completed enclaves owned by this space – OUCBECPU.
128	80	SMF99_AS_ENCLAVE _IFA_TIME	8	binary	Total IFA time for the enclaves owned by the address space – OucbxEncTimeOnPro(pro_ifs).
136	88	SMF99_AS_ENCLAVE _IFACP_TIME	8	binary	Total IFA time spent on CP for the enclaves owned by the address space - OucbxEncTimeProOnCP(pro_ifs).
144	90	SMF99_AS_ENCLAVE _SUP_TIME	8	binary	Total SUP time for the enclaves owned by the address space – OucbxEncTimeOnPro(pro_sup).
152	98	SMF99_AS_ENCLAVE _SUPCP_TIME	8	binary	Total SUP time spent on CP for the enclaves owned by the address space - OucbxEncTimeProOnCP(pro_sup).
160	A0	SMF99_AS_BA_BRKLOCELM	18	character	Location element for each processor type which describes the breakup environment of this address space, or 0.
178	B2	SMF99_AS_BA_MEM_SCORE	24	binary	Memory score of this address space for each processor type, or 0.
202	CA	SMF99_AS_BA_LOCELM	18	character	Location element for each processor type which describes the current processor location of this address space, or 0.
224	E0	SMF99_AS_TRC	8	EBCDIC	Tenant report class of address space.
232	E8	SMF99_AS_TRG	8	EBCDIC	Tenant resource group of address space.
240	F0	*	16	binary	Internal use by IBM

Subtype 3

Self-Defining Section

Offsets		Name	Length	Format	Description
0		SMF993COF	4	binary	Offset to class information from the beginning of record (including RDW).
4	4	SMF993CLN	2	binary	Length of the class information.
6	6	SMF993CON	2	binary	Number of class information.

Offsets		Name	Length	Format	Description
8	8	SMF993CPOF	4	binary	Offset to class period section from beginning of record (including RDW).
12	C	SMF993CPLN	2	binary	Length of the class period section.
14	E	SMF993CPON	2	binary	Number of period sections.

Class data section

Offsets	Name	Length	Format	Description
0	SMF99_PNAM	8	EBCDIC	Service class name

Period Self Defining Section

Offsets		Name	Length	Format	Description
0		SMF993_PRPOF	4	binary	Offset to paging rate plot for this period from the beginning of the record (including RDW).
4	4	SMF993_PRPLN	2	binary	Length of paging rate plot.
6	6	SMF993_PRPON	2	binary	Number of paging rate plots.
8	8	SMF993_MPLOF	4	binary	Offset to MPL delay plots for this period from the beginning of the record (including RDW).
12	C	SMF993_MPLLN	2	binary	Length of MPL delay plots.
14	E	SMF993_MPLON	2	binary	Number of MPL delay plots.
16	10	SMF993_RUAOF	4	binary	Offset to ready user average plots for this period from the beginning of the record (including RDW).
20	14	SMF993_RUALN	2	binary	Length of ready user average plot.
22	16	SMF993_RUAON	2	binary	Number of ready user average plots.
24	18	SMF993_SWPOF	4	binary	Offset to swap delay plots for this period from the beginning of the record (including RDW).
28	1C	SMF993_SWPLN	2	binary	Length of swap delay plot.
30	1E	SMF993_SWPON	2	binary	Number of swap delay plots.
32	20	SMF993_PASOF	4	binary	Offset to proportional aggregate speed plots for this period from the beginning of the record (including RDW).
36	24	SMF993_PASLN	2	binary	Length of proportional aggregate speed plots.
38	26	SMF993_PASON	2	binary	Number of proportional aggregate speed plots.
40	28	SMF993_QMPLOF	4	binary	Offset to the queue delay plots for this period from the beginning of the record (including RDW)
44	2C	SMF993_QMPLLN	2	binary	Length of the queue delay plot.
46	2E	SMF993_QMPLON	2	binary	Number of queue delay plots.
48	30	SMF993_QRUAOF	4	binary	Offset to the queue ready user average for this period from the beginning of the record (including RDW).
52	34	SMF993_QRUALN	2	binary	Length of the queue ready user average plot.
54	36	SMF993_QRUAON	2	binary	Number of queue ready user average plot.
56	38	SMF993_INTERNAL _CLASS_NAME	8	EBCDIC	Internal class name of the period. For non-discretionary periods, this will be the same as the external class name. For discretionary periods, this will be of the form $SRMDIxx. For dynamic periods, this will be of the form $SRMSxxx.
64	40	SMF993_QSTPOF	4	binary	Offset to queue service time for this period from beginning of record (including RDW).
68	44	SMF993_QSTPLN	2	binary	Length of queue service time plot.

Offsets		Name	Length	Format	Description
70	46	SMF993_QSTPON	2	binary	Number of queue service time plots.
72	48	SMF993_AINSOF	4	binary	Offset to active server instance plot for this period from beginning of record (including RDW)
76	4C	SMF993_AINSLN	2	binary	Length of active server instance plot
78	4E	SMF993_AINSON	2	binary	Number of active server instance plot
80	50	SMF993_ASTROF	4	binary	Offset to virtual storage plot for active server instances for this period from beginning of record (including RDW)
84	54	SMF993_ASTRLN	2	binary	Length of virtual storage plot
86	56	SMF993_ASTRON	2	binary	Number of virtual storage plot
88	58	SMF993_TSTROF	4	binary	Offset to virtual storage plot for total server instances for this period from beginning of record (including RDW)
92	5C	SMF993_TSTRLN	2	binary	Length of virtual storage plot
94	5E	SMF993_TSTRON	2	binary	Number of virtual storage plot

Period Paging Rate Plot Section

Offsets		Name	Length	Format	Description
0		SMF99_PPRP_PNUM	4	binary	Period number.
4	4	SMF99_PPRP_BW	4	binary	Size of each x bucket width. X is the average address space size in frames.
8	8	SMF99_PPRP_LSTX	4	binary	Last plotted x bucket index.
		*	4	binary	Reserved.
16	10	SMF99_PPRP_POINTS _OF	4	binary	Offset of point entries.
20	14	SMF99_PPRP_POINTS _ON	2	binary	Number of point entries.
22	16	SMF99_PPRP_POINTS _LN	2	binary	Length of a point entry.

MPL Delay Plot Section

Offsets		Name	Length	Format	Description
0		SMF99_MPLP_PNUM	4	binary	Period number
4	4	SMF99_MPLP_BW	4	binary	Size of each x bucket width. X is the percentage of ready users who have an MPL slot available to them.
8	8	SMF99_MPLP_LSTX	4	binary	Last plotted x bucket index.
		*	4	binary	Reserved.
16	10	SMF99_MPLP_POINTS _OF	4	binary	Offset of point entries.
20	14	SMF99_MPLP_POINTS _ON	2	binary	Number of point entries.
22	16	SMF99_MPLP_POINTS _LN	2	binary	Length of a point entry.

Ready User Average Plot Section

Offsets		Name	Length	Format	Description
0		SMF99_RUAP_PNUM	4	binary	Period number.
4	4	SMF99_RUAP_BW	4	binary	Size of each x bucket width. X is the number of MPL slots available to the service class period scaled by 16.
8	8	SMF99_RUAP_LSTX	4	binary	Last plotted x bucket index.
		*	4	binary	Reserved.

Offsets		Name	Length	Format	Description
16	10	SMF99_RUAP_POINTS _OF	4	binary	Offset of point entries.
20	14	SMF99_RUAP_POINTS _ON	2	binary	Number of point entries.
22	16	SMF99_RUAP_POINTS _LN	2	binary	Length of a point entry.

Swap Delay Plot Section

Offsets		Name	Length	Format	Description
0		SMF99_SWPP_PNUM	4	binary	Period number.
4	4	SMF99_SWPP_BW	4	binary	Size of each x bucket width. X is the average time an address space in the service class period is logically swapped or swapped on expanded storage in milliseconds.
8	8	SMF99_SWPP_LSTX	4	binary	Last plotted x bucket index.
		*	4	binary	Reserved.
16	10	SMF99_SWPP_POINTS _OF	4	binary	Offset of point entries.
20	14	SMF99_SWPP_POINTS _ON	2	binary	Number of point entries.
22	16	SMF99_SWPP_POINTS _LN	2	binary	Length of a point entry.

Proportional Aggregate Speed Plot Section

Offsets		Name	Length	Format	Description
0		SMF99_PASP_PNUM	4	binary	Period number.
4	4	SMF99_PASP_BW	4	binary	Size of each x bucket width. X is the proportional aggregate speed of a service class. Units are the same as for velocity.
8	8	SMF99_PASP_LSTX	4	binary	Last plotted x bucket index.
		*	4	binary	Reserved.
16	10	SMF99_PASP_POINTS _OF	4	binary	Offset of point entries.
20	14	SMF99_PASP_POINTS _ON	2	binary	Number of point entries.
22	16	SMF99_PASP_POINTS _LN	2	binary	Length of a point entry.

Queue Delay Plot Section

Offsets		Name	Length	Format	Description
0		SMF99_QMPLP_PNUM	4	binary	Period number.
4	4	SMF99 _QMPLP_DISP _CLASS_NAME	8	EBCDIC	Service class name of the server where the server address spaces are running.
12	C	SMF99_QMPLP_BW	4	binary	Size of each x bucket width. X is the address space size in frames.
16	10	SMF99_QMPLP_LSTX	4	binary	Last plotted x bucket index.
		*	4	binary	Reserved.
24	18	SMF99_QMPLP_POINTS _OF	4	binary	Offset of point entries.
28	1C	SMF99_QMPLP_POINTS _ON	2	binary	Number of point entries.
30	1E	SMF99_QMPLP_POINTS _LN	2	binary	Length of a point entry.

Offsets		Name	Length	Format	Description
32	20	SMF99_QMPLP_Q _TYPE	1	binary	Work queue type: **Bit** **Meaning when set** **0** Queue manager type work queue. **1** Batch type work queue. **2-7** Reserved.
33	21	*	3	EBCDIC	Reserved.
36	24	SMF99_QMPLP _SUBSYS_TYPE	4	EBCDIC	Subsystem type of the owner of the queue. (Applies only to batch queue servers.)
40	28	SMF99_QMPLP _SUBSYS_NAME	8	EBCDIC	Subsystem name of the owner of the queue. (Applies only to batch queue servers.)

Queue Ready User Average Plot Section

Offsets		Name	Length	Format	Description
0		SMF99_QRUAP_PNUM	4	binary	Period number.
4	4	SMF99_QRUAP_DISP _CLASS_NAME	8	EBCDIC	Class name of server service class where the server address spaces are running.
12	C	SMF99_QRUAP_BW	4	binary	Size of each x bucket width. X is the address space size in frames.
16	10	SMF99_QRUAP_LSTX	4	binary	Last plotted x bucket index.
		*	4	binary	Reserved.
24	18	SMF99_QRUAP_POINTS _OF	4	binary	Offset of point entries.
28	1C	SMF99_QRUAP_POINTS _ON	2	binary	Number of point entries.
30	1E	SMF99_QRUAP_POINTS _LN	2	binary	Length of a point entry.

Active server instances plot section

Offsets		Name	Length	Format	Description
0		SMF99_AINS_PNUM	4	binary	Period number
4	4	SMF99_AINS_BW	4	binary	Bucket width
8	8	SMF99_AINS_LSTX	4	binary	Last plotted X bucket
		*	4	binary	Reserved.
16	10	SMF99_AINS_POINTS_OF	4	binary	Offset of point entries
20	14	SMF99_AINS_POINTS_ON	2	binary	Number of point entries
22	16	SMF99_AINS_POINTS_LN	2	binary	Length of a point entry

VS Plot for Active Server Instances Section

Offsets		Name	Length	Format	Description
0		SMF99_ASTR_PNUM	4	binary	Period number
4	4	SMF99_ASTR_BW	4	binary	Bucket width
8	8	SMF99_ASTR_LSTX	4	binary	Last plotted X bucket
		*	4	binary	Reserved.
16	10	SMF99_ASTR_POINTS_OF	4	binary	Offset of point entries
18	12	SMF99_ASTR_POINTS_ON	2	binary	Number of point entries
20	14	SMF99_ASTR_POINTS_LN	2	binary	Length of a point entry

Offsets		Name	Length	Format	Description
22	16	SMF99_ASTR_C_USED	1	binary	Plot curve used **Bit** **Meaning when set** **0** VS curve below 16MB was used last time server instances adjusted **1** VS curve above 16MB was used last time server instances adjusted **2-7** Reserved.
		*	3	EBCDIC	Reserved.

VS Plot for Total Server Instances Section

Offsets		Name	Length	Format	Description
0		SMF99_TSTR_PNUM	4	binary	Period number
4	4	SMF99_TSTR_BW	4	binary	Bucket width
8	8	SMF99_TSTR_LSTX	4	binary	Last plotted X bucket
		*	4	binary	Reserved.
16	10	SMF99_TSTR_POINTS_OF	4	binary	Offset of point entries
18	12	SMF99_TSTR_POINTS_ON	2	binary	Number of point entries
20	14	SMF99_TSTR_POINTS_LN	2	binary	Length of a point entry
22	16	SMF99_TSTR_C_USED	1	binary	Plot curve used **Bit** **Meaning when set** **0** VS curve below 16MB was used last time server instances adjusted **1** VS curve above 16MB was used last time server instances adjusted **2-7** Reserved.
		*	3	EBCDIC	Reserved.

Queue Service Time Plot Section

Offsets		Name	Length	Format	Description
0		SMF99_QSTP_PNUM	4	binary	Period number.
4	4	SMF99_QSTP_DISP _CLASS_NAME	8	EBCDIC	Class name where the server address spaces are running.
12	C	SMF99_QSTP_BW	4	binary	Bucket width.
16	10	SMF99_QSTP_LSTX	4	binary	Last plotted x bucket index.
		*	4	binary	Reserved.
24	18	SMF99_QSTP_POINTS _OF	4	binary	Offset of point entries.
28	1C	SMF99_QSTP_POINTS _ON	2	binary	Number of point entries.
30	1E	SMF99_QSTP _POINTS _LN	2	binary	Length of a point entry.

Plot With Two Curves - Point Entry Section

Offsets		Name	Length	Format	Description
		SMF99_2PLOT_XVAL	4	binary	X value of point plotted in a bucket
		SMF99_2PLOT_Y1VAL	4	binary	Y value of point plotted on first curve
		SMF99_2PLOT_Y2VAL	4	binary	Y value of point plotted on second curve

Subtype 4

Self-Defining Section

Offsets		Name	Length	Format	Description
0		SMF994DEVCLID	4	binary	Identifier of the device cluster. Used to associate a device cluster with the periods in a device cluster through the device cluster identifier field in the subtype 2 record (SMF99_PDEVCL).
4	4	SMF994IOPTOF	4	binary	Offset to the I/O priority table information from the beginning of the record (including RDW).
8	8	SMF994IOPTLN	2	binary	Length of the I/O priority information.
10	A	SMF994IOPTON	2	binary	Number of priority table sections.
12	C	SMF994IOPLTOF	4	binary	Offset to the I/O plot section from the beginning of the record (including RDW).
16	10	SMF994IOPLTLN	2	binary	Length of the I/O plot section.
18	12	SMF99IOPLTON	2	binary	Number of I/O plot sections.

Device Cluster Priority Table Section

Offsets		Name	Length	Format	Description
0		SMF99_IPTPRTY	2	binary	I/O priority.
2	2	SMF99_IPTNP	2	binary	New I/O priority (zero if not changed)
4	4	SMF99_IPTIMDP	4	binary	Initial maximum percentage of time that work at priority could demand I/O, initial value before any priority moves. Percentage scaled by 10.
8	8	SMF99_IPTPMDP	4	binary	The projected maximum percentage of I/O time demanded at priority.
12	C	SMF99_IPTW2UR	4	binary	The ratio of I/O wait to I/O using time scaled by 16.
16	10	SMF99_IPTIMAXD	4	binary	The initial cumulative maximum demand percentage scaled by 10.
20	14	SMF99_IPTWMAXD	4	binary	The projected cumulative maximum demand percentage scaled by 10.

I/O Plot Information Section

Offsets		Name	Length	Format	Description
0		SMF99_IO_PLOT_BW	4	binary	Bucket width.
4	4	SMF99_IO_PLOT_LSTX	4	binary	Last plotted x bucket.
8	8	Reserved.	4	binary	Reserved.
12	C	SMF99_IO_PLOT _POINTS_OF	4	binary	Offset of the point entries.
16	10	SMF99_IO_PLOT _POINTS_ON	2	binary	Number of point entries.

Offsets		Name	Length	Format	Description
18	12	SMF99_IO_PLOT _POINTS_LN	2	binary	Length of a point entry.

Subtype 5

Self-Defining Section

Offsets		Name	Length	Format	Description
0		SMF99ANAM	8	EBCDIC	Address space name
8	8	SMF99ACNM	8	EBCDIC	Service class to which the address space belongs.
16	10	SMF99APNUM	4	binary	Period number that the address space is in.
20	14	SMF99APCS	4	binary	Protective central storage target, in frames.
24	18	SMF99ARCS	4	binary	Restrictive central storage target, in frames. This field is no longer supported with z/OS release V1R8 or higher.
28	1C	SMF99APPS	4	binary	Protective processor storage target, in frames.
32	20	SMF99ARPS	4	binary	Restrictive processor storage target, in frames. This field is no longer supported with z/OS release V1R8 or higher.
36	24	SMF99CPLT	20	EBCDIC	Central storage plot. Mapped by SMF99_S5_CPLT_MAP.
56	38	SMF99PPLT	20	EBCDIC	Processor storage plot. Mapped by SMF99_S5_PPLT_MAP.
76	4C	SMF99ASID	2	binary	Address space ID.
78	4E	SMF99A_EXTERNAL _CLASS _NAME	8	EBCDIC	The name of the external class with which the address space is associated.
86	56	SMF99_S5_FLAGS	1	binary	Flags. **Bit** **Meaning when set** **0** Storage is protected at this instant. **1** Storage protection assigned to space by classification rule. **2** Indicates that storage critical housekeeping was the last to set the storage target for central storage. **3** Indicates that storage critical housekeeping was the last to set the storage target for processor storage. **4** Indicates that policy adjustment was the last to set the storage target for central storage. **5** Indicates that policy adjustment was the last to set the storage target for processor storage. **6-7** Reserved.
87	57	SMF99_AS_IO_Mgmt _Support_Data	2	binary	I/O management support data.
89	59	*	1	EBCDIC	Reserved.

Processor Storage Plot Section

Offsets		Name	Length	Format	Description
		SMF99_S5_PPLT_MAP	*	*	

Offsets		Name	Length	Format	Description
0		SMF99_PPLT_BW	4	binary	Size of each x bucket width. X is the address space size in frames.
4	4	SMF99_PPLT_LSTX	4	binary	Last plotted x bucket index.
		*	4	binary	Reserved.
12	C	SMF99_PPLT_POINTS _OF	4	binary	Offset of point entries.
16	10	SMF99_PPLT_POINTS _ON	2	binary	Number of point entries.
18	12	SMF99_PPLT_POINTS _LN	2	binary	Length of a point entry.

Central storage plot section

Offsets		Name	Length	Format	Description
		SMF99_S5_CPLT_MAP	*	*	
0		SMF99_CPLT_BW	4	binary	Size of each x bucket width. X is the address space size in frames.
4	4	SMF99_CPLT_LSTX	4	binary	Last plotted x bucket index.
		*	4	binary	Reserved.
12	C	SMF99_CPLT_POINTS _OF	4	binary	Offset of point entries.
16	10	SMF99_CPLT_POINTS _ON	2	binary	Number of point entries.
18	12	SMF99_CPLT_POINTS _LN	2	binary	Length of a point entry.

Subtypes 1, 3, and 5

Plot with One Curve - Point Entry Section

Offsets		Name	Length	Format	Description
0		SMF99_PLOT_XVAL	4	binary	X value of point plotted in a bucket.
4	4	SMF99_PLOT_YVAL	4	binary	Y value of point plotted in a bucket.

Subtype 5

Plot With Three Curves - Point Entry Section

Offsets		Name	Length	Format	Description
0		SMF99_3PLOT_XVAL	4	binary	X value of point plotted in a bucket.
4	4	SMF99_3PLOT_Y1VAL	4	binary	Y value of point plotted on first curve. For the processor storage plot, the first curve is the page-in rate per captured (TCB+SRB) second from auxiliary storage. For the central storage plot, the first curve is the page-in rate per captured (TCB+SRB) second from auxiliary and expanded storage.
8	8	SMF99_3PLOT_Y2VAL	4	binary	Y value of point plotted on second curve. For the processor storage plot, the second curve is the paging cost in milliseconds per elapsed second for paging from auxiliary storage. For the central storage plot, the second curve is the paging cost in milliseconds per elapsed second for paging from auxiliary and expanded storage.
12	C	SMF99_3PLOT_Y3VAL	4	binary	Y value of point plotted on third curve. For the processor storage plot, the third curve is the captured time in milliseconds per elapsed second. For the central storage plot, the third curve is the captured time in milliseconds per elapsed second.

Subtype 6

Self-Defining Section

Offsets		Name	Length	Format	Description
0		SMF996CPOF	4	binary	Offset to service class period section.
4	4	SMF996CPLN	2	binary	Length of a service class period section.
6	6	SMF996CPON	2	binary	Number of service class period sections.

Period Data Section

Offsets		Name	Length	Format	Description
0		SMF996_ECLASS _NAME	8	EBCDIC	External class name. For an externally-defined service class, this is a name defined in the service definition. For a server period, this name will of the form $SRMSxxx. For system service classes, this name will be $SRMBEST, $SRMDUMP, $SRMGOOD, $SRMDISC, or $SRMQSC.
8	8	SMF996_PER_NUM	2	binary	Period number within class.
10	A	SMF996_GOALTYPE	1	binary	Goal type: **Value** **Meaning** **0** System, SYSSTC, or server goal **1** Short response time **2** Long response time **3** Velocity **4** Discretionary
11	B	SMF996_PERCENTILE	1	binary	Response time goal percentile. (Zero if period does not have a percentile response time goal.)
12	C	SMF996_ICLASS_NAME	8	EBCDIC	Internal service class name. Same as SMF996_ECLASS_NAME, except for discretionary periods, in which case the name will be of the form $SRMDIxx.
20	14	SMF996_GOALVAL	4	binary	Goal value. If a response time goal, this value will be the goal in milliseconds. If a velocity goal, this value will be the velocity percentage. If a discretionary goal, system goal, or if this is a server period, this value will be zero.
24	18	SMF996_IMPOR	2	binary	Importance of service class period.
26	1A	SMF996_DP	1	binary	Dispatching priority of period for next policy interval.
27	1B	SMF996_IODP	1	binary	I/O priority of period for next policy interval.
28	1C	SMF996_MPLI	2	binary	MPL in-target for next policy interval.
30	1E	SMF996_MPLO	2	binary	MPL out-target for next policy interval.
32	20	SMF996_RUA	4	binary	Average number of ready address spaces over last policy interval, scaled by a factor of 16.
36	24	SMF996_PSPT	4	binary	Time swapped out address spaces in period are protected from being swapped to aux for next policy interval. This value is expressed in units of 1.024 milliseconds.
40	28	SMF996_PSITAR	4	binary	Storage isolation target for next policy interval for each address space in period. (Valid only for work with short response time goals, in which case the value is the number of frames protected. Otherwise, this value is zero.)
44	2C	SMF996_LOCAL_PI	4	binary	Local performance index, times 100.
48	30	SMF996_SYSPLEX_PI	4	binary	Sysplex performance index, times 100.

Offsets		Name	Length	Format	Description
52	34	SMF996_SERVER_DATA _OF	4	binary	Offset to server section from beginning of record (including RDW). Only valid if period is a server period. There will be one server section entry for each different external service class to which server address spaces in this server period were originally classified.
56	38	SMF996_SERVER_DATA _LN	2	binary	Length of each server section entry.
58	3A	SMF996_SERVER_DATA _ON	2	binary	Number of server section entries.
60	3C	SMF996_PSERV	4	binary	Service accumulated during interval.
64	40	SMF996_PISERV	4	binary	zAAP service accumulated during interval.
68	44	SMF996_PSSERV	4	binary	Accumulated SUP service.
72	48	SMF996_Time_at_ PDP_Using	4	binary	Time at PDP using samples during last interval.
76	4C	SMF996_Time_at_PDP	4	binary	Time at PDP accumulator during last interval.
80	50	SMF996_FLAGS	1	binary	Flags. **Bit** **Meaning when set** **0** Period is managed by EWLM performance data. **1** Period belongs to a service class which was assigned to I/O priority group. **2** Specialty engine work in this period is ineligible for “Honor Priority Processing,” i.e., it will not be offloaded to CPs for help processing. **3–7** Reserved.
81	51	*	3	EDCDIC	Reserved.
84	54	SMF996_EWLM_LOCAL_PI	4	binary	EWLM local PI.
88	58	SMF996_EWLM_GLOBAL_PI	4	binary	EWLM global PI.

Server Section

Offsets		Name	Length	Format	Description
0		SMF99_S6_SERVER _CLASS_NAME	8	EBCDIC	Name of the service class to which at least one of the server address spaces in the server period represented by the subtype 6 entry was originally classified.
8	8	SMF99_S6_SERVER _PER_NUM	4	binary	Period number within class.

Subtype 7

Self-Defining Section

Offsets		Name	Length	Format	Description
0		SMF997_PAV_SUBSYS_ID	32	EBCDIC	PAV subsystem ID, (NED TOKEN)
32	20	SMF997_NUM_EXT_SC	4	binary	Number of external service classes. This is needed to determine the index to the SYSTEM service class in the device service class bitmap. The device service class bitmap is in the device data section. The number of external service classes is put in the self-defining section to avoid repeating it for each device.
36	24	SMF997_PAV_DATA _DEV_OF	4	binary	Offset to the first device section, from beginning of record (including RDW).
40	28	SMF997_PAV_DATA _DEV_LEN	2	binary	Length of each device section.
38	26	SMF997_PAV_DATA _DEV_NO	2	binary	Number of device sections.

PAV Device Section

Offsets		Name	Length	Format	Description
0		SMF997_PAV_DEV_ID	2	binary	Device ID.
2	2	SMF997_PAV _DEV_FLAGS	1	binary	Goal type: **Bit** **Meaning when set** **0** PAV device is an unbound alias **1** PAV device managed by WLM **2** PAV device temporarily unavailable **3–7** Reserved.
3	3	SMF997_PAV_DEV _NUM_OF_ALIASES	1	binary	Number of aliases assigned. Valid for PAV base device.
4	4	SMF997_PAV_DEV _AVG_IOS_QUEUE_LEN	4	binary	Average IOS queue length. Valid for PAV base device.
8	8	SMF997_PAV_DEV _AVG_SERVICE_TIME	4	binary	Average service time. Valid for PAV base device in 128 micro seconds.
12	C	SMF997_PAV_DEV _IODELAY_TIME	4	binary	I/O Delay Time. Currently CU queue time.
16	10	SMF997_PAV_DEV _IODELAY_SAMPS	2	binary	I/O Delay samples
18	12	SMF997_PAV_DEV _IOSQSAMPLES	2	binary	IOS Queue samples
20	14	SMF997_PAV_DEV _SUBCHSET	1	binary	Sub Channel set
21	15	*	3	binary	Reserved
24	18	SMF997_PAV_DEV _DEVSC_MAP_OLD	14	binary	Device service class ID bit string for 108 service classes prior to z/OS V1R10
38	26	*	2	binary	Reserved.
40	28	SMF997_PAV_DEV _UTILIZATION	4	binary	Utilization
44	2C	SMF997_PAV_DEV _PENDTIME	4	binary	Pend time
48	30	SMF997_PAV_DEV _DISCTIME	4	binary	Disconnect time
52	34	SMF997_PAV_DEV_SSC	4	binary	Start subchannel count
56	38	SMF997_PAV_DEV _MINACNT	1	binary	Local min alias count
57	39	SMF997_PAV_DEV _GMINACNT	1	binary	Global min alias count
58	3A	*	2	binary	Unused
60	3C	SMF997_PAV_DEV _RSRVD2	8	binary	Reserved
68	44	*	4	binary	Reserved
72	48	SMF997_PAV_DEV_DEVSC_MAP	46	binary	Device service class ID bit string

Subtype 8

Self Defining Section

Offsets		Name	Length	Format	Description
0		SMF998_LD_DATA _OFFSET	4	binary	Offset to LPAR data section from beginning of record (including RDW)
4	4	SMF998_LD_DATA _LENGTH	2	binary	Length of an LPAR data section

Offsets		Name	Length	Format	Description
6	6	SMF998_LD_DATA _NUMBER	2	binary	Number of LPAR data sections
8	8	SMF998_PT_DATA _OFFSET	4	binary	Offset to priority table section from beginning of record (including RDW)
12	C	SMF998_PT_DATA _LENGTH	2	binary	Length of a priority table section
14	E	SMF998_PT_DATA _NUMBER	2	binary	Number of priority table sections
16	10	SMF998_PC_DATA _OFFSET	4	binary	Offset to period CPU section from beginning of record (including RDW)
20	14	SMF998_PC_DATA _LENGTH	2	binary	Length of a period CPU section
22	16	SMF998_PC_DATA _NUMBER	2	binary	Number of period CPU sections
24	18	SMF998_IMAGE_CPU _DATA_OFFSET	4	binary	Offset to image CPU section, from beginning of record (including RDW)
28	1C	SMF998_IMAGE_CPU _DATA_LENGTH	2	binary	Length of an image CPU section
30	1E	SMF998_IMAGE_CPU _DATA_NUMBER	2	binary	Number of image CPU sections
32	20	SMF998_SYSH_CPU _PLOT_OF	4	binary	Offset to the SYSH CPU plot section, from beginning of record (including RDW)
36	22	SMF998_SYSH_CPU _PLOT_LN	2	binary	Length of SYSH CPU plot section
38	24	SMF998_SYSH_CPU _PLOT_ON	2	binary	Number of SYSH CPU plot sections

LPAR Data Entry Section

Offsets		Name	Length	Format	Description
0		SMF998_ImageSystemName	8	EBCDIC	Image system name
8	8	SMF998_ControlFlag1	1	binary	Control flag that indicates why the rest of the data in the LD entry has not been filled in. **Bit** **Meaning when set** **0** Indicates that this is an overflow SMF 99 subtype 8 record for specified system. The appropriate LD data for this system appears in the first SMF 99 subtype 8 record for this system. **1** Indicates that this system does not have DIAG support. **2** Indicates that LPAR CPU Management is not enabled. **3** Indicates that this system issued DIAG and it failed. **4** Indicates that an image entry was not returned through the DIAG interface for this system. **5** Indicates that the image is non-z/OS. (LINUX). **6-7** Reserved.
9	9	SMF998_SystemNumber	1	binary	System slot number. The source for this value is QUASNUM in IXCYQUAA.

Offsets		Name	Length	Format	Description
10	A	*	2	EBCDIC	Reserved
12	C	SMF998_LastSetTime	8	binary	Timestamp in STCK format
20	14	SMF998_TotalWeight	4	binary	Total weight of the CEC
24	18	SMF998_ NumberOfSharedPhysicalCPUs	1	binary	Total number of shared (non-dedicated) physical CPU configured for the CEC use
25	19	*	3	EBCDIC	Reserved
28	1C	SMF998_ImageID	1	binary	Image ID of the partition
29	1D	SMF998_ImageFlags	1	binary	Image Flags **Bit** **Meaning when set** **0** Image is capped by software. **1** Identifies whether WLM should be involved in dynamic LPAR weight management. **2** Identifies whether partition is using shared CPs. **3** Identifies whether partition is using dedicated CPs. **4** Identifies whether partition is capped by installation from console. **5-7** Reserved.
30	1E	*	2	EBCDIC	Reserved
32	20	SMF998_ NumberCpusActive	2	binary	Number of CPUs that are currently active
34	22	SMF998_ AverageCpuUtilization	2	binary	Average CPU utilization
36	24	SMF998_ ImageInitialWeight	2	binary	Image initial weight
38	26	SMF998_ ImageCurrentWeight	2	binary	Image current weight
40	28	SMF998_ ImageMinimumWeight	2	binary	Image minimum weight
42	2A	SMF998_ ImageMaximumWeight	2	binary	Image maximum weight
44	2C	SMF998_Pro _Time_Avail	4	binary	Total processor time available, includes captured time plus wait time
48	30	SMF998_Service _Units_Per_Second	4	binary	Unweighted CPU service units per second per online CPU that the hardware is capable of.
52	34	*	16	EBCDIC	Reserved
68	44	SMF998_SoftCapMsu	4	binary	Capacity in millions of service units per hour for which the logical partition is licensed.
72	48	*	4	EBCDIC	Reserved
76	4C	SMF998_ PricingManagementWeight	4	binary	Current pricing management weight

Priority Table Entry Section

Offsets		Name	Length	Format	Description
0		SMF998_PTPRTY	2	binary	Dispatch priority
2	2	SMF998_PTNP	2	binary	New dispatch priority (zero if not changed)

Offsets		Name	Length	Format	Description
4	4	SMF998_PTIMDP	4	binary	Initial maximum percentage of processor demanded at priority, initial value before any priority moves or slice changes
8	8	SMF998_PTPMDP	4	binary	Projected maximum percentage of processor demanded at priority
12	C	SMF998_PTCPUU	4	binary	CPU using samples at priority
16	10	SMF998_PTCPUD	4	binary	CPU delay samples at priority
20	14	SMF998_PTW2UR	4	binary	Wait-to-using ratio at priority (*16)
24	18	SMF998_PTAPU	4	binary	Actual measured processor used at priority
28	1C	SMF998_PTPPU	4	binary	Projected processor time to be used at priority
32	20	SMF998_PTACMD	4	binary	Achievable cumulative max demand for priorities affected by a move
36	24	*	4	binary	Reserved
40	28	SMF998_PTIMAXD	4	binary	Initial cumulative maximum demand
44	2C	SMF998_PTWMAXD	4	binary	Projected cumulative maximum demand
48	30	SMF998_PTIAMTW	4	binary	Initial average mean time to wait
52	34	SMF998_PTWAMTW	4	binary	Projected average mean time to wait

CPU Period Table Entry Section

Offsets		Name	Length	Format	Description
0		SMF998_Service _Class_Name	8	EBCDIC	Internal service class name
8	8	SMF998_Importance	2	binary	Importance
10	A	SMF998_Period _Number	2	binary	Period number
12	C	*	4	EBCDIC	Reserved
16	10	SMF998_Dasd_Io _Delay_Sample	4	binary	Copy of I/O delay samples
20	14	SMF998_Non _Idle_Samp	4	binary	Number of non-idle samples
24	18	SMF998_Cpu _Using_Sample	4	binary	Copy of CPU using samples
28	1C	SMF998_Cpu _Delay_Sample	4	binary	Copy of CPU delay samples
32	20	SMF998_Wlm_Queue _Delay_Sample	4	binary	Copy of WLM queue delay samples
36	24	SMF998_Dasd_Io _Using_Sample	4	binary	Copy of DASD I/O using samples
40	28	SMF998_Max_Dem_Per	4	binary	Maximum percentage of processor time demanded (constant across policy adjustment)
44	2C	SMF998_Pi_Achieved	4	binary	Performance index achieved, adjusted into range, used to select donors and receivers
48	30	SMF998_Sysplex _Pi_Achieved	4	binary	Sysplex performance index achieved, adjusted into range, used to select donors and receivers
52	34	SMF998_Service_Ow	4	binary	Average service over a WLM-defined moving interva
56	38	SMF998_Mtw_Adj	4	binary	Mean time to wait adjusted by cccmxmtw
60	3C	SMF998_Base _Priority	2	binary	Base dispatching priority
62	3E	SMF998_Cap _Num_Slices	2	binary	Current number of sleep slices, or 0
64	40	SMF998_Work _Pro_Used	4	binary	Working variable for assess for processor used

Offsets		Name	Length	Format	Description
68	44	SMF998_Current _Ach_Dem_Per	4	binary	Current achievable demand percentage for the period calculated from the initial PDT fields.
72	48	SMF998_Ach_Dem_Per	4	binary	Working variable for achievable demand percentage
76	4C	SMF998_Old_Work _Pro_Used	4	binary	Work field computed during phase 1 move
80	50	SMF998_Proj_Pi_Com	4	binary	Unadjusted projected PI for committed actions only, used as base for projections
84	54	SMF998_Using_Delta	4	binary	Computed during assessment
88	58	SMF998_LparMgmt _Delay_Delta	4	binary	Delay delta computed by LPAR Mgmt algorithm. This field captures the delay delta for SMF99 recording before it is cleared out.
92	5C	SMF998_Cpu_Cap _Delay_Sample	4	binary	CPU capping delay sample
96	60	SMF998_Iosub _Samples_Data_Offset	4	binary	Offset to I/O subsystem samples data from beginning of record (including RDW)
100	64	SMF998_Iosub _Samples_Data_Length	2	binary	Length of a I/O subsystem samples data section
102	66	SMF998_Iosub _Samples_Data_number	2	binary	Number of I/O subsystem samples data sections
104	68	SMF998_Sysplex _Proj_Pi_Com	4	binary	Unadjusted sysplex projected PI for committed actions only, used as base for projections
108	6C	SMF998_PC_CSS_NUMBER	1	binary	Channel subsystem identifier
109	6D	*	11	EBCDIC	Reserved

LPAR CPU Data for a Partition in an LPAR Cluster Section

Offsets		Name	Length	Format	Description
0		SMF998_LC _Service_Class_Name	8	EBCDIC	Internal service class name
8	8	SMF998_LC _Period_Number	2	binary	Period number
		*	2	binary	Reserved
12	C	SMF998_LC _Machine_Percentage	4	binary	Percent of the CEC shared capacity used by the partition either based on its current weight or utilization
16	10	SMF998_LC _Max_Dem_Per	4	binary	Maximum percentage of processor time demanded by the image during current interval (scaled by 10)
20	14	SMF998_LC _LastInt_Cpu_Using	4	binary	Last interval CPU using samples count
24	18	SMF998_LC _LastInt_Cpu_Delay	4	binary	Last interval CPU delay samples count
28	1C	SMF998_LC _LastInt_Non_Idle	4	binary	Last interval non idle sample count which include using, delay and other
32	20	SMF998_LC _Avg_Cpu_Using	4	binary	Average CPU using samples count
36	24	SMF998_LC _Avg_Cpu_Delay	4	binary	Average CPU delay samples count
40	28	SMF998_LC_Using_Delta	4	binary	Using delta
44	2C	SMF998_LC_Delay_Delta	4	binary	Delay delta
48	30	SMF998_LC _Work_Max_Dem_Per	4	binary	New maximum percentage of processor time demanded by the image during current interval as a result of weight change (scaled by 10)

Offsets		Name	Length	Format	Description
52	34	SMF998_LC _Work_Weighted_ Max_Dem_Per	4	binary	Maximum percentage of processor time demanded by the image as a result of weight change, with respect to its current machine share (based on weight or utilization)
56	38	SMF998_LC _Work_W2U_Ratio	4	binary	New W2U ratio due to change in LPAR weight
60	3C	SMF998_LC_Pi_Delta	4	binary	PI delta projection
64	40	SMF998_LC _Sysplex_Pi_Delta	4	binary	Sysplex PI delta projection

SYSH CPU Plot Section

Offsets		Name	Length	Format	Description
0		SMF99_SYSH _CPU_PLOT_INUM	4	binary	Image number
4	4	SMF99_SYSH _CPU_PLOT_BW	4	binary	Bucket width
8	8	SMF99_SYSH _CPU_PLOT_LSTX	4	binary	Last plotted X bucket
12	C	SMF99_SYSH _CPU_PLOT_POINTS_OF	4	binary	Offset of point entries
16	10	SMF99_SYSH _CPU_PLOT_POINTS_ON	2	binary	Number of point entries
18	12	SMF99_SYSH _CPU_PLOT_POINTS_LN	2	binary	Length of a point entry

Subtypes 2 and 8

I/O Subsystems Samples Data Section

Offsets		Name	Length	Format	Description
0		SMF99_IOSUB_Index	2	binary	Subsystem index. This correlates with SMF999_IOSUB_INDEX.
2	2	*	2	binary	Reserved.
4	4	SMF99_IOSUB _ConnectSamples	2	binary	Connect samples.
6	6	SMF99_IOSUB _PendingSamples	2	binary	Pending samples.

Subtype 9

Self Defining Section

Offsets		Name	Length	Format	Description
0		SMF999_IO_SUBSYSTEM _DATA_OFFSET	4	binary	Offset to IO Subsystem data section from beginning of record (including RDW)
4	4	SMF999_IO_SUBSYSTEM _DATA_LENGTH	2	binary	Length of IO Subsystem Data section
6	6	SMF999_IO_SUBSYSTEM _DATA_NUMBER	2	binary	Number of IO Subsytem Data sections
8	8	SMF999_IOSUB _PLOT_OF	4	binary	Offset to IO Subsystem plots
12	C	SMF999_IOSUB _PLOT_LN	2	binary	Length of IO Subsystem plots
14	E	SMF999_IOSUB _PLOT_ON	2	binary	Number of IO Subsystem plots
16	10	SMF999_CHANNEL _DATA_OF	4	binary	Offset to Channel Data section

Offsets		Name	Length	Format	Description
20	14	SMF999_CHANNEL _DATA_LN	2	binary	Length of Channel Data section
22	16	SMF999_CHANNEL _DATA_ON	2	binary	Number of Channel Data section

Channel path data entry section

Offsets		Name	Length	Format	Description
0		SMF999_FLAG1	1	binary	IO subsystem flags **Bit** **Meaning when set** **0** Indicates that the I/O subsystem is eligible for dynamic management. **1** Indicates CONFIG change has been made. **2** Indicates that no point was plotted this interval. If this indicator is on, SMF99_IOSUB_INTERVAL _VELOCITY is not relevant. **3** Indicates that no channel data was written this interval. This indicator is set when the structure for the channel data does not exist. **4** Indicates that while calculating the busy to connect ratio an entry ratio was converted from >1.6 to 1.3. **5-7** Reserved.
1	1	SMF999_CONTROL_FLAGS	1	binary	Control flags **Bit** **Meaning when set** **0** Indicates that this SMF 99 subtype 9 record represents a situation that caused us not to create valid SMF 99 subtype 9 data. Identify the condition by checking one of the following indicators. Data in this SMF 99 subtype 9 is invalid other than possibly the SMF999_IOSUB_INDEX (valid when empty slot or old slot entry). **1** Indicates that registry data does not exist. **2** Indicates that the WLM LPAR Cluster structure is not connected. **3** Indicates that the SMF 99 buffer for the subtype 9 data was not processed from the previous interval. **4** Indicates empty slot entry. **5** Indicates old slot entry. **6** Indicates unknown reason. **7** Reserved.

Offsets		Name	Length	Format	Description
2	2	SMF999_ROW_INDEX	2	binary	Channel path data row index
4	4	*	1	EBCDIC	Reserved
5	5	SMF999_DIAG_TOKEN	3	binary	Internal diagnosis data
8	8	SMF999_TOKEN_NED	32	EBCDIC	Token NED of I/O subsystem
40	28	SMF999_IOSUB _TARGET_VELOCITY	4	binary	I/O subsystem target velocity set by WLM
44	2C	SMF999_IOSUB _VELOCITY	4	binary	The actual I/O velocity of the subsystem
48	30	SMF999_IOSUB _AVG_SVC_TIME	4	binary	Average service time
52	34	SMF999_IOSUB _CHECK_POINT_TIME	4	binary	Average service time of the subsystem when SRM set a target
56	38	SMF999_IOSUB _INDEX	2	binary	IO Subsystem Index
58	3A	SMF999_LCU _SQNUMBER	2	binary	LCU sequence number
60	3C	SMF999_CONTROL _UNIT_ARRAY	16	binary	Control unit numbers, SMF999_CONTROL_UNITS(1-8), associated with LCU
76	4C	SMF999_IOSUB _PROJECTED_VELOCITY	4	binary	Projected velocity to be expected if a change is to be made
80	50	SMF999_IOSUB _INTERVAL_VELOCITY	4	binary	The 10 second I/O velocity that is used to plot a point.
84	54	SMF999_AVG_BUSY _TO_CONNECT_RATIO	4	binary	The average busy to connect time ratio calculated by WLM during the 10 second copy interval.
88	58	SMF999_CLEAR_INTERVAL	2	binary	Clear interval index
90	5A	SMF999_CSS_NUMBER	1	binary	Channel subsystem identifier
91	5B	*	5	binary	Reserved
92	5C	SMF999_IOSUB _INTERVALCHANNEL WAITTIME	4	HEX	Interval Channel-Wait-Time
96	60	SMF999_TIMESTAMP_SYSTEM	8	EBCDIC	Identifies the system that made a CONFIG change

I/O Subsystem Plot Section

Offsets		Name	Length	Format	Description
0		SMF99_IOSUB_BW	4	binary	Bucket width.
4	4	SMF99_IOSUB_LSTX	4	binary	Last plotted x bucket.
8	8	*	4	binary	Reserved.
12	C	SMF99_IOSUB _POINTS_OF	4	binary	Offset of point entries.
16	10	SMF99_IOSUB _POINTS_ON	2	binary	Number of point entries.
18	12	SMF99_IOSUB _POINTS_LN	2	binary	Length of a point entry.

Channel path data entry section

Offsets		Name	Length	Format	Description
0		SMF999_CHANNEL_ID	1	binary	I/O Subsystem channel ID.
1	1	SMF999_CHANNEL _TYPE	1	binary	I/O Subsystem channel type.

Offsets		Name	Length	Format	Description
2	2	SMF999_CHANNEL _FLAG	1	binary	I/O Subsystem channel flags bit indicate if channel is managed: **Bit** **Meaning when set** **0** Indicates that this channel can be managed by WLM. **1-7** Reserved.
3	3	*	1	EBCDIC	Reserved
4	4	SMF999_CHANNEL _UTILIZATION	4	binary	I/O Subsystem Channel utilization for the current data collection interval.
8	8	SMF999_CHANNEL _PROJECTED_UTILIZATION	1	binary	Projected I/O Subsystem Channel utilization for the current data collection interval (percentage).
9	9	SMF999_CHANNEL _PROJ_CURRENT _PATH_LOAD	1	binary	Percent use for path projected for the current configuration during the calibration pass.
10	A	SMF999_CHANNEL _#SYSTEMS_CONTRIBUTED	2	binary	Count of systems that have contributed to this channel data.
12	C	SMF999_CHANNEL _PORT_BUSY_COUNT	4	binary	Channel port busy count.

Subtype 10

Header/Self-defining Section

Offsets		Name	Length	Format	Description
0		SMF9910_CPU_DATA _OFFSET	4	HEX	Offset to CPU data section from beginning of record
4	4	SMF9910_CPU_DATA _LENGTH	2	HEX	Length of CPU data section
6	6	SMF9910_CPU_DATA _NUMBER	2	HEX	Number of CPU data sections
8	8	SMF9910_PROC_SPEED _CHG_DATA_OLD_OFFSET	4	HEX	Offset to old processor speed change data section (including RDW)
12	C	SMF9910_PROC_SPEED _CHG_DATA_OLD_LENGTH	2	HEX	Length of old processor speed change data section
14	E	SMF9910_PROC_SPEED _CHG_DATA_OLD_NUMBER	2	HEX	Number of old processor speed change data sections
16	10	SMF9910_PROC_SPEED _CHG_DATA_NEW_OFFSET	4	HEX	Offset to new processor speed change data section (including RDW)
20	14	SMF9910_PROC_SPEED _CHG_DATA_NEW_LENGTH	2	HEX	Length of new processor speed change data section
22	16	SMF9910_PROC_SPEED _CHG_DATA_NEW_NUMBER	2	HEX	Number of new processor speed change data sections

CPU Data Section

Offsets		Name	Length	Format	Description
0	0	*	2	binary	Reserved.
2	2	SMF99A_CPU_RmctScSq	2	binary	Number of speed changes.
4	4	*	152	binary	Internal use by IBM

Processor Speed Change Section (old or new)

Offsets		Name	Length	Format	Description
0	0	SMF99A_PSC_Reserved	12	binary	Reserved
12	C	SMF99A_PSC_RMCTCpMp	4	binary	CP speed
16	10	SMF99A_PSC_RMCTAdjc	4	binary	CPU rate adjustment factor
20	14	SMF99A_PSC_Reserved	3920	binary	Reserved

Subtype 11

Subtype 11 contains information about Group Capacity Limits. A subtype 11 record is written every 5 minutes.

Header/Self-defining Section

Offsets		Name	Length	Format	Description
0		SMF99B_CAPTY_ GROUP_DATA_OFFSET	4	binary	Offset to group capacity data section from beginning of record, included RDW.
4	4	SMF99B_CAPTY_ GROUP_DATA_LENGTH	2	binary	Length of group capacity data section.
6	6	SMF99B_CAPTY_ GROUP_DATA_NUMBER	2	binary	Number of group capacity data sections.
8	8	SMF99B_CEC_ SERVICE_DATA_OFFSET	4	binary	Offset to CEC service data section from beginning of record.
12	C	SMF99B_CEC_ SERVICE_DATA_LENGTH	2	binary	Length of CEC service data section.
14	E	SMF99B_CEC_ SERVICE_DATA_NUMBER	2	binary	Number of CEC service data sections.

Capacity group data section

Offsets		Name	Length	Format	Description
0		SMF99B_ CAPACITYGROUPNAME	8	EBCDIC	Name of the capacity group. All partitions that have the same capacity group name build the capacity group.
8	8	SMF99B_ GroupProcessorDispatchTime	8	binary	The dispatch time accumulated over all processors of all LPARs belonging to the capacity group.
16	10	SMF99B_GroupWeight	4	binary	The weight accumulated over all LPARs belonging to the capacity group.
20	14	SMF99B_Group_Msu_Limit	4	binary	The group limit in million service units per hour (MSU).
24	18	SMF99B_ImgMsuLimit	4	binary	Capacity in millions of service units per hour, which is derived from defined and group capacity.
28	1C	SMF99B_ CecNumberOfPartitions	4	binary	Number of partitions, returned in the output area of the Diagnose 204 hardware instruction.
32	20	SMF99B_ GrpNumberOfPartitions	4	binary	Number of partitions in the same group as this partition.
36	24	SMF99B_AvgUnused	4	binary	Average unused rate in millions of service units per hour. This is a long term average.
40	28		16		Reserved.
56	38	SMF99B_DonatedServiceUnits	4	binary	Indicates that service units have been donated by one or more group members during the last complete five minute intervals.
60	3C	SMF99B_ReceiverWeight	4	binary	The weight accumulated over all receivers of donated service units.
64	40	SMF99B_ImgBaseMsu	4	binary	Capacity in MSU that belongs to this image. The capacity depends on the ratio between the current weight and the group weight.
68	44	SMF99B_ServiceTableIndex	4	binary	Index to the current entry for the SMF99B_ImgService field.
72	48	SMF99B_GroupJoinedTod	8	binary	Timestamp when this LPAR joined its group.
80	50		1244		Reserved.

CEC service data section

The CEC service data section consists of an array containing a variable number of entries. The number of entries is in field SMF99B_CEC_SERVICE_DATA_NUMBER. Each entry contains the following fields:

Offsets		Name	Length	Format	Description
0		SMF99B_ImgName	8	EBCDIC	Name of logical partition.
8	8	SMF99B_ImgSystemName	8	EBCDIC	Image system name as specified in hardware instruction DIAGNOSE 300 or by external means. Value is zero if no system name is declared.
16	10	SMF99B_ImgGroupName	8	EBCDIC	Name of the capacity group. All partitions which have the same CapacityGroupName build the capacity group.
24	18	SMF99B_ImgService	192	binary	Service units accumulated for an image of the CEC.
216	D8	SFM99B_ImgProcessor DispatchTime	8	binary	Sum of processor dispatch times for this logical partition in microseconds. Updated every policy adjustment interval.
224	E0	SMF99B_ImgInitialWght	2	binary	Initial weight of the logical partition.
226	E2	SMF99B_ImgCurrentWght	2	binary	Current weight of the logical partition.
226	E2		4		Reserved.

Subtype 12

Subtype 12 contains HiperDispatch interval data. A set of subtype 12 records is written each policy interval.

Note: In some of the following subtype 12 field descriptions, the term "CPU/core" indicates the applicability of the text, as follows:

- When the multithreading facility is not installed or when the facility is installed but not enabled, the field descriptions relate to logical or physical CPUs.
- When the multithreading facility is installed and enabled, the field descriptions relate to logical or physical cores.

Self-defining section

Offsets		Name	Length	Format	Description
0	0	SMF9912_HD_Int_Hdr_OFFSET	4	binary	Offset to header data section.
4	4	SMF9912_HD_Int_Hdr_LENGTH	2	binary	Length of header data section.
6	6	SMF9912_HD_Int_Hdr_NUMBER	2	binary	Number of header data sections.
8	8	SMF9912_HD_Cap_Hdr_OFFSET	4	binary	Offset to capacity data section.
12	C	SMF9912_HD_Cap_Hdr_LENGTH	2	binary	Length of capacity data section.
14	E	SMF9912_HD_Cap_Hdr_NUMBER	2	binary	Number of capacity data sections.
16	10	SMF9912_HD_Proc_Hdr_OFFSET	4	binary	Offset to processor data section.
20	14	SMF9912_HD_Proc_Hdr_LENGTH	2	binary	Length of processor data section.
22	16	SMF9912_HD_Proc_Hdr_NUMBER	2	binary	Number of processor data sections.

Header data section

Offsets		Name	Length	Format	Description
0	0	SMF99C_VCM_SMF_Sequ	4	binary	HiperDispatch SMF sequence number.
4	4	SMF99C_VCM_ErrorCode	2	binary	HiperDispatch Error Code.
6	6	*	1	binary	Reserved.

Offsets		Name	Length	Format	Description
7	7	SMF99C_VCM_Diag204_ Flags	1	binary	Flags: **Bit** **Meaning when set** **0** LPAR capped by WLM. **1** LPAR capped by customer. **2** Wait completion.
8	8	SMF99C_VCM_Interval_Len	4	binary	Measured interval length in microseconds.
12	C	SMF99C_VCM_LparPhysProcShr	4	binary	LPAR physical processor share for general CPUs/ cores, scaled by 256.
16	10	SMF99C_VCM_Interval_TOD	8	binary	TOD when HiperDispatch code got control. In STCK format.
24	18	SMF99C_VCM_Flags	4	binary	HiperDispatch (HD) status flags.
24	18	SMF99C_VCM_Flag1	1	binary	1st flag byte: **Bit** **Meaning when set** **0** Topology has changed. **1** Rebuild affinity nodes. **2** Honor priority has changed. **3** Dispatcher WUQ errorr. **4** Processor speed change. **5-7** Reserved.
25	19	SMF99C_VCM_Flag2	1	binary	2nd flag byte: **Bit** **Meaning when set** **0** CEC capacities are valid. **1** LPAR capacities are valid. **2** Old VCM state. **3** Reserved. **4** Dispatcher affinity was updated. **5** PTF was issued to initiate a switch into the opposite mode. However, the PTF return info tells us that we are already in the requested mode. **6** VCM is transitioning to/from vertical. **7** Reserved.

Offsets		Name	Length	Format	Description
26	1A	SMF99C_VCM_Flag3	1	binary	3rd flag byte: **Bit** **Meaning when set** **0** Topology facility installed. **1** IFA facility installed. **2** LPAR has only dedicated CPUs/cores. **3** Cross memory set. **4** New container TLE. **5** Reserved. **6** Write TopoChg section. **7** Reserved.
27	1B	SMF99C_VCM_Flag4	1	binary	4th flag byte: **Bit** **Meaning when set** **0** IFA honor priority state of previous interval. **1** SUP honor priority state of previous interval. **2-7** Reserved.
28	1C	*	4	binary	Reserved.
32	20	SMF99C_VCM_DiagMPWQ	16	structure	1st data element of diagnostic MPWQ data array.
48	30		16	structure	2nd data element of diagnostic MPWQ data array.
64	40	SMF99C_VCM_DiagECPX	16	structure	1st data element of diagnostic ECPX data array.
80	50		16	structure	2nd data element of diagnostic ECPX data array.
96	60	SMF99C_MT_Flags	4	binary	HiperDispatch (HD) MT status flags
96	60	SMF99C_MT_Flag1	1	binary	1st MT flag byte: **Bit** **Meaning when set** **0** Processor resource is viewed as a CPU core. **1** Multiple CPUs defined within a CPU core. **2-3** Reserved. **4** HiperDispatch is now ready for MT mode switches. **5-7** Reserved.

Offsets		Name	Length	Format	Description
97	61	SMF99C_MT_Flag2	1	binary	2nd MT flag byte: **Bit** **Meaning when set** **0** MT mode change is pending due to STSI. **1** The supervisor-requested MT reconfiguration is pending. **2** MT mode change is pending due to HISMT recovery. **3** MT mode change is pending due to wait completion status change. **4** MT mode change is pending due to supervisor request. **5-7** Reserved.
98	62	*	2	binary	Reserved.
100	64	SMF99C_VCM_current_state	4	binary	Current HiperDispatch state.
104	68	SMF99C_VCM_previous_state	4	binary	Previous HiperDispatch state.
108	6C	SMF99C_VCM_Restart_Ctr	4	binary	Recovery restart counter.
112	70	SMF99C_VCM _HardwareGroupname	8	EBCDIC	Hardware group name
120	78	*	2	binary	Internal use by IBM

Capacity data section

Offsets		Name	Length	Format	Description
0	0	SMF99C_HD_Int_Cap _ProcType	1	binary	Processor type.
1	1	*	15	binary	Reserved.
16	10	SMF99C_VCM_LparCapsSMF	0	binary	LPAR capacities.
16	10	SMF99C_VCM_LparFlags	1	binary	LPAR Status Flags **Bit** **Meaning when set** **0** The physical CPU/core share matches the number and polarization of the CPUs/cores passed by the topology information. **1** The physical CPU/core share is higher than the number of VHs and VMs passed by the topology info. **2** The physical CPU/core share is lower than the number of VHs and VMs passed by the topology info. **3-7** Reserved.
17	11	*	3	binary	Reserved.
20	14	SMF99C_VCM _MvsBusyDynaThr Unpark	2	binary	Dynamic MvsBusy threshold for unparking, scaled by 16.
22	16	SMF99C_VCM _MvsBusyDynaThrPark	2	binary	Dynamic MvsBusy threshold for parking, scaled by 16.

Offsets		Name	Length	Format	Description
24	18	SMF99C_VCM _MvsBusyThrUnpark	2	binary	MvsBusy threshold for unparking, scaled by 16.
26	1A	SMF99C_VCM _MvsBusyThrPark	2	binary	MvsBusy threshold for parking, scaled by 16.
28	1C	SMF99C_VCM_MvsBusy	4	binary	Average CPU usage, scaled by 16.
32	20	SMF99C_VCM _LparCapUsedAdj	4	binary	Used LPAR capacity in microseconds, adjusted to the scheduled VCM interval length.
36	24	SMF99C_VCM_LparCapUsed	4	binary	Used LPAR capacity in microseconds.
40	28	SMF99C_VCM _LparCapUsedDiscr	4	binary	Used capacity of the non-guaranteed capacity (partially VM and unparked VLs) in microseconds, adjusted to the scheduled VCM interval length.
44	2C	SMF99C_VCM _LparCapUsedVmVl	4	binary	Used capacity on VMs and VLs, adjusted to the scheduled VCM interval length.
48	30	SMF99C_VCM_ LowCECMaxUp	2	binary	Maximum number of VLs unparked if low CEC utilization.
50	32	SMF99C_VCM_ LowCECMvsBusy	2	binary	Park threshold for low CEC utilization, scaled by 16
52	34	SMF99C_VCM_LparCap VmVlUsedLparCap UsedOfAlloc	4	binary	Percentage used of allocated VM + VL capacity, scaled by 256.
56	38	SMF99C_VCM _LparCapVmVlUsedOver Guaran	4	binary	Percentage of guaranteed VM capacity used by VM + VL, scaled by 256.
60	3C	SMF99C_VCM _LparCapAllocVmVl	4	binary	Allocated LPAR capacity on VMs and VLs in microseconds.
64	40	SMF99C_VCM_LparCapAlloc	4	binary	Allocated LPAR capacity in microseconds. The allocated capacity is provided by the guaranteed capacity on VHs and VMs, plus extra capacity on VMs and unparked VLs.
68	44	SMF99C_VCM _LparCapNonGuaran	4	binary	Non guaranteed LPAR capacity in microseconds.
72	48	SMF99C_VCM _LparCapMedGuaran	4	binary	Guaranteed LPAR capacity on VMs in microseconds.
76	4C	SMF99C_VCM_Lpar CapGuaran	4	binary	Guaranteed LPAR capacity in microseconds. This value is calculated from the physical processor share of this LPAR.
80	50	SMF99C_VCM _MvsBusyProjected	4	binary	Projected MvsBusy, scaled by 16.
84	54	SMF99C_VCM _LparUnusedCapShare	4	binary	Unused capacity share of this LPAR in microseconds.
88	58	SMF99C_VCM _LparUnusedCap	4	binary	Unused LPAR capacity in microseconds including the unused capacity share for this LPAR.
92	5C	SMF99C_VCM _CECUtilPark	2	binary	CEC Utilization threshold for parking, scaled by 256.
94	5E	SMF99C_VCM_PUpDispl	2	binary	Park / Unpark displacement, scaled by 16
96	60	SMF99C_VCM_Diag204 _LogInfo	16	binary	LPAR information.
96	60	SMF99C_VCM_D204_TotalW	4	binary	Total LPAR weight.
100	64	SMF99C_VCM_D204 _CurrentW	4	binary	Current LPAR weight.
104	68	SMF99C_VCM_D204 _WrkCurrW	4	binary	Accumulated current LPAR weight.
108	6C	SMF99C_VCM_D204_LCpus	2	binary	Number of logical CPUs/cores for this LPAR.
110	6E	SMF99C_VCM_D204_Flags1	1	binary	LPAR Status flags **Bit** **Meaning when set** **0** LPAR capped by customer per processor type. **1-7** Reserved.
111	6F	*	1	binary	Reserved.

Offsets		Name	Length	Format	Description
112	70	SMF99C_VCM_CPUs	0	binary	CPU/core data.
112	70	SMF99C_VCM_CpuHi	1	binary	Number of VHs.
113	71	SMF99C_VCM_CpuMed	1	binary	Number of VMs.
114	72	SMF99C_VCM_CpuLo	1	binary	Number of VLs.
115	73	SMF99C_VCM_ CpuLoUnparked	1	binary	Number of unparked VLs.
116	74	SMF99C_VCM_ CpuLoParked	1	binary	Number of parked VLs.
117	75	*	11	binary	Reserved.
128	80	SMF99C_VCM_DiagCapAdj	16	binary	Diagnose information capacity adjustment.
128	80	SMF99C_VCM_DiagCapFlags	4	binary	Capacity change flags.
128	80	SMF99C_VCM_Diag CapIncr	2	binary	Capacity increase flags **Bit** **Meaning when set** **0** Adjust capacity increase. **1** Adjust capacity increase by unparking a processor. **2** Unpark request. **3** Unpark all request. **4** Reserved. **5** Unpark requested because the LPAR capacity is below the guaranteed capacity + unused capacity share. **6** PR/SM capped LPAR: Unpark requested because of high VH utilization. **7-15** Reserved.

Offsets		Name	Length	Format	Description
130	82	SMF99C_VCM_DiagCapDecr	2	binary	Capacity decrease flags **Bit** **Meaning when set** **0** Adjust capacity decrease. **1** Adjust capacity decrease by parking a processor. **2** Park requested. **3** Park all request. **4** MvsBusy too low. **5** VL effect too low. **6** Small VM/VL effectiveness. **7** no VM/VL effectiveness. **8** If no VH exists. **9** No capacity decrease adjustment. Reason: Low CEC utilization. **10** PR/SM capped LPAR: Park all. Below zEC12 hardware. **11** PR/SM capped LPAR: Park all. High CEC utilization and no unused LPAR capacity. **12** PR/SM capped LPAR: VH utilization is low. **13** PR/SM capped LPAR: VL effect too low. **14** PR/SM capped LPAR: MVS busy too low. **15** PR/SM capped LPAR: Adjust capacity decrease.
132	84	*	4	binary	Reserved.
136	88	SMF99C_VCM _DiagCapDecr_Cont	1	binary	Capacity decrease flags continuation: **Bit** **Meaning when set** **0** Park all request. Free capacity unpark threshold above upper limit. **1** PR/SM capped LPAR: No capacity decrease adjustment. Reason: Low CEC utilization **2-7** Reserved.
137	89	*	3	binary	Reserved.
140	8C	*	4	binary	Reserved.
144	90	SMF99C_VCM_ CecCapsSMF	0	binary	CEC data.
144	90	SMF99C_VCM_ CecCapTotal	4	binary	Total CEC capacity in microseconds.

Offsets		Name	Length	Format	Description
148	94	SMF99C_VCM_ CecCapUsedAdj	4	binary	CEC capacity used in microseconds, adjusted to the scheduled VCM interval length.
152	98	SMF99C_VCM_ CecCapUsed	4	binary	CEC capacity used in microseconds.
156	9C	SMF99C_VCM_CecCapFree	4	binary	Free CEC capacity in microseconds, adjusted to the scheduled VCM interval length.
160	A0	*	2	binary	Reserved.
162	A2	SMF99C_VCM_CecSharedCps	2	binary	Number of shared CPUs/cores.
164	A4	SMF99C_VCM_ CecCapFreeLimit	2	binary	CEC free limit for unparking, scaled by 256.
166	A6	SMF99C_VCM_CecUtil	2	binary	Total CEC utilization, scaled by 256.
168	A8	SMF99C_VCM _CecTotUnusedCap	4	binary	Total unused capacity of all LPARs in CEC in microseconds. The unused capacity of the requesting LPAR is not included.
172	AC	SMF99C_VCM _CecTotLparWgtAbove Guaran	2	binary	Total weight of all LPARs with a processor demand above guaranteed capacity. The weight of the requesting LPAR is always included.
174	AE	*	2	binary	Reserved.
176	B0	SMF99C_VCM _CecPhysMgmTime	4	binary	Physical LPAR management time of all CPUs/cores in microseconds.
180	B4	SMF99C_VCM _CecPhysMgmTimeAdj	4	binary	Physical LPAR management time of all CPUs/cores, adjusted to the scheduled VCM interval length.
184	B8	*	4	binary	Reserved.
188	BC	*	4	binary	Reserved.
192	C0	SMF99_MT	16	binary	Multithreading data.
192	C0	SMF99C_MT_CF	4	binary	Capacity factor of processor class.
196	C4	SMF99C_MT_mCF	4	binary	Max capacity factor of processor class.
200	C8	SMF99C_MT_Opt_Orig	1	binary	Multithreading mode value.
201	C9	SMF99C_MT_Opt_InUse	1	binary	Multithreading mode value as forced by environment.
202	CA	SMF99C_MT_Curr	1	binary	Multithreading mode currently in use.
203	CB	SMF99C_MT_tgt	1	binary	Multithreading mode target value.
204	CC	*	4	binary	Reserved.
208	D0	SMF99C_VCM_Diag204 _LogInfo _cont	16	binary	LPAR information - continuation.
208	D0	SMF99C_VCM_D204 _CpuTypeCap	4	binary	PR/SM capping limit: **Bit** **Meaning when set** **0** Reserved. **1-31** PR/SM capping limit: Count of hundredths of CPUs/cores units.
208	D0	SMF99C_VCM _D204HardwareGroup CpuTypeCap	4	binary	HW group capping limit. Count of 100ths of proc units.
212	D4	*	8	binary	Reserved.
220	DC	SMF99C_VCM _LparCapsSMF_cont	32	binary	LPAR capacities - continuation.
220	DC	SMF99C_VCM _PRSMCapCecUtilParkAllThr	2	binary	PR/SM capping: CEC utilization park all threshold scaled by 256.
222	DE	SMF99C_VCM _PRSMCapVhUtilThr_max	2	binary	PR/SM capping: VH/VM utilization unpark threshold scaled by 256.

Offsets		Name	Length	Format	Description
224	E0	SMF99C_VCM _PRSMCapVhUtilThr_min	2	binary	PR/SM capping: VH/VM utilization park threshold scaled by 256.
226	E2	*	2	binary	Reserved.
228	E4	SMF99C_VCM _LparCapUsedVHAdj	4	binary	Used VH capacity of previous interval in microseconds.
232	E8	SMF99C_VCM _LparCapUsedVMAdj	4	binary	Used VM capacity of previous interval in microseconds.
236	EC	SMF99C_VCM_VHUtil	2	binary	VH utilization of previous interval scaled by 256.
238	EE	SMF99C_VCM_VMUtil	2	binary	VM utilization of previous interval scaled by 256.
240	F0	SMF99C_VCM_ProjVHMUtil	2	binary	Projected VH utilization (or projected VM utilization if there is no VH in the topology) if one VL would have been parked.
242	F2	*	2	binary	Reserved.
244	F4	*	8	binary	Reserved.
256	100	SMF99C_VCM_ProjVHMUtil	16	binary	Memory affinity data
256	100	SMF99C_VCM_MA-Flgs	1	binary	Memory affinity status **Bit** **Meaning when set** **0** Broken up address spaces are not balanced in consideration of memory affinity aspects **1** No processor topology location crossing **2** Single AFN **3** Memory affinity not supported for this hardware **4** High storage consumer address spaces are not balanced in consideration of memory affinity aspects **5-7** Reserved
257	101	*	1	binary	Reserved
258	102	SMF99C_VCM_HscDynMvsBusyThr	2	binary	Dyanamic MVS busy threshold
260	104	SMF99C_VCM_HdMaHSCT	2	binary	High storage consumer threshold
262	106	SMF99C-VCM_HdTDMU	2	binary	Maximum topology distance value
264	108	*	8	binary	Reserved
272	110	*	72	binary	Internal use by IBM

Processor data section

Offsets		Name	Length	Format	Description
0	0	SMF99C_HD_Int_Proc_Idx	2	binary	HiperDispatch interval processor index.

Offsets		Name	Length	Format	Description
2	2	SMF99C_LCCADSF2	1	binary	Processor flag 1 **Bit** **Meaning when set** **0** Reserved. **1** Processor parked. **2-7** Reserved.
3	3	SMF99C_LCCASCFL	1	binary	Processor flag 2 **Bit** **Meaning when set** **0-6** Reserved. **7** Processor park request pending.
4	4	*	12	HEX	Reserved.

Subtype 13

The information contained in subtype 13 is for IBM internal use only.

Subtype 14

Subtype 14 contains HiperDispatch topology data. Subtype 14 records are written:

- Every five minutes, or
- In the current policy interval, if a HiperDispatch topology change occurred.

Note: In some of the following subtype 14 field descriptions, the term "CPU/core" indicates the applicability of the text, as follows:

- When the multithreading facility is not installed or when the facility is installed but not enabled, the field descriptions relate to logical or physical CPUs.
- When the multithreading facility is installed and enabled, the field descriptions relate to logical or physical cores.

Self-defining section

Offsets		Name	Length	Format	Description
0	0	SMF9914_HD_TopoChg _Hdr_OFFSET	4	binary	Offset to header data section.
4	4	SMF9914_HD_TopoChg _Hdr_LENGTH	2	binary	Length of header data section.
6	6	SMF9914_HD_TopoChg _Hdr_NUMBER 2	2	binary	Number of header data sections.
8	8	*	4	binary	Reserved.
12	C	*	2	binary	Reserved.
14	E	*	2	binary	Reserved.
16	10	SMF9914_HD_TopoChg _CPU_OFFSET	4	binary	Offset to processor data section.
20	14	SMF9914_HD_TopoChg _CPU_LENGTH	2	binary	Length of processor data section.
22	16	SMF9914_HD_TopoChg _CPU_NUMBER	2	binary	Number of processor data sections.

Offsets		Name	Length	Format	Description
24	18	SMF9914_HD_TopoChg _Node_OFFSET	4	binary	Offset to node data section.
28	1C	SMF9914_HD_TopoChg _Node_LENGTH	2	binary	Length of node data section.
30	1E	SMF9914_HD_TopoChg _Node_NUMBER	2	binary	Number of node data sections.
32	29	SMF9914_HD_TopoChg _MPWQ_OFFSET	4	binary	Offset to MPWQ data section.
36	24	SMF9914_HD_TopoChg _MPWQ_LENGTH	2	binary	Length of MPWQ data section.
38	26	SMF9914_HD_TopoChg _MPWQ_NUMBER	2	binary	Number of MPWQ data sections.
40	28	SMF9914_HD_TopoChg _MPWQ_HNODE_ OFFSET	4	binary	Offset to MPWQ HNODE data section.
44	2C	SMF9914_HD_TopoChg _MPWQ_HNODE_ LENGTH	2	binary	Length of MPWQ HNODE data section.
46	2E	SMF9914_HD_TopoChg _MPWQ_HNODE_ NUMBER	2	binary	Number of MPWQ HNODE data sections.

Header data section

Offsets		Name	Length	Format	Description
0	0	SMF99E_VCM_SMF_Sequ	4	binary	Balancer interval sequence number.
4	4	SMF99E_VCM_Flag1	1	binary	Balancer interval flag1 **Bit** **Meaning when set** **0** Topology has changed. **1** Rebuild affinity nodes **2** Honour priority has changed. **3** Dispatcher WUQ error. **4** Processor speed change. **5-7** Reserved.

Offsets		Name	Length	Format	Description
5	5	SMF99E_VCM_Flag2	1	binary	Balancer interval flag2 **Bit** **Meaning when set** **0** CEC capacities are valid. **1** LPAR capacities are valid. **2** Old VCM state. **3** Reserved. **4** Dispatcher affinity was updated. **5** PTF was issued to initiate a switch opposite mode. However, the PTF return info tells us that we are already in the requested mode. **6** VCM in transition to/from vertical. **7** Reserved.
6	6	SMF99E_VCM_ErrorCode	2	binary	VCM error code.
8	8	*	3	binary	Reserved.
11	B	SMF99E_VCM_CpsPerAN	1	binary	CPUs/cores per affinity node.
12	C	SMF99E_VCM_LparPhysProcShr	4	binary	LPAR physical processor share for general CPUs/cores, scaled by 256.
16	10	SMF99E_VCM_MaxAffinityIndex	2	binary	Maximum affinity index the system supports for the life of the IPL.
18	12	SMF99E_VCM_MaxCpuIdForIPL	2	binary	Maximum CPU ID/core ID the system supports activating for the life of the IPL.
20	14	SMF99E_VCM_HwLevel	4	binary	HW level.
24	18	SMF99E_VCM_CURRTOPO_TOD	8	binary	Timestamp of the STSI returned SYSIB 15.1.*x* information which is currently used by HiperDispatch.
32	20	*	8	binary	Reserved.

Processor data section

Offsets		Name	Length	Format	Description
0	0	SMF99E_HD_TopoChg_CPU _Index	2	binary	Logical CPU/core number.
2	2	*	6	HEX	Reserved.
8	8	SMF99E_CP_CPU_Array	8	binary	CPU/core data.
8	8	SMF99E_CP_Cpu_Type	1	binary	CPU/core type.

Offsets		Name	Length	Format	Description
9	9	SMF99E_CP_Misc	1	binary	CPU/core miscellaneous info **Bit** **Meaning when set** **0-5** Reserved. **6-7** CPU/core polarization.
10	A	SMF99E_CP_Topo	2	binary	CPU/core topology information.
10	A	SMF99E_CP_ChipID	1	binary	Chip ID.
11	B	SMF99E_CP_BookID	1	binary	Book ID.
12	C	SMF99E_CP_Cap	4	binary	CPU/core capacity in microseconds.
16	10	SMF99E_CP_CI	8	binary	CPU/core container information of configuration topology.
16	10	SMF99E_CP_CI_NlInUse	1	binary	Number of highest nesting level in use in array SMF99E_CP_CI_NL. 0 = there is no container information available in SMF99E_CP_CI_NL.
17	11	SMF99E_CP_CI_Flags	1	binary	Flags: **Bit** **Meaning when set** **0** No CPU topology information available in SMF99E_CP_Topo **1-7** Reserved.
18	12	SMF99E_CP_CI_NL	6	binary	CPU container information of the configuration topology per nesting level
18	12	SMF99E_CP_CI_NL1	1	binary	Container ID of nesting level 1
19	13	SMF99E_CP_CI_NL2	1	binary	Container ID of nesting level 2
20	14	SMF99E_CP_CI_NL3	1	binary	Container ID of nesting level 3
21	15	SMF99E_CP_CI_NL4	1	binary	Container ID of nesting level 4
22	16	SMF99E_CP_CI_NL5	1	binary	Container ID of nesting level 5
23	17	*	1	HEX	Reserved.

Node data section

Offsets		Name	Length	Format	Description
0	0	SMF99E_HD_TopoChg_Node_Index	2	binary	Node number.
2	2	*	6	HEX	Reserved.
8	8	SMF99E_AN_Array	0	binary	Affinity node data .
8	8	SMF99E_AN_Node	8	binary	Affinity node.
8	8	SMF99E_AN_CpuType	1	binary	CPU/core type.
9	9	*	1	binary	Reserved.
10	A	SMF99E_AN_CpuCounts	6	binary	CPU/core counts.
10	A	SMF99E_AN_PolarHi	2	binary	Number of VHs in this affinity node.
12	C	SMF99E_AN_PolarMed	2	binary	Number of VMs in this affinity node.
14	E	SMF99E_AN_PolarLow	2	binary	Number of VLs in this affinity node.
16	10	SMF99E_AN_Info	4	binary	Affinity node info.
16	10	SMF99E_AN_Topo	2	binary	CPU/core topology information.
16	10	SMF99E_AN_ChipID	1	binary	Chip ID.
17	11	SMF99E_AN_BookID	1	binary	Book ID.
18	12	*	1	binary	Reserved.

Offsets		Name	Length	Format	Description
19	13	SMF99E_AN_Flags	1	binary	Flags **Bit** **Meaning when set** **0** CPUs/cores on this node are boundary crossing. **1** Helper nodes are boundary crossing. **2-7** Reserved.
20	14	SMF99E_AN_Cap	4	binary	Capacity of affinity node in microseconds.
24	18	SMF99E_AN_CI	8	binary	CPU/core container information of configuration topology.
24	18	SMF99E_AN_CI_NlInUse	1	binary	Number of highest nesting level in use in array SMF99E_AN_CI_NL. 0 = there is no container information available in SMF99E_AN_CI_NL.
25	19	SMF99E_AN_CI_Flags	1	binary	Flags: **Bit** **Meaning when set** **0** No CPU topology information available in SMF99E_AN_Topo. **1-7** Reserved.
26	1A	SMF99E_AN_CI_NL	6	binary	CPU/core container information of the configuration topology per nesting level.
26	1A	SMF99E_AN_CI_NL1	1	binary	Container ID of nesting level 1
27	1B	SMF99E_AN_CI_NL2	1	binary	Container ID of nesting level 2
28	1C	SMF99E_AN_CI_NL3	1	binary	Container ID of nesting level 3
29	1D	SMF99E_AN_CI_NL4	1	binary	Container ID of nesting level 4
30	1E	SMF99E_AN_CI_NL5	1	binary	Container ID of nesting level 5
31	1F	*	1	HEX	Reserved.

MPWQ CPU/core data section

Offsets		Name	Length	Format	Description
0	0	SMF99E_HD_TopoChg _MPWQ_CPU_ Index	2	binary	MPWQ CPU/core Number.
2	2	SMF99E_MPWQ_Affinity _Node	1	binary	Affinity node this CPU/core belongs to.
3	3	SMF99E_MPWQ_Share	1	binary	CPU/core share.

MPWQ HNode data section

Offsets		Name	Length	Format	Description
0	0	SMF99E_HD_TopoChg _MPWQ_Node_Index	2	binary	MPWQ Node Number.
2	2	SMF99E_MPWQ_Affinity _Node_Help_ Sum	2	binary	Affinity node crossing index block.
2	2	SMF99E_MPWQ_Drawer _Crossing_Index	1	binary	Drawer crossing index.
3	3	*	1	binary	Reserved.
4	4	SMF99E_MPWQ_Help_Nodes	44	binary	Helper nodes array of this affinity node. Consists of 44 one-byte data elements. Only the first 44 helper nodes are supported.

Offsets		Name	Length	Format	Description
48	30	SMF99E_MPWQ_Affinity _Node_Help_Sum_Cont	7	binary	Continuation of affinity node crossing index block.
48	30	SMF99E_MPWQ_ContCrossIndex	5	binary	Container crossing index array.
48	30	SMF99E_MPWQ_ContCrossIndex_NL1	1	binary	Container crossing index of nesting level 1.
49	31	SMF99E_MPWQ_ContCrossIndex_NL2	1	binary	Container crossing index of nesting level 2.
50	32	SMF99E_MPWQ_ContCrossIndex_NL3	1	binary	Container crossing index of nesting level 3.
51	33	SMF99E_MPWQ_ContCrossIndex_NL4	1	binary	Container crossing index of nesting level 4.
52	34	SMF99E_MPWQ_ContCrossIndex_NL5	1	binary	Container crossing index of nesting level 5.
53	35	SMF99E_MPWQ_HighestContCross	1	binary	Highest container crossing for cores assigned to this affinity node.
54	36	*	1	binary	Reserved.

Record type 100 (X'64') — Db2 Statistics

IBM Db2® writes record type 100 to record transaction data collected at event monitoring points. For more information about record type 100, see the appropriate edition of *IBM DB2 for z/OS Managing Performance* for your version of Db2.

Record type 101 (X'65') — Db2 Accounting

IBM Db2 writes record type 101 to account for resources during a transaction. For more information about record type 101, see the appropriate edition of *IBM DB2 for z/OS Managing Performance* for your version of Db2.

Record type 102 (X'66') — Db2 Performance

IBM Db2 writes record type 102 to record performance information. For more information about record type 102, see the appropriate edition of *IBM DB2 for z/OS Managing Performance* for your version of Db2.

Record type 103 (X'67') — IBM HTTP Server

IBM HTTP Server - Powered by Apache writes record type 103 subtypes 13 and 14 to record configuration and performance information. For more information about these records, see the IBM HTTP Server 8.5.5 in IBM Documentation (www.ibm.com/docs/en/ibm-http-server/8.5.5) or later.

Record type 104 (X'68') — RMF Distributed Platform Performance Data

This record type serves as a container for performance measurement data collected by RMF XP from non z/OS platforms. The following subtype ranges are defined to contain data for the supported platforms:

Subtype 1-12
: performance data from AIX® on System p

Subtype 20-31
: performance data from Linux on System x

Subtype 40-53
: performance data from Linux on IBM z Systems

Subtype descriptions

One specific subtype is used to collect one individual CIM metric category according to the CIM data model on the affected platform. The CIM metric category, in return, is mapped to the resource models used by RMF XP on the supported platforms. For example, metrics from the CIM metric category AIX_ActiveMemoryExpansion are related to metrics from the ACTIVE_MEMORY_EXPANSION resource that is used by RMF XP for AIX on System p.

Table 20. Mapping of CIM Metric Categories to RMF XP Resource Types

CIM Metric Categories	**RMF XP Resource Types**
AIX on System p	
AIX_ActiveMemoryExpansion	ACTIVE_MEMORY_EXPANSION
AIX_Processor	LOGICAL_PROCESSOR
AIX_ComputerSystem	PARTITION
AIX_Disk	DISK
AIX_NetworkPort	NETWORK_PORT
AIX_FileSystem	LOCAL_FILE_SYSTEM
AIX_Memory	MEMORY
AIX_OperatingSystem	AIX_IMAGE
AIX_Process	PROCESS
AIX_SharedEthernetAdapter	SHARED_ETHERNET_ADAPTER
AIX_ActiveMemorySharing	ACTIVE_MEMORY_SHARING
AIX_VirtualTargetDevice	VIRTUAL_TARGET_DEVICE
Linux on System x	
Linux_IPProtocolEndpoint	IP_PROTOCOL_ENDPOINT
Linux_LocalFileSystem	LOCAL_FILE_SYSTEM
Linux_NetworkPort	NETWORK_PORT
Linux_OperatingSystem	XLINUX_IMAGE
Linux_Processor	LOGICAL_PROCESSOR
Linux_UnixProcess	PROCESS
Linux_Storage	DISK
Linux_KVM	KVM_GUEST
Linux_Xen	XEN_GUEST
Linux on IBM z Systems	
Linux_IPProtocolEndpoint	IP_PROTOCOL_ENDPOINT
Linux_LocalFileSystem	LOCAL_FILE_SYSTEM
Linux_NetworkPort	NETWORK_PORT
Linux_OperatingSystem	ZLINUX_IMAGE
Linux_Processor	LOGICAL_PROCESSOR

Table 20. Mapping of CIM Metric Categories to RMF XP Resource Types (continued)	
CIM Metric Categories	**RMF XP Resource Types**
Linux_UnixProcess	PROCESS
Linux_Storage	DISK
Linux_zCEC	CEC
Linux_zLPAR	LPAR
Linux_zChannel	CHANNEL
Linux_zECKD	VOLUME

See *z/OS RMF Reporter Programmer's Guide* for the documentation of the RMF XP resource models.

AIX on System p

Performance data for AIX on System p is collected in the following subtypes:

Subtype 1
AIX_ActiveMemoryExpansionMetrics

Subtype 2
AIX_ProcessorMetrics

Subtype 3
AIX_ComputerSystemMetrics

Subtype 4
AIX_DiskMetrics

Subtype 5
AIX_NetworkPortMetrics

Subtype 6
AIX_FileSystemMetrics

Subtype 7
AIX_MemoryMetrics

Subtype 8
AIX_OperatingSystemMetrics

Subtype 9
AIX_ProcessMetrics

Subtype 10
AIX_SharedEthernetAdapterMetrics

Subtype 11
AIX_ActiveMemorySharingMetrics

Subtype 12
AIX_VirtualTargetDeviceMetrics

Linux on System x

Performance data for Linux on System x is collected in the following subtypes:

Subtype 20
Linux_IPProtocolEndpointMetrics

Subtype 21
Linux_LocalFileSystemMetrics

Subtype 22
Linux_NetworkPortMetrics

Subtype 23
Linux_OperatingSystemMetrics

Subtype 24
Linux_ProcessorMetrics

Subtype 25
Linux_UnixProcessMetrics

Subtype 26
Linux_StorageMetrics

Subtype 30
Linux_KVMMetrics

Subtype 31
Linux_XenMetrics

Linux on z Systems

Performance data for Linux on IBM z Systems is collected in the following subtypes:

Subtype 40
Linux_IPProtocolEndpointMetrics

Subtype 41
Linux_LocalFileSystemMetrics

Subtype 42
Linux_NetworkPortMetrics

Subtype 43
Linux_OperatingSystemMetrics

Subtype 44
Linux_ProcessorMetrics

Subtype 45
Linux_UnixProcessMetrics

Subtype 46
Linux_StorageMetrics

Subtype 50
Linux_zCECMetrics

Subtype 51
Linux_zLPARMetrics

Subtype 52
Linux_zChannelMetrics

Subtype 53
Linux_zECKDMetrics

Record environment

The following conditions exist for the generation of this record:

Macro
SMFWTM (record exit: IEFU83)

Mode
Task

Storage Residency
31-bit

Security Notice

To write SMF record type 104, the GPM4CIM started task needs at least READ access to the BPX.SMF profile of the FACILITY class, specified with your system authorization facility (SAF) product. The following is an example for RACF, where GPMSERVE is the user ID which is assigned to the GPM4CIM started task:

```
RDEFINE FACILITY BPX.SMF UACC(NONE)
PERMIT BPX.SMF CLASS(FACILITY) ID(GPMSERVE) ACCESS(READ)
SETROPTS RACLIST(FACILITY) REFRESH
```

Record Mappings

Header/Self-defining Section

The following content is common to all records of type 104, independent of the subtype.

Offsets		Name	Length	Format	Description
Common header for SMF record type 104					
0	0	SMF104LEN	2	binary	Record length. This field and the next field (total of four bytes) form the RDW (record descriptor word). See "Standard and Extended SMF record headers" on page 162 for a detailed description.
2	2	SMF104SEG	2	binary	Segment descriptor (see record length field).
4	4	SMF104FLG	1	binary	System indicator: **Bit** **Meaning when set** **0** New record format **1** Subtypes used **2** Reserved **3-6** Version indicators* **7** System is running in PR/SM mode *See "Standard and Extended SMF record headers" on page 162 for a detailed description.
5	5	SMF104RTY	1	binary	Record type 104 (X'68').
6	6	SMF104TME	4	binary	Time since midnight, in hundredths of a second, that the record was moved into the SMF buffer.
10	A	SMF104DTE	4	packed	Date when the record was moved into the SMF buffer, in the form 0*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for a detailed description.
14	E	SMF104SID	4	EBCDIC	System identification (from the SMFPRMxx SID parameter).
18	12	SMF104SSI	4	EBCDIC	Subsystem identification (GPM).
22	16	SMF104STY	2	binary	Record subtype.
24	18	SMF104TRN	2	binary	Number of triplets in this record. A triplet is a set of three SMF fields (offset/length/number values) that defines a section of the record. The offset is the offset from the RDW.
26	1A		2		Reserved.
28	1C	SMF104PRS	4	binary	Offset to RMF XP product section from the RDW.
32	20	SMF104PRL	2	binary	Length of RMF XP product section.

Offsets		Name	Length	Format	Description
34	22	SMF104PRN	2	binary	Number of RMF XP product sections.
Header extension for all subtypes					
36	24	SMF104ICS	4	binary	Offset to image control section from the RDW.
40	28	SMF104ICL	2	binary	Length of image control section.
42	2A	SMF104ICN	2	binary	Number of image control sections.
44	2C	SMF104MES	4	binary	Offset to metric section from the RDW.
48	30	SMF104MEL	2	binary	Length of metric section.
50	32	SMF104MEN	2	binary	Total number of metric sections.

RMF XP product section

Offsets		Name	Length	Format	Description
0	0	SMF104MFV	2	packed	RMF version number.
2	2	SMF104PRD	8	EBCDIC	Product name (***RMF XP***).
10	A	SMF104IST	4	packed	Time that the RMF XP measurement interval started, in the form 0*hhmmssF*, where *hh* is the hours, *mm* is the minutes, *ss* is the seconds, and *F* is the sign.
14	E	SMF104DAT	4	packed	Date when the RMF measurement interval started, in the form 0*cyydddF*. See “Standard and Extended SMF record headers” on page 162 for a detailed description.
18	12	SMF104INT	4	packed	Duration of RMF measurement interval, in the form *mmsstttF*, where *mm* is the minutes, *ss* is the seconds, *ttt* is the milliseconds, and *F* is the sign. The end of the measurement interval is the sum of the recorded start time and this field.
22	16	SMF104LGO	8	binary	Offset GMT to local time (STCK format).
30	1E		2		Reserved.
32	20	SMF104XPL	2	binary	RMF XP functionality level.
34	22	SMF104CPX	24	EBCDIC	System complex name, specified with the COMPLEX parameter in the *cfg4A|X|Z* configuration file.
58	3A	SMF104OSL	8	EBCDIC	Operating system label served by RMF XP (AIX or LINUX).
66	42	SMF104PLT	2	binary	Platform type served by RMF XP: **0** AIX on IBM Power Systems **1** Linux on System x **2** Linux on z Systems®
68	44	SMF104MVS	8	EBCDIC	z/OS software level for the current system (consists of an acronym and the version, release, and modification level - ZV*vvrrmm*).
76	4C	SMF104XNM	8	EBCDIC	Sysplex name of the current sysplex as defined in parmlib member COUPLE*xx*.
84	54	SMF104SNM	8	EBCDIC	System name for the current system as defined in parmlib member IEASYS*xx* SYSNAME parameter.

Image Control Section

One Image Control Section is produced for each system returning any metric value.

Offsets		Name	Length	Format	Description
0	0	SMF104MIM	64	EBCDIC	Name of this monitored image, extracted from the CIM metrics collection.
64	40	SMF104TIM	14	EBCDIC	Timestamp in the format *yyyymmddhhmmss*, extracted from the CIM metrics collection.
78	4E	SMF104DUR	14	EBCDIC	Interval duration in the format *yyyymmddhhmmss*, extracted from the CIM metrics collection.
92	5C	SMF104CIM	64	EBCDIC	Name of the image where the CIM server is running, specified with the IMAGE parameter in the *cfg4A|X|Z* configuration file.
156	9C	SMF104OST	4	EBCDIC	Operating system type where the CIM server is running, extracted from the OSType attribute of the CIM_Operating_System instance: **9** AIX **36** Linux
160	A0	SMF104OSV	64	EBCDIC	Operating system version where the CIM server is running, extracted from the version attribute of the CIM_Operating_System instance.
224	E0	SMF104CTZ	4	EBCDIC	Current time zone, extracted from the CurrentTimeZone attribute of the CIM_Operating_System instance. This value represents the GMT offset in minutes.
228	E4	SMF104MIND	2	binary	Index of first metric section associated with this monitored image.
230	E6	SMF104MNUM	2	binary	Number of metric sections associated with this monitored image.

Subtypes 1 - 12 for AIX on System p

Subtypes 1 - 12 of record type 104 contain metrics from systems running with AIX on System p. The description column of the record fields shows (in parenthesis) the name of the corresponding metric in the AIX resource model used by RMF XP.

Subtype 1 — AIX_ActiveMemoryExpansionMetrics

Offsets		Name	Length	Format	Description
0	0	R10401MNAME	64	EBCDIC	Name of measured element, extracted from the MeasuredElementName attribute of the CIM_BaseMetricValue instance.
64	40	R10401CMCP	8	floating	Percentage of CPU consumed by memory compression. (CompressMemCPUPercentage)
72	48	R10401CMPPG	8	floating	Number of physical pages in the compressed pool. (CompressedMemPoolPages)
80	50	R10401CMPP	8	floating	Percentage of true memory used for the compressed pool. (CompressedMemPoolPercentage)
88	58	R10401CMPS	8	floating	Size of the compressed memory pool in megabytes. (CompressedMemPoolSize)
96	60	R10401CMEF	8	floating	Current percentage of expanded memory in use for this LPAR. (CurrentMemExpFactor)
104	68	R10401DS	8	floating	Deficit memory size between target size and actual size. (DeficitSize)

Offsets		Name	Length	Format	Description
112	70	R10401EMS	8	floating	Size of expanded memory for this LPAR in megabytes. (ExpMemSize)
120	78	R10401MM	8	floating	Current memory mode. The value can be: **0** Shared **1** Dedicated **2** Expanded (MemoryMode)
128	80	R10401PIR	8	floating	Rate of page-in operations per second from the compressed pool to the uncompressed pool. (PageInRate)
136	88	R10401POR	8	floating	Rate of page-out operations per second from the uncompressed pool to the compressed pool. (PageOutRate)
144	90	R10401TMEF	8	floating	Target percentage of expanded memory in use for this LPAR. (TargetMemExpFactor)
152	98	R10401TMS	8	floating	Size of true memory for this LPAR in megabytes. (TrueMemSize)

Subtype 2 — AIX_ProcessorMetrics

Offsets		Name	Length	Format	Description
0	0	R10402MNAME	64	EBCDIC	Name of measured element, extracted from the MeasuredElementName attribute of the CIM_BaseMetricValue instance.
64	40	R10402TCTP	8	floating	Percentage of time where the processor was active during the interval. (TotalCPUTimePercentage)
72	48	R10402TICTP	8	floating	Percentage of time where the processor was idle during the interval. (TotalIdleCPUTimePercentage)
80	50	R10402TKCTP	8	floating	Percentage of time where the processor was active in kernel mode during the interval. (TotalKernCPUTimePercentage)
88	58	R10402TUCTP	8	floating	Percentage of time where the processor was active in user mode during the interval. (TotalUserCPUTimePercentage)
96	60	R10402TWCTP	8	floating	Percentage of time where the processor was in a wait condition during the interval. (TotalWaitCPUTimePercentage)

Subtype 3 — AIX_ComputerSystemMetrics

Offsets		Name	Length	Format	Description
0	0	R10403MNAME	64	EBCDIC	Name of measured element, extracted from the MeasuredElementName attribute of the CIM_BaseMetricValue instance.

Offsets		Name	Length	Format	Description
64	40	R10403AVP	8	floating	Number of active virtual processors. (ActiveVirtualProcessors)
72	48	R10403EVIP	8	floating	Percentage of the entitled processing capacity idle. (ExternalViewIdlePercentage)
80	50	R10403EVKMP	8	floating	Percentage of the entitled processing capacity used while running in kernel mode. (ExternalViewKernelModePercentage)
88	58	R10403EVTCP	8	floating	Percentage of the entitled processing capacity used. The value is the sum of ExternalViewUserModePercentage and ExternalViewKernelModePercentage. (ExternalViewTotalCPUPercentage)
96	60	R10403EVUMP	8	floating	Percentage of the entitled processing capacity used while running in user mode. (ExternalViewUserModePercentage)
104	68	R10403NOPCU	8	floating	Number of online physical CPUs used by this LPAR. (NumberOfPhysicalCPUsUtilized)
112	70	R10403PDCUP	8	floating	Percentage of the entitled capacity consumed. Percentage of the CPU capacity defined to this operating system container that is actually used, not counting any idle time. (PartitionDefinedCapacityUsedPercentage)
120	78	R10403PCUP	8	floating	Percentage of the physical computation unit available to this LPAR. (PhysicalComputationUnitPercentage)
128	80	R10403TOLSC	8	floating	Time since last boot operation in milliseconds. (TimeOfLastStateChange)
136	88	R10403UGCC	8	floating	CPU time not used on the lowest level of virtualization layer (nearest to the hardware) this operating system is running in and shareable between two or more OS containers. (UnusedGlobalCPUCapacity)
144	90	R10403UPCC	8	floating	CPU Time in milliseconds reserved exclusively for this OS container but not used. (UnusedPartitionCPUCapacity)

Subtype 4 — AIX_DiskMetrics

Offsets		Name	Length	Format	Description
0	0	R10404MNAME	64	EBCDIC	Name of measured element, extracted from the MeasuredElementName attribute of the CIM_BaseMetricValue instance.
64	40	R10404ATP	8	floating	Percentage of time the disk was processing requests. (ActiveTimePercentage)
72	48	R10404AS	8	floating	Free portion of the disk in megabytes. (AvailableSpace)
80	50	R10404ADU	8	floating	Percentage of time the disk spent servicing transfers in relation to the time the disk was active. (AverageDeviceUtilization)

Offsets		Name	Length	Format	Description
88	58	R10404CAP	8	floating	Total size of the disk in megabytes. (Capacity)
96	60	R10404IOI	8	floating	Indicator for the disk utilization. The value represents the product of the ResponseTime multiplied with the RequestRate. (IOIntensity)
104	68	R10404QD	8	floating	Average number of requests on the instantaneous wait queue. (QueueDepth)
112	70	R10404RO	8	floating	Number of transfers from the disk. (ReadOperations)
120	78	R10404RT	8	floating	Average number of bytes read per second from the disk. (ReadThroughput)
128	80	R10404RR	8	floating	Number of I/O requests per second. (RequestRate)
136	88	R10404RTM	8	floating	Average response time per I/O request including service time and wait time. (ResponseTime)
144	90	R10404TO	8	floating	Number of transfers. The value is the sum of ReadOperations and WriteOperations. (TransferredOperations)
152	98	R10404TT	8	floating	Average number of bytes transferred per second. The value is the sum of ReadThroughput and WriteThroughput. (TransferredThroughput)
160	A0	R10404WT	8	floating	Average wait time per I/O request. (WaitTime)
168	A8	R10404WO	8	floating	Number of transfers to the disk. (WriteOperations)
176	B0	R10404WTP	8	floating	Average number of bytes written to disk per second. (WriteThroughput)

Subtype 5 — AIX_NetworkPortMetrics

Offsets		Name	Length	Format	Description
0	0	R10405MNAME	64	EBCDIC	Name of measured element, extracted from the MeasuredElementName attribute of the CIM_BaseMetricValue instance.
64	40	R10405BR	8	floating	Bytes received for this interface. (BytesReceived)
72	48	R10405BT	8	floating	Bytes transmitted for this interface. (BytesTransmitted)
80	50	R10405ER	8	floating	Average number of errors per second for this interface. (ErrorRate)
88	58	R10405KRR	8	floating	Kilobytes received per second for this interface. (KbsReceivedRate)

Offsets		Name	Length	Format	Description
96	60	R10405KTHR	8	floating	Kilobytes transmitted and received per second for this interface. (KbsThroughoutRate)
104	68	R10405KTR	8	floating	Kilobytes transmitted per second for this interface. (KbsTransmittedRate)
112	70	R10405NPUP	8	floating	The number of packets transmitted and received for this interface divided by the total number of packets transmitted and received by the system. (NetworkPortUtilizationPercentage)
120	78	R10405PR	8	floating	Number of packets received for this interface. (PacketsReceived)
128	80	R10405PRR	8	floating	Number of packets received per second for this interface. (PacketsReceivedRate)
136	88	R10405PT	8	floating	Number of packets transmitted for this interface. (PacketsTransmitted)
144	90	R10405PTR	8	floating	Number of packets transmitted per second for this interface. (PacketsTransmittedRate)

Subtype 6 — AIX_FileSystemMetrics

Offsets		Name	Length	Format	Description
0	0	R10406MNAME	64	EBCDIC	Name of measured element, extracted from the MeasuredElementName attribute of the CIM_BaseMetricValue instance.
64	40	R10406AS	8	floating	Available space for this filesystem in megabytes. (AvailableSpace)
72	48	R10406TS	8	floating	Total space for this filesystem in megabytes. (TotalSpace)
80	50	R10406US	8	floating	Used space for this filesystem in megabytes. (UsedSpace)

Subtype 7 — AIX_MemoryMetrics

Offsets		Name	Length	Format	Description
0	0	R10407MNAME	64	EBCDIC	Name of measured element, extracted from the MeasuredElementName attribute of the CIM_BaseMetricValue instance.
64	40	R10407AVM	8	floating	Current number of active pages in virtual memory. (ActiveVirtualMemory)
72	48	R10407FSPI	8	floating	Number of page-in operations per second from the filesystem. (FileSystemPageIn)
80	50	R10407FSPO	8	floating	Number of page-out operations per second to the filesystem. (FileSystemPageOut)
88	58	R10407MUP	8	floating	Average percentage of memory utilized during the interval. (MemoryUtilizationPercentage)

Offsets		Name	Length	Format	Description
96	60	R10407PFM	8	floating	Number of page-faults per second. (PageFaultMemory)
104	68	R10407PSI	8	floating	Number of page-in operations per second from the pagingspace. (PageSpaceIn)
112	70	R10407PSO	8	floating	Number of page-out operations per second from the pagingspace. (PageSpaceOut)
120	78	R10407PSM	8	floating	Number of page-stealing operations per second. (PageStealMemory)

Subtype 8 — AIX_OperatingSystemMetrics

Offsets		Name	Length	Format	Description
0	0	R10408MNAME	64	EBCDIC	Name of measured element, extracted from the MeasuredElementName attribute of the CIM_BaseMetricValue instance.
64	40	R10408CCI	8	floating	CPU time consumed by this operating system divided by CPU time which could have been used by the operating system within the interval. The value of this metric is between 0 (no CPU time consumed) and 1 (all entitled CPU capacity used). (CPUConsumptionIndex)
72	48	R10408CSR	8	floating	Number of context switches per second. (ContextSwitchRate)
80	50	R10408EVKMP	8	floating	Percentage of CPU resources used by this operating system in kernel mode in relation to the CPU capacity for the LPAR without taking capping effects or competition with other workloads into account. (ExternalViewKernelModePercentage)
88	58	R10408EVTCP	8	floating	Percentage of CPU resources used by this operating system. The value is the sum of ExternalViewUserModePercentage and ExternalViewKernelModePercentage. (ExternalViewTotalCPUPercentage)
96	60	R10408EVUMP	8	floating	Percentage of CPU resources used by this operating system in user mode in relation to the CPU capacity for the LPAR without taking capping effects or competition with other workloads into account. (ExternalViewUserModePercentage)
104	68	R10408FPM	8	floating	Amount of currently unused physical memory. (FreePhysicalMemory)
112	70	R10408FSIPF	8	floating	Amount of virtual memory that can be swapped out into paging files or block devices. (FreeSpaceInPagingFiles)
120	78	R10408FVM	8	floating	Amount of currently unused virtual memory. (FreeVirtualMemory)
128	80	R10408HIR	8	floating	Number of hardware interrupts per second. (HardwareInterruptRate)
136	88	R10408IVIP	8	floating	Percentage of time the operating system was idle. (InternalViewIdlePercentage)

Offsets		Name	Length	Format	Description
144	90	R10408IVKMP	8	floating	Percentage of CPU time spent in kernel mode by the operating system. (InternalViewKernelModePercentage)
152	98	R10408IVTCP	8	floating	Percentage of CPU time spent by the operating system. (InternalViewTotalCPUPercentage)
160	A0	R10408IVUMP	8	floating	Percentage of CPU time spent in user mode by the operating system. (InternalViewUserModePercentage)
168	A8	R10408KMT	8	floating	Total CPU time the operating system spent in kernel mode. (KernelModeTime)
176	B0	R10408LA	8	floating	Average number of dispatchable units in the ready queue, not counting any idle tasks. A currently running unit is counted as dispatchable unit as well. (LoadAverage)
184	B8	R10408NOP	8	floating	Number of processes currently loaded or running in the operating system. Kernel threads are not taken into account. (NumberOfProcesses)
192	C0	R10408NOU	8	floating	Number of user sessions for which the operating system is currently storing state information. If the same user is logged in several times, each session is counted. (NumberOfUsers)
200	C8	R10408PIR	8	floating	Average number of pages paged in per second. (PageInRate)
208	D0	R10408POR	8	floating	Average number of pages paged out per second. (PageOutRate)
216	D8	R10408SIR	8	floating	Number of software interrupts per second. (SoftwareInterruptRate)
224	E0	R10408TCT	8	floating	Sum of KernelModeTime and UserModeTime, that is, the total CPU time spent in user mode or kernel mode. (TotalCPUTime)
232	E8	R10408UMT	8	floating	Total CPU time the operating system spent in user mode. (UserModeTime)

Subtype 9 — AIX_ProcessMetrics

Offsets		Name	Length	Format	Description
0	0	R10409MNAME	64	EBCDIC	Name of measured element, extracted from the MeasuredElementName attribute of the CIM_BaseMetricValue instance.
64	40	R10409AKMT	8	floating	CPU time used by this process in kernel mode since process creation. (AccumulatedKernelModeTime)
72	48	R10409ATCT	8	floating	Sum of AccumulatedUserModeTime and AccumulatedKernelModeTime for this process. (AccumulatedTotalCPUTime)

Offsets		Name	Length	Format	Description
80	50	R10409AUMT	8	floating	CPU time used by this process in user mode since process creation. (AccumulatedUserModeTime)
88	58	R10409EVKMP	8	floating	CPU resources used by this process in kernel mode in relation to the CPU capacity available on a higher level of virtualization. (ExternalViewKernelModePercentage)
96	60	R10409EVTCP	8	floating	CPU resources used by this process in relation to the CPU capacity available on a higher level of virtualization. The value is the sum of ExternalViewUserModePercentage and ExternalViewKernelModePercentage for this process. (ExternalViewTotalCPUPercentage)
104	68	R10409EVUMP	8	floating	CPU resources used by this process in user mode in relation to the CPU capacity available on a higher level of virtualization. (ExternalViewUserModePercentage)
112	70	R10409IVKMP	8	floating	CPU time spent for this process in kernel mode in relation to the total CPU time spent for the system in kernel mode. (InternalViewKernelModePercentage)
120	78	R10409IVTCP	8	floating	Total CPU time spent for this process in relation to the total CPU time spent for the system. The value is the sum of InternalViewUserModePercentage and InternalViewKernelModePercentage for this process. (InternalViewTotalCPUPercentage)
128	80	R10409IVUMP	8	floating	CPU time spent for this process in user mode in relation to the total CPU time spent for the system in user mode. (InternalViewUserModePercentage)
136	88	R10409KMT	8	floating	CPU time spent in kernel mode by this process. (KernelModeTime)
144	90	R10409MNOOF	8	floating	Maximum number of open files for this process. (MaxNumberOfOpenFiles)
152	98	R10409PIR	8	floating	Average number of pages paged in per second on behalf of this process. (PageInRate)
160	A0	R10409RSS	8	floating	Physical memory size for this process. (ResidentSetSize)
168	A8	R10409SS	8	floating	Integral shared memory size for this process. (SharedSize)
176	B0	R10409TCT	8	floating	Sum of UserModeTime and KernelModeTime for this process. (TotalCPUTime)
184	B8	R10409UMT	8	floating	CPU time spent in user mode by this process. (UserModeTime)
192	C0	R10409VS	8	floating	Virtual memory size for this process. (VirtualSize)

Subtype 10 — AIX_SharedEthernetAdapterMetrics

Offsets		Name	Length	Format	Description
0	0	R10410MNAME	64	EBCDIC	Name of measured element, extracted from the MeasuredElementName attribute of the CIM_BaseMetricValue instance.
64	40	R10410BIR	8	floating	Bytes received rate for this shared ethernet adapter. (ByteInRate)
72	48	R10410BOR	8	floating	Bytes sent rate for this shared ethernet adapter. (ByteOutRate)
80	50	R10410PIR	8	floating	Packets received rate for this shared ethernet adapter. (PacketInRate)
88	58	R10410POR	8	floating	Packets sent rate for this shared ethernet adapter. (PacketOutRate)
96	60	R10410TR	8	floating	Transfer rate for this shared ethernet adapter. (TransferedRate)

Subtype 11 — AIX_ActiveMemorySharingMetrics

Offsets		Name	Length	Format	Description
0	0	R10411MNAME	64	EBCDIC	Name of measured element, extracted from the MeasuredElementName attribute of the CIM_BaseMetricValue instance.
64	40	R10411AMSE	8	floating	Indicator if active memory sharing is enabled (1) or not (0). (ActiveMemorySharingEnabled)
72	48	R10411HPI	8	floating	Number of hypervisor page-in operations. (HypervsrPageIn)
80	50	R10411HPIT	8	floating	Time waiting for hypervisor page-in operations in milliseconds. (HypervsrPageInTime)
88	58	R10411LP	8	floating	Policy of loan memory in response to hypervisor requests. The value can be off (0), default (1) or aggressive (2). (LoanPolicy)
96	60	R10411LMS	8	floating	Amount of logical memory currently loaned to the hypervisor in megabytes. (LoanedMemSize)
104	68	R10411MPS	8	floating	Amount of memory in the shared memory pool in megabytes. (MemPoolSize)
112	70	R10411MIOME	8	floating	Minimum I/O memory entitlement for this LPAR in megabytes. (MinIOMemEntitlement)
120	78	R10411TIOME	8	floating	Total I/O memory entitlement for this LPAR in megabytes. (TotalIOMemEntitlement)
128	80	R10411UIOME	8	floating	Used I/O memory entitlement for this LPAR in megabytes. (UsedIOMemEntitlement)

Subtype 12 — AIX_VirtualTargetDeviceMetrics

Offsets		Name	Length	Format	Description
0	0	R10412MNAME	64	EBCDIC	Name of measured element, extracted from the MeasuredElementName attribute of the CIM_BaseMetricValue instance.
64	40	R10412KRR	8	floating	Read rate per second for this virtual target device. (KbsReadRate)
72	48	R10412KWR	8	floating	Write rate per second for this virtual target device. (KbsWriteRate)
80	50	R10412TR	8	floating	Average number of transmissions per second for this virtual target device. (TransferRate)

Subtypes 20 - 31 for Linux on System x

Subtypes 20 - 31 of record type 104 contain metrics from systems running with Linux on System x. The description column of the record fields shows (in parenthesis) the name of the corresponding metric in the Linux on System x resource model used by RMF XP.

Subtype 20 — Linux_IPProtocolEndpointMetrics

Offsets		Name	Length	Format	Description
0	0	R10420MNAME	64	EBCDIC	Name of measured element, extracted from the MeasuredElementName attribute of the CIM_BaseMetricValue instance.
64	40	R10420BR	8	floating	Number of bytes received on this IP protocol endpoint during the interval. (BytesReceived)
72	48	R10420BT	8	floating	Number of bytes transmitted on this IP protocol endpoint during the interval. (BytesTransmitted)
80	50	R10420ER	8	floating	Average number of errors per second during the interval. This includes errors that occurred during transmitting and receiving and recovered errors as well as unrecovered errors. (ErrorRate)
88	58	R10420PR	8	floating	Total number of packets received on this IP protocol endpoint during the interval. (PacketsReceived)
96	60	R10420PT	8	floating	Total number of packets transmitted on this IP protocol endpoint during the interval. (PacketsTransmitted)
104	68	R10420PRR	8	floating	Average number of packets received per second on this IP protocol endpoint during the interval. (PacketReceiveRate)
112	70	R10420PTR	8	floating	Average number of packets transmitted per second on this IP protocol endpoint during the interval. (PacketTransmitRate)
120	78	R10420BRR	8	floating	Average number of bytes received per second on this IP protocol endpoint during the interval. (ByteReceiveRate)

Offsets		Name	Length	Format	Description
128	80	R10420BTR	8	floating	Average number of bytes transmitted per second on this IP protocol endpoint during the interval. (ByteTransmitRate)
136	88	R10420RDR	8	floating	Average number of received packets dropped per second on this IP protocol endpoint during the interval. (ReceiveDropRate)
144	90	R10420RPD	8	floating	Number of received packets dropped on this IP protocol endpoint during the interval. (ReceivePacketsDropped)
152	98	R10420TDR	8	floating	Average number of transmitted packets dropped per second on this IP protocol endpoint during the interval. (TransmitDropRate)
160	A0	R10420TPD	8	floating	Number of transmitted packets dropped on this IP protocol endpoint during the interval. (TransmitPacketsDropped)

Subtype 21 — Linux_LocalFileSystemMetrics

Offsets		Name	Length	Format	Description
0	0	R10421MNAME	64	EBCDIC	Name of measured element, extracted from the MeasuredElementName attribute of the CIM_BaseMetricValue instance.
64	40	R10421AS	8	floating	Amount of free space for the file system. (AvailableSpace)
72	48	R10421ASP	8	floating	Percentage of free space for the file system. (AvailableSpacePercentage)

Subtype 22 — Linux_NetworkPortMetrics

Offsets		Name	Length	Format	Description
0	0	R10422MNAME	64	EBCDIC	Name of measured element, extracted from the MeasuredElementName attribute of the CIM_BaseMetricValue instance.
64	40	R10422BR	8	floating	Number of bytes received on this network port during the interval including any protocol overhead such as framing characters, headers and trailers. (BytesReceived)
72	48	R10422BT	8	floating	Number of bytes transmitted on this network port during the interval including any protocol overhead such as framing characters, headers and trailers. (BytesTransmitted)
80	50	R10422ER	8	floating	Average number of network errors per second during the interval. This includes errors that occurred during transmitting and receiving, and recovered errors as well as unrecovered errors. (ErrorRate)

Subtype 23 — Linux_OperatingSystemMetrics

Offsets		Name	Length	Format	Description
0	0	R10423MNAME	64	EBCDIC	Name of measured element, extracted from the MeasuredElementName attribute of the CIM_BaseMetricValue instance.
64	40	R10423CCI	8	floating	CPU time consumed by this operating system, divided by CPU time which could have been used by the operating system within the interval. The value of this metric is between 0 (no CPU time consumed) and 1 (all entitled CPU capacity used). (CPUConsumptionIndex)
72	48	R10423CSR	8	floating	Number of context switches per second. Scheduler efficiency is one major bottleneck for highly scalable server images. This metric shows how demanding a workload is with regard to the operating system scheduler. (ContextSwitchRate)
80	50	R10423EVKMP	8	floating	Percentage of CPU resources used by this operating system in kernel mode in relation to the CPU capacity of the virtual server without taking capping effects or competition with other workloads into account. (ExternalViewKernelModePercentage)
88	58	R10423EVTCP	8	floating	Percentage of CPU resources used by this operating system in relation to the CPU capacity of the virtual server without taking capping effects or competition with other partitions into account. (ExternalViewTotalCPUPercentage)
96	60	R10423EVUMP	8	floating	Percentage of CPU resources used by this operating system in user mode in relation to the CPU capacity of the virtual server without taking capping effects or competition with other workloads into account. (ExternalViewUserModePercentage)
104	68	R10423FPM	8	floating	Amount of physical memory currently unused and available. In a virtualized environment this is the free memory available to the operating system. (FreePhysicalMemory)
112	70	R10423FSIPF	8	floating	Amount of virtual memory that can be mapped into the operating system's paging files without causing any used pages to be purged from the paging files. If an operating system does not support paging, a value of zero is returned. (FreeSpaceInPagingFiles)
120	78	R10423FVM	8	floating	Amount of virtual memory currently unused and available. (FreeVirtualMemory)
128	80	R10423HIR	8	floating	Number of hardware interrupts per second. (HardwareInterruptRate)
136	88	R10423IVIP	8	floating	Percentage of time this operating system was idle (OS view). Idle is the CPU time spent looking for work. In a virtual environment, idle time can be used by other operating systems running on the same physical server. (InternalViewIdlePercentage)
144	90	R10423IVKMP	8	floating	Percentage of CPU resources used in kernel mode by this operating system. (InternalViewKernelModePercentage)

Offsets		Name	Length	Format	Description
152	98	R10423IVTCP	8	floating	Percentage of CPU resources used by this operating system. (InternalViewTotalCPUPercentage)
160	A0	R10423IVUMP	8	floating	Percentage of CPU resources used in user mode by this operating system. (InternalViewUserModePercentage)
168	A8	R10423KMT	8	floating	CPU time the operating system spent in kernel mode during the interval. (KernelModeTime)
176	B0	R10423LA	8	floating	Average number of dispatchable units in the ready queue, not counting any idle tasks. A currently running unit is counted as dispatchable unit as well. (LoadAverage)
184	B8	R10423NOP	8	floating	Number of process contexts currently loaded or running on the operating system. (NumberOfProcesses)
192	C0	R10423NOU	8	floating	Number of user sessions for which the operating system is currently storing state information. If the same user is logged on several times, each session is counted separately. (NumberOfUsers)
200	C8	R10423PIR	8	floating	Average number of pages paged in per second. (PageInRate)
208	D0	R10423POR	8	floating	Average number of pages paged out per second. (PageOutRate)
216	D8	R10423SSIPF	8	floating	Number of kilobytes that can be stored in the operating system's paging files. This number does not represent the actual physical size of the paging file on disk. A value of zero indicates that there are no paging files. (SizeStoredInPagingFiles)
224	E0	R10423TCT	8	floating	CPU time the operating system spent during the interval. The value is the sum of KernelModeTime and UserModeTime and does not include any idle time. (TotalCPUTime)
232	E8	R10423TVIRMS	8	floating	Number of kilobytes of virtual memory. This value is the sum of total physical memory and the amount of paging space. (TotalVirtualMemorySize)
240	F0	R10423TVISMS	8	floating	Total amount of physical memory available to the operating system. This value does not necessarily indicate the true amount of physical memory, but indicates the amount that is reported as being available to the operating system. (TotalVisibleMemorySize)
248	F8	R10423UMT	8	floating	CPU time the operating system spent in user mode during the interval. (UserModeTime)
256	100	R10423UPM	8	floating	Amount of physical memory currently in use. (UsedPhysicalMemory)
264	108	R10423UVM	8	floating	Amount of virtual memory currently in use. (UsedVirtualMemory)

Offsets		Name	Length	Format	Description
272	110	R10423IOWT	8	floating	CPU time the operating system spent waiting for I/O during the interval. (IOWaitTime)
280	118	R10423CSC	8	floating	Accumulated number of context switches. Scheduler efficiency is one major bottleneck for highly scalable server images. This metric shows how demanding a workload is with regard to the operating system scheduler. (ContextSwitchCounter)
288	120	R10423HIC	8	floating	Accumulated number of hardware interrupts. (HardwareInterruptCounter)
296	128	R10423LC	8	floating	Accumulated number of dispatchable units in the ready queue, not counting any idle tasks. A currently running unit is counted as dispatchable unit as well. (LoadCounter)
304	130	R10423PIC	8	floating	Accumulated number of pages paged in. (PageInCounter)
312	138	R10423POC	8	floating	Accumulated number of pages paged out. (PageOutCounter)

Subtype 24 — Linux_ProcessorMetrics

Offsets		Name	Length	Format	Description
0	0	R10424MNAME	64	EBCDIC	Name of measured element, extracted from the MeasuredElementName attribute of the CIM_BaseMetricValue instance.
64	40	R10424TCTP	8	floating	Percentage of time where the CPU was not idle. (TotalCPUTimePercentage)

Subtype 25 — Linux_UnixProcessMetrics

Offsets		Name	Length	Format	Description
0	0	R10425MNAME	64	EBCDIC	Name of measured element, extracted from the MeasuredElementName attribute of the CIM_BaseMetricValue instance.
64	40	R10425AKMT	8	floating	CPU time in kernel mode spent for this process since process creation. (AccumulatedKernelModeTime)
72	48	R10425ATCT	8	floating	CPU time spent for this process since process creation. (AccumulatedTotalCPUTime)
80	50	R10425AUMT	8	floating	CPU time in user mode spent for this process since process creation. (AccumulatedUserModeTime)
88	58	R10425EVKMP	8	floating	Percentage of CPU resources used in kernel mode by this process in relation to the CPU capacity available on a higher level of virtualization. (ExternalViewKernelModePercentage)

Offsets		Name	Length	Format	Description
96	60	R10425EVTCP	8	floating	Percentage of CPU resources used by this process in relation to the CPU capacity available on a higher level of virtualization. The value is the sum of ExternalViewUserModePercentage and ExternalViewKernelModePercentage for this process. (ExternalViewTotalCPUPercentage)
104	68	R10425EVUMP	8	floating	Percentage of CPU resources used by this process in user mode in relation to the CPU capacity available on a higher level of virtualization. (ExternalViewUserModePercentage)
112	70	R10425IVKMP	8	floating	CPU time spent for this process in kernel mode in relation to the total CPU time spent for the system in kernel mode. (InternalViewKernelModePercentage)
120	78	R10425IVTCP	8	floating	Total CPU time spent for this process in relation to the total CPU time spent for the system. The value is the sum of InternalViewUserModePercentage and InternalViewKernelModePercentage for this process. (InternalViewTotalCPUPercentage)
128	80	R10425IVUMP	8	floating	CPU time spent for this process in user mode in relation to the total CPU time spent for the system in user mode. (InternalViewUserModePercentage)
136	88	R10425KMT	8	floating	CPU time the process consumed in kernel mode during the interval. (KernelModeTime)
144	90	R10425PIR	8	floating	Number of pages paged in per second on behalf of this process. (PageInRate)
152	98	R10425POR	8	floating	Number of pages paged out per second on behalf of this process. (PageOutRate)
160	A0	R10425RSS	8	floating	Amount of physical memory used by this process. Any memory currently paged out is not included in this number. (ResidentSetSize)
168	A8	R10425SS	8	floating	Number of bytes this process shares with other processes like dynamic link libraries. (SharedSize)
176	B0	R10425TCT	8	floating	CPU time the process consumed during the interval. This value is the sum of KernelModeTime and UserModeTime and does not include any idle time. (TotalCPUTime)
184	B8	R10425UMT	8	floating	CPU time the process consumed in user mode during the interval. (UserModeTime)
192	C0	R10425VS	8	floating	The size of the virtual memory used by this process. (VirtualSize)
200	C8	R10425PIC	8	floating	Accumulated number of pages paged in on behalf of this process. (PageInCounter)
208	D0	R10425POC	8	floating	Accumulated number of pages paged out on behalf of this process. (PageOutCounter)

Subtype 26 — Linux_StorageMetrics

Offsets		Name	Length	Format	Description
0	0	R10426MNAME	64	EBCDIC	Name of measured element, extracted from the MeasuredElementName attribute of the CIM_BaseMetricValue instance.
64	40	R10426CAP	8	floating	Total Capacity of the device in bytes. (Capacity)
72	48	R10426RD	8	floating	Number of kilobytes read from the device during the interval. (Read)
80	50	R10426WR	8	floating	Number of kilobytes written to the device during the interval. (Write)

Subtype 30 — Linux_KVMMetrics

Offsets		Name	Length	Format	Description
0	0	R10430MNAME	64	EBCDIC	Name of measured element, extracted from the MeasuredElementName attribute of the CIM_BaseMetricValue instance.
64	40	R10430AVP	8	floating	Number of active virtual processors for this domain. (ActiveVirtualProcessors)
72	48	R10430EVTCTP	8	floating	Percentage of CPU resources used by this domain during the interval. If power management or hyper-threading are used, the content of this metric may be wrong. The metric is derived from TotalCPUTime and ActiveVirtualProcessors. (ExternalViewTotalCPUTimePercentage)
80	50	R10430HFPM	8	floating	Host physical memory currently not claimed by any domain. (HostFreePhysicalMemory)
88	58	R10430HMP	8	floating	Percentage of overall physical memory claimed by this domain. (HostMemoryPercentage)
96	60	R10430PMATVS	8	floating	Memory currently claimed by this domain. Note that a domain may ask the hypervisor for more memory if under memory pressure. (PhysicalMemoryAllocatedToVirtualSystem)
104	68	R10430PMATVSP	8	floating	Percentage of memory currently claimed by this domain in relation to the defined maximum. (PhysicalMemoryAllocatedToVirtualSystemPercentage)
112	70	R10430TMEVTCTP	8	floating	Percentage of CPU resources used by this domain during the most recent 10 minute interval. (TenMinuteExternalViewTotalCPUTimePercentage)
120	78	R10430TMTCT	8	floating	CPU time spent for this domain during the most recent 10 minute interval. (TenMinuteTotalCPUTime)
128	80	R10430TCT	8	floating	CPU time spent for this domain during the interval. (TotalCPUTime)
136	88	R10430BC	8	floating	Total capacity of the first block device for this domain in bytes. (BlockCapacity)

Offsets		Name	Length	Format	Description
144	90	R10430BR	8	floating	Number of kilobytes read from the first block device for this domain during the interval. (BlockRead)
152	98	R10430BW	8	floating	Number of kilobytes written to the first block device for this domain during the interval. (BlockWrite)
160	A0	R10430CRTC	8	floating	Accumulated CPU idle time in microseconds for this domain. (CPUReadyTimeCounter)
168	A8	R10430CUTC	8	floating	Accumulated CPU busy time in microseconds for this domain. (CPUUsedTimeCounter)
176	B0	R10430VSS	8	floating	Current state of this domain. The value can be one of the following: **0** nostate **1** running **2** blocked **3** paused **4** shutdown **5** shutoff **6** crashed **7** suspended (VirtualSystemState)

Subtype 31 — Linux_XenMetrics

Offsets		Name	Length	Format	Description
0	0	R10431MNAME	64	EBCDIC	Name of measured element, extracted from the MeasuredElementName attribute of the CIM_BaseMetricValue instance.
64	40	R10431AVP	8	floating	Number of active virtual processors for this domain. (ActiveVirtualProcessors)
72	48	R10431EVTCTP	8	floating	Percentage of CPU resources used by this domain during the interval. If power management or hyper-threading are used, the content of this metric may be wrong. The metric is derived from TotalCPUTime and ActiveVirtualProcessors. (ExternalViewTotalCPUTimePercentage)
80	50	R10431HFPM	8	floating	Host physical memory currently not claimed by any domain. (HostFreePhysicalMemory)
88	58	R10431HMP	8	floating	Percentage of overall physical memory claimed by this domain. (HostMemoryPercentage)
96	60	R10431PMATVS	8	floating	Memory currently claimed by this domain. Note that a domain may ask the hypervisor for more memory if under memory pressure. (PhysicalMemoryAllocatedToVirtualSystem)

Offsets		Name	Length	Format	Description
104	68	R10431PMATVSP	8	floating	Percentage of memory currently claimed by this domain in relation to the defined maximum. (PhysicalMemoryAllocatedToVirtualSystemPercentage)
112	70	R10431TMEVTCTP	8	floating	Percentage of CPU resources used by this domain during the most recent 10 minute interval. (TenMinuteExternalViewTotalCPUTimePercentage)
120	78	R10431TMTCT	8	floating	CPU time spent for this domain during the most recent 10 minute interval. (TenMinuteTotalCPUTime)
128	80	R10431TCT	8	floating	CPU time spent for this domain during the interval. (TotalCPUTime)

Subtypes 40 - 53 for Linux on z Systems

Subtypes 40 - 53 of record type 104 contain metrics from systems running with Linux on IBM z Systems. The description column of the record fields shows (in parenthesis) the name of the corresponding metric in the Linux on z Systems resource model used by RMF XP.

Subtype 40 — Linux_IPProtocolEndpointMetrics

Offsets		Name	Length	Format	Description
0	0	R10440MNAME	64	EBCDIC	Name of measured element, extracted from the MeasuredElementName attribute of the CIM_BaseMetricValue instance.
64	40	R10440BR	8	floating	Number of bytes received on this IP protocol endpoint during the interval. (BytesReceived)
72	48	R10440BT	8	floating	Number of bytes transmitted on this IP protocol endpoint during the interval. (BytesTransmitted)
80	50	R10440ER	8	floating	Average number of errors per second during the interval. This includes errors that occurred during transmitting and receiving and recovered errors as well as unrecovered errors. (ErrorRate)
88	58	R10440PR	8	floating	Total number of packets received on this IP protocol endpoint during the interval. (PacketsReceived)
96	60	R10440PT	8	floating	Total number of packets transmitted on this IP protocol endpoint during the interval. (PacketsTransmitted)
104	68	R10440PRR	8	floating	Average number of packets received per second on this IP protocol endpoint during the interval. (PacketReceiveRate)
112	70	R10440PTR	8	floating	Average number of packets transmitted per second on this IP protocol endpoint during the interval. (PacketTransmitRate)
120	78	R10440BRR	8	floating	Average number of bytes received per second on this IP protocol endpoint during the interval. (ByteReceiveRate)

Offsets		Name	Length	Format	Description
128	80	R10440BTR	8	floating	Average number of bytes transmitted per second on this IP protocol endpoint during the interval. (ByteTransmitRate)
136	88	R10440RDR	8	floating	Average number of received packets dropped per second on this IP protocol endpoint during the interval. (ReceiveDropRate)
144	90	R10440RPD	8	floating	Number of received packets dropped on this IP protocol endpoint during the interval. (ReceivePacketsDropped)
152	98	R10440TDR	8	floating	Average number of transmitted packets dropped per second on this IP protocol endpoint during the interval. (TransmitDropRate)
160	A0	R10440TPD	8	floating	Number of transmitted packets dropped on this IP protocol endpoint during the interval. (TransmitPacketsDropped)

Subtype 41 — Linux_LocalFileSystemMetrics

Offsets		Name	Length	Format	Description
0	0	R10441MNAME	64	EBCDIC	Name of measured element, extracted from the MeasuredElementName attribute of the CIM_BaseMetricValue instance.
64	40	R10441AS	8	floating	Amount of free space for the file system. (AvailableSpace)
72	48	R10441ASP	8	floating	Percentage of free space for the file system. (AvailableSpacePercentage)

Subtype 42 — Linux_NetworkPortMetrics

Offsets		Name	Length	Format	Description
0	0	R10442MNAME	64	EBCDIC	Name of measured element, extracted from the MeasuredElementName attribute of the CIM_BaseMetricValue instance.
64	40	R10442BR	8	floating	Number of bytes received on this network port during the interval including any protocol overhead such as framing characters, headers, and trailers. (BytesReceived)
72	48	R10442BT	8	floating	Number of bytes transmitted on this network port during the interval including any protocol overhead such as framing characters, headers, and trailers. (BytesTransmitted)
80	50	R10442ER	8	floating	Average number of network errors per second during the interval. This includes errors that occurred during transmitting and receiving, and recovered errors as well as unrecovered errors. (ErrorRate)

Subtype 43 — Linux_OperatingSystemMetrics

Offsets		Name	Length	Format	Description
0	0	R10443MNAME	64	EBCDIC	Name of measured element, extracted from the MeasuredElementName attribute of the CIM_BaseMetricValue instance.
64	40	R10443CCI	8	floating	CPU time consumed by this operating system divided by CPU time which could have been used by the operating system within the interval. The value of this metric is between 0 (no CPU time consumed) and 1 (all entitled CPU capacity used). (CPUConsumptionIndex)
72	48	R10443CSR	8	floating	Number of context switches per second. Scheduler efficiency is one major bottleneck for highly scalable server images. This metric shows how demanding a workload is with regard to the operating system scheduler. (ContextSwitchRate)
80	50	R10443EVKMP	8	floating	Percentage of CPU resources used by this operating system in kernel mode in relation to the CPU capacity of the virtual server without taking capping effects or competition with other workloads into account. (ExternalViewKernelModePercentage)
88	58	R10443EVTCP	8	floating	Percentage of CPU resources used by this operating system in relation to the CPU capacity of the virtual server without taking capping effects or competition with other partitions into account. (ExternalViewTotalCPUPercentage)
96	60	R10443EVUMP	8	floating	Percentage of CPU resources used by this operating system in user mode in relation to the CPU capacity of the virtual server without taking capping effects or competition with other workloads into account. (ExternalViewUserModePercentage)
104	68	R10443FPM	8	floating	Amount of physical memory currently unused and available. In a virtualized environment this is the free memory available to the operating system. (FreePhysicalMemory)
112	70	R10443FSIPF	8	floating	Amount of virtual memory that can be mapped into the operating system's paging files without causing any used pages to be purged from the paging files. If an operating system does not support paging, a value of zero is returned. (FreeSpaceInPagingFiles)
120	78	R10443FVM	8	floating	Amount of virtual memory currently unused and available. (FreeVirtualMemory)
128	80	R10443HIR	8	floating	Number of hardware interrupts per second. (HardwareInterruptRate)
136	88	R10443IVIP	8	floating	Percentage of time this operating system was idle (OS view). Idle is the CPU time spent looking for work. In a virtual environment, idle time can be used by other operating systems running on the same physical server. (InternalViewIdlePercentage)
144	90	R10443IVKMP	8	floating	Percentage of CPU resources used in kernel mode by this operating system. (InternalViewKernelModePercentage)

Offsets		Name	Length	Format	Description
152	98	R10443IVTCP	8	floating	Percentage of CPU resources used by this operating system. (InternalViewTotalCPUPercentage)
160	A0	R10443IVUMP	8	floating	Percentage of CPU resources used in user mode by this operating system. (InternalViewUserModePercentage)
168	A8	R10443KMT	8	floating	CPU time the operating system spent in kernel mode during the interval. (KernelModeTime)
176	B0	R10443LA	8	floating	Average number of dispatchable units in the ready queue, not counting any idle tasks. A currently running unit is counted as dispatchable unit as well. (LoadAverage)
184	B8	R10443NOP	8	floating	Number of process contexts currently loaded or running on the operating system. (NumberOfProcesses)
192	C0	R10443NOU	8	floating	Number of user sessions for which the operating system is currently storing state information. If the same user is logged on several times, each session is counted separately. (NumberOfUsers)
200	C8	R10443PIR	8	floating	Average number of pages paged in per second. (PageInRate)
208	D0	R10443POR	8	floating	Average number of pages paged out per second. (PageOutRate)
216	D8	R10443SSIPF	8	floating	Number of kilobytes that can be stored in the operating system's paging files. This number does not represent the actual physical size of the paging file on disk. A value of zero indicates that there are no paging files. (SizeStoredInPagingFiles)
224	E0	R10443TCT	8	floating	CPU Time the operating system spent during the interval. The value is the sum of KernelModeTime and UserModeTime and does not include any idle time. (TotalCPUTime)
232	E8	R10443TVIRMS	8	floating	Number of kilobytes of virtual memory. This value is the sum of total physical memory and the amount of paging space. (TotalVirtualMemorySize)
240	F0	R10443TVISMS	8	floating	Total amount of physical memory available to the operating system. This value does not necessarily indicate the true amount of physical memory, but indicates the amount that is reported as being available to the operating system. (TotalVisibleMemorySize)
248	F8	R10443UMT	8	floating	CPU time the operating system spent in user mode during the interval. (UserModeTime)
256	100	R10443UPM	8	floating	Amount of physical memory currently in use (UsedPhysicalMemory)
264	108	R10443UVM	8	floating	Amount of virtual memory currently in use. (UsedVirtualMemory)

Offsets		Name	Length	Format	Description
272	110	R10443IOWT	8	floating	CPU time the operating system spent waiting for I/O during the interval. (IOWaitTime)
280	118	R10443CSC	8	floating	Accumulated number of context switches. Scheduler efficiency is one major bottleneck for highly scalable server images. This metric shows how demanding a workload is with regard to the operating system scheduler. (ContextSwitchCounter)
288	120	R10443HIC	8	floating	Accumulated number of hardware interrupts.. (HardwareInterruptCounter)
296	128	R10443LC	8	floating	Accumulated number of dispatchable units in the ready queue, not counting any idle tasks. A currently running unit is counted as dispatchable unit as well. (LoadCounter)
304	130	R10443PIC	8	floating	Accumulated number of pages paged in. (PageInCounter)
312	138	R10443POC	8	floating	Accumulated number of pages paged out. (PageOutCounter)

Subtype 44 — Linux_ProcessorMetrics

Offsets		Name	Length	Format	Description
0	0	R10444MNAME	64	EBCDIC	Name of measured element, extracted from the MeasuredElementName attribute of the CIM_BaseMetricValue instance.
64	40	R10444TCTP	8	floating	Percentage of time where the CPU was not idle. (TotalCPUTimePercentage)

Subtype 45 — Linux_UnixProcessMetrics

Offsets		Name	Length	Format	Description
0	0	R10445MNAME	64	EBCDIC	Name of measured element, extracted from the MeasuredElementName attribute of the CIM_BaseMetricValue instance.
64	40	R10445AKMT	8	floating	CPU time in kernel mode spent for this process since process creation. (AccumulatedKernelModeTime)
72	48	R10445ATCT	8	floating	CPU time spent for this process since process creation. (AccumulatedTotalCPUTime)
80	50	R10445AUMT	8	floating	CPU time in user mode spent for this process since process creation. (AccumulatedUserModeTime)
88	58	R10445EVKMP	8	floating	Percentage of CPU resources used in kernel mode by this process in relation to the CPU capacity available on a higher level of virtualization. (ExternalViewKernelModePercentage)

Offsets		Name	Length	Format	Description
96	60	R10445EVTCP	8	floating	Percentage of CPU resources used by this process in relation to the CPU capacity available on a higher level of virtualization. The value is the sum of ExternalViewUserModePercentage and ExternalViewKernelModePercentage for this process. (ExternalViewTotalCPUPercentage)
104	68	R10445EVUMP	8	floating	Percentage of CPU resources used by this process in user mode in relation to the CPU capacity available on a higher level of virtualization. (ExternalViewUserModePercentage)
112	70	R10445IVKMP	8	floating	CPU time spent for this process in kernel mode in relation to the total CPU time spent for the system in kernel mode. (InternalViewKernelModePercentage)
120	78	R10445IVTCP	8	floating	Total CPU time spent for this process in relation to the total CPU time spent for the system. The value is the sum of InternalViewUserModePercentage and InternalViewKernelModePercentage for this process. (InternalViewTotalCPUPercentage)
128	80	R10445IVUMP	8	floating	CPU time spent for this process in user mode in relation to the total CPU time spent for the system in user mode. (InternalViewUserModePercentage)
136	88	R10445KMT	8	floating	CPU time the process consumed in kernel mode during the interval. (KernelModeTime)
144	90	R10445PIR	8	floating	Number of pages paged in per second on behalf of this process. (PageInRate)
152	98	R10445POR	8	floating	Number of pages paged out per second on behalf of this process. (PageOutRate)
160	A0	R10445RSS	8	floating	Amount of physical memory used by this process. Any memory currently paged out is not included in this number. (ResidentSetSize)
168	A8	R10445SS	8	floating	Number of bytes this process shares with other processes like dynamic link libraries. (SharedSize)
176	B0	R10445TCT	8	floating	CPU time the process consumed during the interval. This value is the sum of KernelModeTime and UserModeTime and does not include any idle time. (TotalCPUTime)
184	B8	R10445UMT	8	floating	CPU time the process consumed in user mode during the interval. (UserModeTime)
192	C0	R10445VS	8	floating	The size of the virtual memory used by this process. (VirtualSize)
200	C8	R10445PIC	8	floating	Accumulated number of pages paged in on behalf of this process. (PageInCounter)
208	D0	R10445POC	8	floating	Accumulated number of pages paged out on behalf of this process. (PageOutCounter)

Subtype 46 – Linux_StorageMetrics

Offsets		Name	Length	Format	Description
0	0	R10446MNAME	64	EBCDIC	Name of measured element, extracted from the MeasuredElementName attribute of the CIM_BaseMetricValue instance.
64	40	R10446CAP	8	floating	Total Capacity of the device in bytes. (Capacity)
72	48	R10446RD	8	floating	Number of kilobytes read from the device during the interval. (Read)
80	50	R10446WR	8	floating	Number of kilobytes written to the device during the interval. (Write)

Subtype 50 — Linux_zCECMetrics

Offsets		Name	Length	Format	Description
0	0	R10450MNAME	64	EBCDIC	Name of measured element, extracted from the MeasuredElementName attribute of the CIM_BaseMetricValue instance.
64	40	R10450EVKMP	8	floating	Capacity-based CPU percentage of CEC CPU resources used by PR/SM LPAR hypervisor to do the virtualization. (ExternalViewKernelModePercentage)
72	48	R10450EVTCP	8	floating	Capacity-based total CPU percentage on CEC level. The percentage the physical CPU resources of the CEC were not idle. (ExternalViewTotalCPUPercentage)
80	50	R10450EVUMP	8	floating	Capacity-based CPU percentage of CEC CPU resources used by the hosted virtual servers. (ExternalViewUserModePercentage)
88	58	R10450KMT	8	floating	Sum of all LPAR management times for the CEC. (KernelModeTime)
96	60	R10450TCT	8	floating	Total CPU time spent for all z Systems LPARs. (TotalCPUTime)
104	68	R10450UGCC	8	floating	Entitled CPU time not used on this CEC. (UnusedGlobalCPUCapacity)
112	70	R10450UMT	8	floating	Total CPU time spent in user mode for all z Systems LPARs. (UserModeTime)

Subtype 51 — Linux_zLPARMetrics

Offsets		Name	Length	Format	Description
0	0	R10451MNAME	64	EBCDIC	Name of measured element, extracted from the MeasuredElementName attribute of the CIM_BaseMetricValue instance.
64	40	R10451AVP	8	floating	Average number of virtual processors active in the interval for the LPAR. (ActiveVirtualProcessors)
72	48	R10451EVIP	8	floating	CPU idle time divided by the online time in the interval. (ExternalViewIdlePercentage)

Offsets		Name	Length	Format	Description
80	50	R10451EVKMP	8	floating	LPAR management time divided by the online time in the interval. (ExternalViewKernelModePercentage)
88	58	R10451EVTCP	8	floating	Total CPU time divided by the online time in the interval. (ExternalViewTotalCPUPercentage)
96	60	R10451EVUMP	8	floating	User mode time (CPU time without LPAR management time) divided by the online time in the interval. (ExternalViewUserModePercentage)
104	68	R10451KMT	8	floating	Kernel mode time (LPAR management time) for this LPAR in milliseconds. (KernelModeTime)
112	70	R10451TCT	8	floating	Total CPU time (dispatch time) for this LPAR in milliseconds. (TotalCPUTime)
120	78	R10451UPCC	8	floating	CPU time in milliseconds, exclusively reserved, but unused for this LPAR. (UnusedPartitionCPUCapacity)
128	80	R10451UMT	8	floating	User mode time (effective dispatch time) for this LPAR in milliseconds. (UserModeTime)

Subtype 52 — Linux_zChannelMetrics

Offsets		Name	Length	Format	Description
0	0	R10452MNAME	64	EBCDIC	Name of measured element, extracted from the MeasuredElementName attribute of the CIM_BaseMetricValue instance.
64	40	R10452BUP	8	floating	Percentage of bus cycles where the bus has been found busy for this channel in relation to the theoretical limit. (BusUtilizationPercentage)
72	48	R10452PRT	8	floating	Data transfer rates from the control unit to the channel for this partition. (PartitionReadThroughput)
80	50	R10452PUP	8	floating	The channel path utilization percentage for this partition during the interval. (PartitionUtilizationPercentage)
88	58	R10452PWT	8	floating	Data transfer rates from the channel to the control unit for this partition. (PartitionWriteThroughput)
96	60	R10452TRT	8	floating	Data transfer rates from the control unit to the channel for the CEC. (TotalReadThroughput)
104	68	R10452TUP	8	floating	The channel path utilization percentage for the CEC during the interval. (TotalUtilizationPercentage)
112	70	R10452TWT	8	floating	Data transfer rates from the channel to the control unit for the CEC. (TotalWriteThroughput)

Subtype 53 — Linux_zECKDMetrics

Offsets		Name	Length	Format	Description
0	0	R10453MNAME	64	EBCDIC	Name of measured element, extracted from the MeasuredElementName attribute of the CIM_BaseMetricValue instance.
64	40	R10453ADU	8	floating	Percentage of time the device spent servicing transfers in relation to the time the device was active. (AverageDeviceUtilization)
72	48	R10453CT	8	floating	Average connect time in milliseconds per I/O request for this device. (ConnectTime)
80	50	R10453CUQT	8	floating	Average control unit queue time in milliseconds per I/O request for this device. (ControlUnitQueueTime)
88	58	R10453DT	8	floating	Average disconnect time in milliseconds per I/O request for this device. (DisconnectTime)
96	60	R10453IOI	8	floating	Indicator for the device utilization. The value represents the product of the ResponseTime multiplied with the RequestRate. (IOIntensity)
104	68	R10453ICRT	8	floating	Average initial command response time in milliseconds per I/O request for this device. (InitialCommandResponseTime)
112	70	R10453PT	8	floating	Average pending time in milliseconds per I/O request for this device. (PendingTime)
120	78	R10453RR	8	floating	Number of I/O requests per second for this device. (RequestRate)
128	80	R10453RTM	8	floating	Average response time in milliseconds per I/O request for this device. (ResponseTime)

Record type 105 (X'69') — GDPS/Global Mirror

IBM GDPS/Global Mirror (GDPS/GM) writes record type 105 to record configuration and performance information used by the GDPS GM Monitor. For more information, see the "SMF Data" appendix in the GDPS GM Monitor documentation. If you are not a current GDPS/GM user and need to understand the mapping of this record, send an email request to gdps@us.ibm.com.

Record type 106 (X'6A') — BCPii activity

Record type 106 is written for every successful Base Control Program internal interface (BCPii) API call that results in a hardware update or action.

BCPii provides several authorized programming interfaces that either change or modify the configuration of a CPC, image (LPAR), activation profile, or user-defined image group. The HWISET and HWIREST operations allow updates to an attribute value (such as a processor weight) stored on the support element (SE) for either a CPC, image, or activation profile. The HWICMD and HWIREST operations can perform extremely disruptive operations to the CPC or image (such as activation of an image).

Whenever an HWISET, HWICMD, or HWIREST requests to modify a resource or perform a command like operation is successfully issued, SMF record type 106 is written to record the specifics of the completed update or operation, the target of the update or operation, and user identification to note the program, address space, and user ID associated with that update or operation.

Macro to symbolically address record type 106: The SMF record mapping macro to symbolically address record type 106 is HWISMF6A. The macro is supplied in SYS1.MACLIB.

For information about using BCPii, see *z/OS MVS Programming: Callable Services for High-Level Languages*.

Record environment

The following conditions exist for the generation of this record:

Macro
SMFEWTM, BRANCH=Y, MODE=XMEM (record exit: IEFU85)

Mode
Task

Storage residency
31-bit

Record mapping

Header/self-defining section

This section contains the common SMF record header fields and the triplet fields (offset, length, and number), if applicable, that locates the other sections of the record.

Offsets		Name	Length	Format	Description
0	0	SMF6ALEN	2	binary	Record length
2	2	SMF6ASEG	2	binary	Segment descriptor
4	4	SMF6AFLG	1	binary	Header flags: **Bit** **Meaning when set** **0** Subsystem name follows standard header **1** Subtypes utilized **2-7** Reserved
5	5	SMF6ARTY	1	binary	Record type 106 (X'6A').
6	6	SMF6ATME	4	binary	Time since midnight, in hundredths of a second, when record was moved to the SMF buffer.
10	A	SMF6ADTE	4	packed	Date when the record was moved into the SMF buffer, in the form 0*cyydddF*. See "Standard and Extended SMF record headers" on page 162 for a detailed description.
14	E	SMF6ASID	4	EBCDIC	System identification (from SMFPRM*xx* **SID** parameter).
18	12	SMF6AWID	4	EBCDIC	Subsystem ID.
22	16	SMF6ASTP	2	binary	Record subtype.
24	18	SMF6ASDL	4	binary	Length of self-defining section.
28	1C	SMF6APOF	4	binary	Offset to product section.
32	20	SMF6APLN	2	binary	Length of product section.
34	22	SMF6APON	2	binary	Number of product sections.
36	24	SMF6AEOF	4	binary	Offset to execution environment section.

Offsets		Name	Length	Format	Description
40	28	SMF6AELN	2	binary	Length of execution environment section.
42	2A	SMF6AEON	2	binary	Number of execution environment sections.
44	2C	SMF6ADOF	4	binary	Offset to CMSET/CMD data section.
48	30	SMF6ADLN	2	binary	Length of CMSET/CMD data section.
50	32	SMF6ADON	2	binary	Indicates if there is a CMSET/CMD data section in the record: • 0 indicates that this is for HWIREST • 1 indicates that this is for HWISET or HWICMD
52	34	SMF6AROF	4	binary	Offset to the HWIREST data section.
56	38	SMF6ARLN	2	binary	Length of HWIREST data section.
58	3A	SMF6ARON	2	binary	Indicates if there is HWIREST data section in the record: • 0 indicates that this is for HWISET or HWICMD • 1 indicates that this is for HWIREST
60	3C	SMF6_NUM_OF_REST_RECS	4	binary	Total number of records that were generated for the specific HWIREST request.

Product section

Triplet information: This section is located on the record using the following triplet fields, which are located in “Header/self-defining section” on page 1074:

Offset
SMF6APOF

Length
SMF6APLN

Number
SMF6APON

Offsets		Name	Length	Format	Description
0	0	SMF6ARVN	2	EBCDIC	Record version number.
2	2	SMF6APNM	8	EBCDIC	Product name (BCPII).
10	A	SMF6AOSL	8	EBCDIC	MVS product level.
18	12	SMF6ASYN	8	EBCDIC	Current system name (from SYSNAME parmlib option).

Execution environment section

Triplet information: This section is located on the record using the following triplet fields, which are located in “Header/self-defining section” on page 1074:

Offset
SMF6AEOF

Length
SMF6AELN

Number
SMF6AEON

Also refer to the SMF6AESD DSECT section in the HWISMF6A macro in SYS1.MACLIB.

Offsets		Name	Length	Format	Description
0	0	SMF6ACTP	2	binary	Connect type from HWICONN: **Value** **Meaning** **1** Connection to a target CPC **2** Connection to an image of a CPC **3** Connection to a capacity record of a CPC **4** Connection to a reset activation profile associated with a CPC **5** Connection to an image activation profile associated with a CPC **6** Connection to a load activation profile associated with a CPC **7** Connection to a user-defined image group on a CPC **8** Connection to a group profile associated with a CPC **9** Connection to an LPAR Capacity group associated with a CPC
2	2	SMF6ACPC	17	EBCDIC	CPC name.
19	13	SMF6ANLL	1	EBCDIC	Word boundary use.
20	14	SMF6ARTN	16	EBCDIC	Request parameter.
36	24	SMF6AASD	2	binary	Two-byte address space identifier (ASID).
38	26	SMF6AJOB	8	EBCDIC	Job name.
46	2E	SMF6AUSR	8	EBCDIC	User name.

Subtype 1

This section provides additional details for the following APIs:

- “HWISET API” on page 1076
- “HWIREST API” on page 1077

HWISET API

This section provides additional details for all BCPii HWISET API calls that complete with a return code of zero and identifies the exact attribute and value that was modified.

Also refer to the SMF6ASET DSECT section in the HWISMF6A macro in SYS1.MACLIB.

Triplet information: This section is located on the record using the following triplet fields, which are located in “Header/self-defining section” on page 1074 when SMF6ASTP = SMF6A_SMF_HWISET_SUBTYPE and SMF6ADON =1:

Offset
SMF6ADOF

Length
SMF6ADLN

Number
SMF6ADON

Offsets		Name	Length	Format	Description
0	0	SMF6ATYP	4	binary	SET type.
4	4	SMF6ATVL	4	binary	SET type value length.
8	8	SMFSETDA	257	EBCDIC	SET parameter data.

HWIREST API

This section provides additional details for all successful BCPii HWIREST API calls that issued a POST/PUT/DELETE request for URI that does NOT contain 'operations'. Successful is defined as the service returning an HTTP Status in the 200 range.

Also refer to the SMF6ASET DSECT section in the HWISMF6A macro in SYS1.MACLIB.

Triplet information: This section is located on the record using the following triplet fields, which are located in "Header/self-defining section" on page 1074 when SMF6ASTP = SMF6A_SMF_HWISET_SUBTYPE and SMF6ARON =1:

Offset
SMF6ADOF

Length
SMF6ADLN

Number
SMF6ARON

Offsets		Name	Length	Format	Description
0	0	SMF6A_REST_RQST_IDL	4	binary	Request ID data length.
4	4	SMF6A_REST_RQST_ID	64	character	Request ID data.
68	44	SMF6A_REST_SEQ_NUM	4	binary	Sequence of the records to be concatenated together, starting at 1.
72	48	SMF6A_REST_MTHD	4	binary	HTTP method: 1 - POST 3 - PUT 4 - DELETE
76	4C	SMF6A_REST_ENCD	4	binary	Encoding all of the character data fields: 1 - UTF8 2 - IBM1047
80	50	SMF6A_REST_URIL	4	binary	URI data length.
84	54	SMF6A_SMFA_REST_URI	2048	character	URI data.
2132	854	SMF6A_REST_TARGETNAME L	4	binary	Target Name data length.
2136	858	SMF6A_REST_TARGETNAME	256	character	Target Name data.
2392	958	SMF6A_REST_RQST_BDYL	4	binary	Request Body data length.
2396	95C	SMF6A_REST_RQST_BDY	10000	character	Request Body data.

The Request Body parameter can contain up to 64K of data, however, each record can only contain 10000 of those bytes. In the event that the Request Body exceeds 10000 characters, multiple records are generated. Each of those records will contain a portion of the Request Body data and be associated with a unique sequence number (SMF6A_REST_SEQ_NUM). The application should concatenate the records together using the sequence number value, where 1 is the first record in the sequence, up to SMF6A_NUM_OF_REST_RECS.

The following sorting, or concatenation, method is recommended for HWIREST records:

- Sort records by their REQUEST ID (SMF6A_REST_RQST_ID)
- If the number of records (SMF6A_REST_RECS) is greater than 1, concatenate the records in increasing order (SMF6A_REST_SEQ_NUM), starting with 1 up to the total number of records.

Subtype 2

This section provides additional details for the following two APIs:

- “HWICMD API” on page 1078
- “HWIREST API” on page 1078

HWICMD API

This section provides additional details for all BCPii HWICMD API calls that complete with a return code of zero and identifies the exact command attributes that were specified.

Also refer to the SMF6ACMD DSECT section in the HWISMF6A macro in SYS1.MACLIB.

Triplet information: This section is located on the record using the following triplet fields, which are located in “Header/self-defining section” on page 1074 when SMF6ASTP = SMF6A_SMF_HWICMD_SUBTYPE and SMF6ADON = 1:

Offset
SMF6ADOF

Length
SMF6ADLN

Number
SMF6ADON

Offsets		Name	Length	Format	Description
0	0	SMF6ACTY	4	binary	Command type.
4	4	SMF6AAOS	4	binary	CMD parameter data offset.
8	8	SMFCMDPM	328	EBCDIC	CMD passed in parameter.
336	150	SMFCMDDL	4	binary	XML or IPL token data length.
340	154	SMFCMDDA	3483	EBCDIC	XML or IPL token data.

HWIREST API

This section provides additional details for all successful BCPii HWIREST API calls that issued a POST/PUT/DELETE request for URI that contains 'operations'. Successful is defined as the service returning an HTTP Status in the 200 range.

Also refer to the SMF6ACMD DSECT section in the HWISMF6A macro in SYS1.MACLIB.

Triplet information: This section is located on the record using the following triplet fields, which are located in “Header/self-defining section” on page 1074 when SMF6ASTP = SMF6A_SMF_HWICMD_SUBTYPE and SMF6ARON = 1:

Offset
SMF6ADOF

Length
SMF6ADLN

Number
SMF6ARON

Offsets		Name	Length	Format	Description
0	0	SMF6A_REST_RQST_IDL	4	binary	Request ID data length.

Offsets		Name	Length	Format	Description
4	4	SMF6A_REST_RQST_ID	64	character	Request ID data.
68	44	SMF6A_REST_SEQ_NUM	4	binary	Sequence of the records to be concatenated together, starting at 1.
72	48	SMF6A_REST_MTHD	4	binary	HTTP method: 1 - POST 3 - PUT 4 - DELETE
76	4C	SMF6A_REST_ENCD	4	binary	Encoding all of the character data fields: 1 - UTF8 2 - IBM1047
80	50	SMF6A_REST_URIL	4	binary	URI data length.
84	54	SMF6A_SMFA_REST_URI	2048	character	URI data.
2132	854	SMF6A_REST_TARGETNAMEL	4	binary	Target Name data length.
2136	858	SMF6A_REST_TARGETNAME	256	character	Target Name data.
2392	958	SMF6A_REST_RQST_BDYL	4	binary	Request Body data length.
2396	95C	SMF6A_REST_RQST_BDY	10000	character	Request Body data.

The Request Body parameter can contain up to 64K of data, however, each record can only contain 10000 of those bytes. In the event that the Request Body exceeds 10000 characters, multiple records are generated. Each of those records will contain a portion of the Request Body data and be associated with a unique sequence number (SMF6A_REST_SEQ_NUM). The application should concatenate the records together using the sequence number value, where 1 is the first record in the sequence, up to SMF6A_NUM_OF_REST_RECS.

The following sorting, or concatenation, method is recommended for HWIREST records:

- Sort records by their REQUEST ID (SMF6A_REST_RQST_ID)
- If the number of records (SMF6A_REST_RECS) is greater than 1, concatenate the records in increasing order (SMF6A_REST_SEQ_NUM), starting with 1 up to the total number of records.

Record type 108 (X'6C') — Domino Server Statistics

This record type presents data for a Domino® for S/390® server running on an z/OS system. The specific type of data that is being reported is defined by the subtype field on the record (SMF108STP) in the standard record header.

Subtype Descriptions

Subtype 1 - Server Load

This subtype contains counts of activity done by the server running on the z/OS system.

Subtype 2 - User activity

This subtype will report Domino User activity for the different protocols Domino supports.

Subtype 3 - Monitoring and Tuning

This subtype will monitor some statistics and certain configuration parameters used by the server.

Subtype 6 - Data base activity

This subtype will report Domino specific data for Domino data bases.

Record environment

SMF Type 108 records are generated using the C language function 'smf_record' which is a part of the z/OS extensions to the language. Records are generated at the expiration of the SMF Global Interval (combination of INTVAL an SYNCVAL parameters in the SMFPRMxx parmlib member). The generated invocation results in an environment which equates to

Macro
SMFTWM (SVC level interface) — record exit = IEFU83

Mode
Task

Storage Residency
31-bit

SUBSYS
'STC'

Security Notice

Because the processing which generates these records is using the 'C' language interface there is some security setup that must be done in order to enable these records to be generated. The RACF commands (or their equivalent) must be issued before these records can be generated:

- RDEFINE FACILITY BPX.SMF UACC(NONE) — may have already been done
- PERMIT BPX.SMF CLASS(FACILITY) ID(<server>) ACCESS(READ) — allow access
- SETROPTS RACLIST(FACILITY) REFRESH — refresh in-core tables

Record Mappings

The record mappings are shown as two sections, a Common Section which appears on all subtypes and a Unique Section for each subtype.

Common Sections

The following sections appear on each of the Type 108 subtype records and are included in the documentation once.

Header/Self-defining Section

This section contains the common SMF record headers fields and the triplet fields (offset/length/number), if applicable, that locate the other sections on the record.

Offsets		Name	Length	Format	Description
0	0	SMF108LEN	2	binary	Record length. This field and the next field (total of four bytes) form the RDW (record descriptor word).
2	2	SMF108SEG	2	binary	Segment description (see record length field).

Offsets		Name	Length	Format	Description
4	4	SMF108FLG	1	binary	System indicator: **Bit** **Meaning when set** **0** Reserved **1** Subtypes used **2** Reserved **3-6** Version indicators* **7** Reserved.
5	5	SMF108RTY	1	binary	Record type 108 (X'6C').
6	6	SMF108TME	4	binary	Time since midnight, in hundredths of a second, that the record was moved into the SMF buffer.
10	A	SMF108DTE	4	packed	Date when the record was moved into the SMF buffer, in the form 0*cyydddF*.
14	E	SMF108SID	4	EBCDIC	System identification (from the SID parameter).
18	12	SMF108SSI	4	EBCDIC	Subsystem identification.
22	16	SMF108STP	2	binary	Record Subtype **Subtype** **Description** **1** Server Load **2** User activity **3** Monitoring and Tuning **6** Data base acitivity
24	18	SMF108PRO	4	binary	Offset to Product Section
28	1C	SMF108PRL	2	binary	Length of Product Section
30	1E	SMF108PRN	2	binary	Number of Product Sections (should be '1')
32	20	SMF108SSO	4	binary	Offset to Self-Defining Section
36	28	SMF108SSL	2	binary	Length of Self-Defining Section
38	2A	SMF108SSN	2	binary	Number of Self-Defining Section (should be '1')

Product Section

This section contains the general information about the server and the system that it is running on.

Offsets		Name	Length	Format	Description
0	0	SMF108PRRVN	4	binary	Record version number. Set to 6 for Domino Release 6.0.0.
4	4	SMF108PRPVN	8	EBCDIC	Product version number (6.0.0 for example). This is the first eight bytes of the product version string and may contain text or other characters after the number.
12	C	SMF108PRSVN	32	EBCDIC	Server Name (used to identify partitioned servers)
44	2C	SMF108PRSPN	8	EBCDIC	Sysplex Name (general-use-programming-interface (gupi) field in cvt/ecvt)
52	34	SMF108PRSYN	8	EBCDIC	System Name (gupi field in cvt/ecvt)
60	3C	SMF108PROSL	8	EBCDIC	OS/390 System Level (gupi field in cvt/ecvt)
68	44	SMF108PRISTARTT	8	binary STCK	Interval Start Time

Offsets		Name	Length	Format	Description
76	4C	SMF108PRIENDT	8	binary STCK	Interval End Time
84	54	SMF108CVTTV	4	binary	CVTTV GMT offset time.
88	58	SMF108PRPID	4	binary	Process ID of the Domino server

Subtype 1 — Server Load

Self-Defining Section

This section contains the triplet fields (offset/length/number) that locate the specific sections for this subtype on the record.

Offsets		Name	Length	Format	Description
0	0	SMF108SLO	4	binary	Offset to Server Load Section
4	4	SMF108SLL	2	binary	Length of Server Load Section
6	6	SMF108SLN	2	binary	Number of Server Load Section (should be '1')
8	8	SMF108TRO	4	binary	Offset to Transaction Section
12	C	SMF108TRL	2	binary	Length of Transaction Section
14	E	SMF108TRN	2	binary	Number of Transaction Section (1 per transaction type processed)
16	10	SMF108PTO	4	binary	Offset to Port Activity Section
20	14	SMF108PTL	2	binary	Length of Port Activity Section
22	16	SMF108PTN	2	binary	Number of Port Activity Sections (1 per TCP/IP port)

Server Load Section

This section contains the counters showing activity at the server level (globally).

Offsets		Name	Length	Format	Description
0	0	SMF108SLCU	4	binary	Current number of users
4	4	SMF108SLUA	4	binary	Number of currently connected users that are currently active
8	8	SMF108SLUA1M	4	binary	Number of currently connected users that have been active within the last 1 minute
12	12	SMF108SLUA3M	4	binary	Number of currently connected users that have been active within the last 3 minutes
16	10	SMF108SLUA5M	4	binary	Number of currently connected users that have been active within the last 5 minutes
20	14	SMF108SLUA15M	4	binary	Number of currently connected users that have been active within the last 15 minutes
24	18	SMF108SLUA30M	4	binary	Number of currently connected users that have been active within the last 30 minutes
28	1C	SMF108SLDMSENTL	4	binary	Number of Domino mail messages delivered to local users
32	20	SMF108SLDMSENTLAS	4	binary	Average size of Domino mail and SMTP messages delivered to local users
36	24	SMF108SLDMSENTR	4	binary	Number of Domino mail and SMTP messages sent to other servers
40	28	SMF108SLDMSENTRAS	4	binary	Average size of Domino mail messages sent to other servers
44	2C	SMF108SLSMREC	4	binary	Number of SMTP messages received from other servers during interval
48	30	SMF108SLSMRECAS	4	binary	Average size of SMTP messages received from other servers during interval
52	34	SMF108SLSMSENT	4	binary	Number of SMTP messages sent to other servers during interval
56	38	SMF108SLSMSENTAS	4	binary	Average size of SMTP messages sent to other servers during interval
60	3C	SMF108SLTRANS	4	binary	Total number of transactions processed during interval
64	40	SMF108SLSVREPL	4	binary	Number of replications initiated by this server

Offsets		Name	Length	Format	Description
68	44	SMF108SLNWSESIN	4	binary	Number of incoming (to the server from clients) sessions established during the interval. (Version 1 format only. For Release 5.01 or higher this field will be set to zero. This data is now recorded in the Port Activity Section).
72	48	SMF108SLNWSESOUT	4	binary	Number of outgoing sessions established during the interval. (Version 1 format only. For Release 5.01 or higher this field will be set to zero. This data is now recorded in the Port Activity Section).
76	4C	SMF108SLNWBR	4	binary	Number of network Bytes/1024 received during interval. (Version 1 format only. For Release 5.01 or higher this field will be set to zero. This data is now recorded in the Port Activity Section).
80	50	SMF108SLNWBS	4	binary	Number of network Bytes/1024 sent during interval. (Version 1 format only. For Release 5.01 or higher this field will be set to zero. This data is now recorded in the Port Activity Section).
84	54	SMF108SLTT	2	binary	Total number of physical thread pool threads, server_pool_tasks
86	56	SMF108SLVTIU	2	binary	Number of virtual thread pool threads currently in use
88	58	SMF108SLAIOR	4	binary	Number of async i/o reads during interval
92	5C	SMF108SLAIOW	4	binary	Number of async i/o writes during interval
96	60	SMF108SLPOP3R	4	binary	Number of POP3 reads during interval
100	64	SMF108SLIMAPR	4	binary	Number of IMAP reads during interval
104	68	SMF108SLHTTPR	4	binary	Number of HTTP reads during interval
108	6C	SMF108SLHTTPW	4	binary	Number of HTTP writes during interval
112	70	SMF108SLVTIUMAX	2	binary	Maximum number of virtual thread pool threads in use during interval
114	72	SMF108SLTASKS	2	binary	Number of tasks currently in use
116	74	SMF108SLTASKSMAX	2	binary	Maximum number of tasks in use during interval
118	76	SMF108SLPTIU	2	binary	Number of physical thread pool threads currently in use
120	78	SMF108SLPTIUMAX	2	binary	Maximum number of physical thread pool threads in use during interval
122	7A	SMF108SLPPAD	2	binary	The pad bytes to get to the next 32 byte boundary.
124	7C	SMF108SLDomino CacheCommandCount	4	binary	The change for this interval in the Domino statistic, Domino.Cache.Command.Count.
128	80	SMF108SLDomino CacheDesignCount	4	binary	The change for this interval in the Domino statistic, Domino.Cache.Design.Count.
132	84	SMF108SLDomino CacheSessionCount	4	binary	The change for this interval in the Domino statistic, Domino.Cache.Session.Count.
136	88	SMF108SLDomino CacheUserCount	4	binary	The change for this interval in the Domino statistic, Domino.Cache.User.Count.
140	8C	SMF108SLDomino RequestTotal	4	binary	The change for this interval in the Domino statistic, Domino.Cache.Requests.Total.

Transaction Section

This section contains the data being reported for each transaction (by type) that is requested of the server. Only transactions with non-zero activity counts are included.

Offsets		Name	Length	Format	Description
0	0	SMF108TRTYPE	4	binary	Transaction type. See Table 21 on page 1086
4	4	SMF108TRTYPENP	4	binary	Number of transactions of type processed during interval
8	8	SMF108TRTYPETA	4	binary	Total accumulated response time, in milliseconds, for all transactions of type that completed during interval
12	C	SMF108TRTYPENW	4	binary	Total accumulated net wait time, in milliseconds, for all transactions of type that completed during interval. This is the time the server has been waiting for clients to respond.

Port Activity Section

This section contains the data being reported for each TCP/IP port that the server has a connection to.

Offsets		Name	Length	Format	Description
0	0	SMF108PTNAME	8	EBCDIC	First eight bytes of the TCP/IP port. ('TCPIP' for example)
8	8	SMF108PTNWSESIN	4	binary	Number of incoming sessions processed during the interval (client to server connection).
12	C	SMF108PTNWSESOUT	4	binary	Number of outgoing sessions processed during the interval
16	10	SMF108PTNWBR	4	binary	Total number of bytes/1024 received for this port during the interval.
20	14	SMF108PTNWBS	4	binary	Total number of bytes/1024 sent for this port during the interval.

Subtype 2 — User Activity

Self-Defining Section

This section contains the triplet fields (offset/length/number) that locate the specific sections for this subtype on the record.

Offsets		Name	Length	Format	Description
0	0	SMF108UDO	4	binary	Offset to Data Section
4	4	SMF108UDL	2	binary	Length of Data Section
6	6	SMF108UDN	2	binary	Number of Data Sections

Server Load Section

This section contains the counters showing activity at the server level (globally).

Offsets		Name	Length	Format	Description
0	0	SMF108UIPA	16	EBCDIC	IP address presenting the request for service.
16	10	SMF108UTYPE	4	EBCDIC	Type of connection to the Domino server. **User Type description:** • NRPC Notes Data base server • HTTP Notes HTTP server • IMAP IMAP mail server • POP3 POP3 mail server • SMTP SMTP mail server
20	14	SMF108UNAME	36	EBCDIC	Notes user name for NRPC clients.
56	38	SMF108UCPU	4	binary STCK	CPU time used by this user.
64	40	SMF108UBR	4	binary	Number of bytes read by this interval.
68	44	SMF108UBW	4	binary	Number of bytes written by this interval.

Subtype 3 — Monitoring and Tuning

Self-Defining Section

This section contains the triplet fields (offset/length/number) that locate the specific sections for this subtype on the record.

Offsets		Name	Length	Format	Description
0	0	SMF108MTO	4	binary	Offset to Data Section
4	4	SMF108MTL	2	binary	Length of Data Section
6	6	SMF108MTN	2	binary	Number of Data Sections (should be '1')

Monitoring and Tuning Data Section

This section contains some statistics and certain configuration parameters for tuning the Domino server.

Offsets		Name	Length	Format	Description
0	0	SMF108MTMAXUSERS	4	binary	Maximum number of users
4	4	SMF108MTMAXCONTR	4	binary	Limit for number of concurrent transactions
8	8	SMF108MTMAXCONSES	4	binary	Maximum number of sessions to run concurrently
12	C	SMF108MTSESTIMEOUT	2	binary	Number of minutes in timeout
14	E	SMF108MTUPMAX	2	binary	Maximum number of concurrent update tasks
16	10	SMF108MTMAILBOXES	2	binary	Maximum number of mail.box'es
18	12	SMF108MTREPMAX	2	binary	Maximum number of replicators (concurrent)
20	14	SMF108MTNSFPOOL	4	binary	Maximum size of nsf buffer pool (in bytes)
24	18	SMF108MTSFPOOLIU	4	binary	Number of bytes in nsf buffer pool (in use)
28	1C	SMF108MTDBCENAB	1	binary	dbcache enabled = 1, 0 if disabled
29	1D	RESERVECHAR	3	N/A	Reserved for alignment
32	20	SMF108MTDBCMAXE	4	binary	Maximum number of dbcache entries
36	24	SMF108MTDBCCE	4	binary	Number of dbcache (current entries)
40	28	SMF108MTDBCIDBO	4	binary	Number of dbcache (initial db opens)
44	2C	SMF108MTDBCOCR	4	binary	Number of dbcache (overcrowding rejections)
48	30	SMF108MTDBCHITS	4	binary	Number of dbcache (hits)
52	34	SMF108MTDBCHWM	4	binary	dbcache (high water mark)
56	38	SMF108MTSATH	2	binary	Server availability threshold
58	3A	SMF108MTSAX	2	binary	Server availability index
60	3C	SMF108MTNIFS	4	binary	Database.NIFPool.Size (in bytes)
64	40	SMF108MTNIFN	4	binary	Database.NIFPool.Used
68	44	SMF108MTNSFS	4	binary	Database.NSFPool.Size (in bytes)
72	48	SMF108MTNSFN	4	binary	Database.NSFPool.Used
76	4C	SMF108MTDBPR	4	binary	Number of Database.BufferPool (Reads)
80	50	SMF108MTDBPW	4	binary	Number of Database.BufferPool (Writes)
84	54	SMF108MTMMXFER	2	binary	Maximum number of mail transfer threads
86	56	SMF108MTMMXDLV	2	binary	Maximum number of mail delivery threads
88	58	SMF108MTMMXCONXFR	2	binary	Maximum number of concurrent mail transfer threads

Subtype 6 — Data Base Activity

Self-Defining Section

This section contains the triplet fields (offset/length/number) that locate the specific sections for this subtype on the record.

Offsets		Name	Length	Format	Description
0	0	SMF108DBO	4	binary	Offset to Data Section
4	4	SMF108DBL	2	binary	Length of Data Section
6	6	SMF108DBN	2	binary	Number of Data Sections

Data Base Activity Data Section

This section contains the data for Domino Data Base activity.

Offsets		Name	Length	Format	Description
0	0	SMF108DBNAME	64	EBCDIC	Last 64 characters of the data base name.
64	40	SMF108DBINDEX	4	binary	Number of indexing operations started on this data base by the server.

Offsets		Name	Length	Format	Description
68	44	SMF108DBREPS	4	binary	Number of replications on this data base initiated by this server.
72	48	SMF108DBDOCADDS	4	binary	Number of documents added to this data base.
76	4C	SMF108DBDOCDELS	4	binary	Number of documents deleted from this data base.

Constants: Transaction types

Table 21 on page 1086 contains a brief description of the transaction types recorded in "Transaction Section" on page 1083.

Table 21. Transaction types

Decimal type	Description
1	OPEN_DB_RQST
2	CREATE_DB_RQST
3	CLOSE_DB_RQST
4	GET_SPECIAL_NOTE_ID_RQST
5	ITEM_DEF_TABLE_RQST
6	OPEN_NOTE_RQST
7	UPDATE_NOTE_RQST
8	UPDATE_NOTE_RQST_ALT
9	DELETE_NOTE_RQST
10	GET_NOTE_INFO_RQST
11	SET_SPECIAL_NOTE_ID_RQST
12	DB_INFO_GET_RQST
13	DB_INFO_SET_RQST
14	DB_MODIFIED_TIME_RQST
15	SEARCHSTART_RQST
16	SEARCHSTOP_RQST
17	SERVER_TIME_RQST
18	DELETE_DB_RQST
19	FILE_SUMMARY_RQST
22	DB_REPLINFO_SET_RQST
23	DB_REPLINFO_GET_RQST
24	GET_MODIFIED_NOTES_RQST
25	STAMP_NOTES_RQST
26	RENAME_DB_RQST
27	REPLICATE_RQST
28	LOOKUP_HELP_NOTE_RQST
29	DB_SPACE_USAGE_RQST
30	GET_OBJECT_SIZE_RQST
31	FREE_OBJECT_RQST
32	ALLOC_OBJECT_RQST
33	REALLOC_OBJECT_RQST
34	READ_OBJECT_RQST

Table 21. Transaction types (continued)

Decimal type	Description
35	WRITE_OBJECT_RQST
36	TEXT_SEARCH_RQST
37	ALLOC_UPDATE_OBJECT_RQST
38	FREE_UPDATE_OBJECT_RQST
39	GET_SERVER_STATS_RQST
40	FT_SEARCH_RQST
41	FT_CLOSE_SEARCH_RQST
42	COMPACT_DB_RQST
43	FT_GET_LAST_INDEXTIME_RQST
44	RELAY_EVENT_RQST
45	REMOTE_CONSOLE_RQST
46	FT_DELETE_INDEX_RQST
47	FT_INDEX_RQST
48	CLOSE_DB_RQST_ALT
49	CLOSE_COLLECTION_RQST_ALT
50	CREATE_COLLECTION_RQST
51	OPEN_COLLECTION_RQST
52	CLOSE_COLLECTION_RQST
53	UPDATE_COLLECTION_RQST
54	UPDATE_FILTERS_RQST
55	READ_ENTRIES_RQST
56	LOCATE_NOTE_RQST
57	FIND_NOTEID_RQST
58	FIND_BY_KEY_RQST
59	NIFOPENNOTE_RQST
60	NIFSTAMPNOTES_RQST
61	GET_COLLECTION_DATA_RQST
62	ASYNC_NIFOPENNOTE_RQST
63	ASYNC_READ_ENTRIES_RQST
64	UPDATE_UNID_TABLE_RQST
65	SET_COLLATION_RQST
66	NIF_UPDATE_FOLDER_RQST
67	NIF_FOLDER_COUNT_RQST
68	NIF_PURGE_FOLDER_RQST
69	PURGE_COLLECTION_RQST
70	NIF_GET_IDTABLE_RQST
75	NAME_LOOKUP_RQST
76	GET_SERVER_NAMES_RQST
77	GET_SERVER_NAMES_LITE_RQST

Table 21. Transaction types (continued)	
Decimal type	**Description**
78	NAME_GET_AB_RQST
79	NAME_LOOKUPID_RQST
80	ASYNC_NAME_LOOKUP_RQST
81	ME_LOOKUP_RQST32
101	GET_NAMED_OBJECT_ID_RQST
102	DB_READ_HIST_RQST
103	DB_WRITE_HIST_RQST
104	GET_NOTE_INFO_BY_UNID_RQST
105	POLL_DEL_SEQNUM_RQST
106	GET_MULT_NOTE_INFO_BY_UNID_RQST
107	ASYNC_CANCEL_RQST
108	ASYNC_OPEN_NOTE_RQST
109	ASYNC_READ_OBJECT_RQST
110	ASYNC_NOTIFICATION_RSP
111	SERVER_TIME_LITE_RQST
112	GET_SERVER_STATS_LITE_RQST
114	GET_REPLICA_MATCHES_RQST
115	ASYNC_URL_GET_HEADER_RQST
116	DB_LSEC_INFO_GET_RQST
117	DB_LSEC_INFO_SET_RQST
118	GET_MULT_NOTE_INFO_RQST
119	DB_QUOTA_GET_RQST
120	DB_QUOTA_SET_RQST
121	SERVER_AVAILABLE_RQST
122	SERVER_AVAILABLE_LITE_RQST
123	SERVER_FIND_REPID_RQST
124	SERVER_FIND_REPID_LITE_RQST
125	OPEN_NOTE_BY_URL_RQST
126	ASYNC_OPEN_NOTE_BY_URL_RQST
127	AUTHENTICATE_RQST
128	UPDATE_FOLDER_RQST
129	PURGE_FOLDER_RQST
130	COPY_FOLDER_RQST
131	START_FOLDER_REPL_SOURCE_RQST
132	START_FOLDER_REPL_DEST_RQST
133	GET_FOLDER_REPL_OPS_RQST
134	APPLY_FOLDER_REPL_OPS_RQST
135	END_FOLDER_REPL_SOURCE_RQST
136	END_FOLDER_REPL_DEST_RQST

Table 21. Transaction types (continued)

Decimal type	Description
137	FOLDER_GETIDTABLE_RQST
138	DB_ADMIN_FUNC_RQST
139	DB_ADMIN_SET_RQST
140	DB_ADMIN_GET_RQST
141	DB_FTSIZE_GET_RQST
142	START_SERVER_RQST
143	RUNDOWN_TRANS_RQST
144	ASYNC_RUNDOWN_RQST
145	DB_GET_PURGE_INFO_RQST
146	DB_GETSET_DEL_SEQNUM_RQST
147	DB_DIRLINK_GET_RQST
148	DB_DIRLINK_SET_RQST
149	DB_SET_TRUNC_INFO_RQST
150	SCHED_RQST
151	ASYNC_SCHED_RQST
152	COPY_OBJECT_RQST
153	ASYNC_REMOTE_CONSOLE_RQST
154	DB_STREAMMODE_SET_RQST
155	ASYNC_READ_OBJECT_BY_URL_RQST
156	GET_UNREAD_TABLE_RQST
157	SET_UNREAD_TABLE_RQST
158	RUN_SERVER_AGENT_RQST
159	GET_TCP_HOSTNAME_RQST
160	ITEM_DEF_TABLE_EXT_RQST
161	GET_DBOPTIONS_RQST
162	SET_DBOPTIONS_RQST
163	PUT_QUEUE_MSG_RQST
164	ASYNC_TRACK_MESSAGE_RQST
165	MAIL_ROUTER_PUSH_RQST
166	FOLDER_GETMODTIME_RQST
167	COPY_FDO_RQST
168	GET_FDO_SIZE_RQST
169	SET_SUPERBLOCK_FDO_RQST
170	GET_SUPERBLOCK_FDO_RQST
171	REGISTER_MONITOR_RQST
172	DEREGISTER_MONITOR_RQST
173	MONITOR_GETEVENTS_RQST
174	SV_INFO_GET_RQST
175	GET_ARCHIVE_NOTES_RQST

Table 21. Transaction types (continued)

Decimal type	Description
176	PROFILE_ENUM_RQST
177	LOCK_NOTE_RQST
178	JS_GETSCHED_RQST
179	UNDELETE_NOTES_RQST
180	NSF_FIND_DESIGNNOTE_RQST
181	NSF_DESIGNNOTE_ENUM_RQST
182	GET_DBINFOFLAGS_RQST
183	GETSET_FOLDERINFO_RQST
184	COPY_FILE_RQST
185	DBINFO_GET_RQST
186	DBSETNOTES_RQST
187	DBGETOBJECT_RQST
188	DB_IMAP_FETCHNOTES_RQST
189	DB_IMAP_GET_FOLDERS_INFO_RQST
190	DB_IMAP_GET_ALL_FOLDERS_RQST
191	DB_IMAP_GET_SUB_LIST_RQST
192	DB_IMAP_SUBSCRIBE_FOLDER_RQST
193	DB_IMAP_CREATE_FOLDER_RQST
194	DB_IMAP_DELETE_FOLDER_RQST
195	DB_IMAP_RENAME_RQST
196	DB_IMAP_EXPUNGE_MESSAGES_RQST
197	DB_IMAP_SET_CLEAR_FLAGS_RQST
198	DB_IMAP_COPY_MESSAGES_RQST
199	DB_IMAP_APPEND_MESSAGE_RQST
200	DB_IMAP_SEARCH_RQST
201	DB_IMAP_UPDATE_INFO_RQST
202	DB_IMAP_ENABLE_FOLDERS_RQST
203	DB_IMAP_DISABLE_FOLDERS_RQST
204	DB_QUOTA_SET_HDB_RQST
205	DB_QUOTA_GET_HDB_RQST
206	LOG_SEARCHR6_MSG_RQST
207	ASYNC_OPEN_COLLECTION_RQST
208	DB_ARCHIVE_DELETE_NOTES_RQST
209	DB_ARCHIVE_PRUNE_NOTES_RQST
210	GET_SSO_TOKEN_TQST
211	DB_BEGIN_TRANSACTION_RQST
212	DB_COMMIT_TRANSACTOIN_RQST
213	DB_ABORT_TRANSACTION_RQST
214	GET_IOR_RQST

Table 21. Transaction types (continued)

Decimal type	Description
215	GET_MODFOLDERS_RQST
216	DB_MAJMIN_RQST
217	SERVER_ACL_RQST
218	GET_ALLFOLDERCHANGES_RQST
219	DB_CREATE_SHELL_DB_RQST
220	UPGRADE_MAIL_DESIGN_RQST
221	GET_NAMELIST_RQST
222	XACL_OBJ_ACCESS_RQST
223	XACL_ITEM_ACCESS_RQST
224	UPDATE_NOTE_HEADER_FLAGS_RQST
225	GET_UNREAD_REPL_ENTRIES
226	APPLY_UNREAD_REPL_ENTRIES

Record type 109 (X'6D') — TCP/IP Statistics

The Transmission Control Protocol/Internet Protocol (TCP/IP) syslog daemon writes type 109 records to collect system messages. For more information about record type 109, see the "SMF type 109 records" topic in *z/OS Communications Server: IP Programmer's Guide and Reference*.

Record type 110 (X'6E') — CICS TS for z/OS Statistics

CICS Transaction Server for z/OS writes record type 110 to record transaction data collected at event monitoring points. For more information about record type 110, see the customization documentation available at CICS Transaction Server for z/OS (www.ibm.com/support/knowledgecenter/SSGMGV/welcome.html).

Record type 111 (X'6F') — CICS TS for z/OS Statistics

CICS Transaction Gateway for z/OS writes record type 111 to record data relating to a specific Gateway daemon address space. For more information about record type 111, see *CICS Transaction Gateway z/OS Administration* (SC34-2964), available from IBM Publications Center (www.ibm.com/e-business/linkweb/publications/servlet/pbi.wss) or from CICS Transaction Server for z/OS (www.ibm.com/support/knowledgecenter/SSGMGV/welcome.html).

Record type 113 (X'71') — Hardware capacity, reporting, and statistics

The system writes record type 113 to record hardware capacity, reporting, and statistics for IBM System z10 or later CPCs. With the enhanced-monitor facility released with the IBM z196 and later CPCs, the SMF record can be utilized to capture software events.

For more information about hardware data event collection, see Setting up hardware event data collection in *z/OS MVS System Commands*.

Record type 113 has two subtypes:

- “Subtype 1” on page 1093
- “Subtype 2” on page 1095

IBM makes the following recommendations:

- Products should process SMF type 113 subtype 1 records, when available, because that is where future enhancements will be made. If subtype 1 records are not available, products may process the subtype 2 records.
- Customers should collect SMF type 113 subtype 1 and 2 records.

Record mapping

Header section

This section contains the common SMF record headers fields and the triplet fields (offset/length/number), if applicable, that locate the other sections on the record.

Offsets		Name	Length	Format	Description
0	0	SMF113LEN	2	binary	Record length.
2	2	SMF113SEG	2	binary	Segment descriptor.
4	4	SM113FLG	1	binary	Header flag byte: **Bit** **Meaning when set** **0** Subsystem identification follows system identifcation **1** Subtypes used **2** Reserved **3-6** Version indicators **7** Reserved
5	5	SMF113RTY	1	binary	Record type 113 (X'71')
6	6	SMF113TME	4	packed	Time since midnight, in hundredths of a second, when the record was moved into the SMF buffer.
10	A	SMF113DTE	4	packed	Date that the record was moved into the SMF buffer, in the form 0*cyydddF*.
14	E	SMF113SID	4	EBCDIC	System identification (from the SID parameter).
18	12	SMF113WID	4	EBCDIC	Subsystem identifier.
22	16	SMF113STP	2	binary	Indicates the record subtype, based on the value of SMF113STP: **1** Hardware event counter deltas **2** Hardware event counters
24	18		2		Reserved.
26	1A	SMF113SDL	2	binary	Length of self-defining section.

Self-defining section, based on the address of SMF record type 113 + the length of the header section

Offsets		Name	Length	Format	Description
0	0	SMF113SOF	4	binary	Offset to subsystem section from beginning of record type 113
4	4	SMF113SLN	2	binary	Length of subsystem section
6	6	SMF113SON	2	binary	Number of subsystem sections
8	8	SMF113IOF	4	binary	Offset to identification section from beginning of record type 113
12	0C	SMF113ILN	2	binary	Length of identification section
14	0E	SMF113ION	2	binary	Number of identification sections
16	10	SMF113DOF	4	binary	Offset to data section from beginning of record type 113

Offsets		Name	Length	Format	Description
20	14	SMF113DLN	2	binary	Length of data section
22	16	SMF113DON	2	binary	Number of data sections

Subsystem section, based on the address of SMF record type 113 + the offset value in SMF113SOF

This section contains information about the subsystem that generated the record.

Offsets		Name	Length	Format	Description
0	0		2		Reserved
2	2	SMF113RVN	2	EBCDIC	Record version number
4	4	SMF113PNM	8	EBCDIC	Product name
12	C	SMF113OSL	8	EBCDIC	MVS product level

Identification section, based on the address of SMF record type 113 + the offset value in SMF113IOF

Offsets		Name	Length	Format	Description
0	0	SMF113JBN	8	EBCDIC	Job name
8	8	SMF113RST	4	binary	Reader start time
12	C	SMF113RSD	4	packed	Reader start date
16	10	SMF113STN	8	EBCDIC	Step name
24	18	SMF113IntervalStart	8	binary	Interval start time, STCK format
32	20	SMF113IntervalEnd	8	binary	Interval end time, STCK format

Subtype 1

Subtype 1 of record type 113 contains event counter deltas for IBM System z10 or later CPCs. You can calculate its location in the SMF record using the following formula:

```
(address of record type 113 + offset value in field SMF113DOF)
```

Subtype 1 records are CPU or core specific. For each hardware data event collection cycle:

- If one or more CPU counter sets are being collected (see the MODIFY HISPROC command), the system creates one subtype 1 record for each active CPU. If one or more core counter sets are being collected (see the MODIFY HISPROC command) in addition, each core counter set will be recorded from one CPU on each core.
- If no CPU counter sets are being collected (see the MODIFY HISPROC command) and one or more core counter sets are being collected (see the MODIFY HISPROC command), the system creates one subtype 1 record for one active CPU on each core.

Each event counter represents the number of times a specific event has occurred from the start of the current hardware data event collection cycle or since the previous SMF Type 113 subtype 1 record was written. The system captures the valid counters and places them in the appropriate counter data slot, based on the counter event. If a counter data slot is zero, either the counter event is not defined or the counter event has not occurred in the current collection cycle. For example, counter event 0 is located in the 1st counter data slot, and counter event 9 is in the 10th slot.

Header/self-defining section, based on the address of SMF record type 113 + the offset value in SMF113DOF

This section contains the common SMF subtype header fields and the triplet fields (offset/length/number), if applicable, that locate the other sections on the record.

Offsets		Name	Length	Format	Description
0	0	SMF113_1_CTS	8	binary	Time when the hardware data collection run started in STCK format
8	8	SMF113_1_CTM	8	binary	Time when this SMF record was written in STCK format.
16	10	SMF113_1_CpuId	2	binary	Processor ID for which the hardware counters are recorded. Note that zero is a valid processor number.
18	12	SMF113_1_CpuProcClass	1	binary	The processor type for which the hardware event counters are recorded. Is one of the following: **0** Standard CP **2** zAAP **4** zIIP
19	13		1	binary	Reserved.
20	14	SMF113_1_CpuSpeed	4	binary	Processor speed for which the event counters are recorded. Speed is in cycles/ microsecond.
24	18	SMF113_1_MachType	4	EBCDIC	The machine type.
28	1C	SMF113_1_MachModel	16	EBCDIC	The machine model.
44	2C	SMF113_1_CtrVersion0	2	binary	Zero counter version number. This number is increased when there is a change to the meaning of a counter in the z/OS counter set.
46	2E	SMF113_1_CtrVersion1	2	binary	First counter version number. This number is increased when there is a change to the meaning of a counter or the number of installed counters in the Basic or Problem-state counter sets.
48	30	SMF113_1_CtrVersion2	2	binary	Second counter version number. This number is increased when there is a change to the meaning of a counter or the number of installed counters in the Crypto-activity or Extended or MT-diagnostic counter sets.
50	32	SMF113_1_Flags2	2	binary	Record flags: **Bit** **Meaning when set** **0** The hardware indicated the hardware has lost counter data during the current interval. **1** The hardware indicated the hardware has lost MT counter data during the current interval.
Self-defining section					
52	34	SMF113_1_CSOF	4	binary	Offset to counter set section, from beginning of r SMF record type 113.
56	38	SMF113_1_CSLN	2	binary	Length of counter set section.
58	3A	SMF113_1_CSON	2	binary	Number of counter set sections.
60	3C	SMF113_1_SeqCode	16	EBCDIC	The machine sequence code.
76	4C	SMF113_1_CoreId	2	binary	Core ID for which the hardware event counters are recorded. Note that zero is a valid core ID number.

Counter set section, based on the address of SMF record type 113 + the offset value in field SMF113_1_CSOF

Offsets		Name	Length	Format	Description
0	0	SMF113_1_CSType	2	binary	Counter set type for counters recorded: **1** Basic counter set **2** Problem-state counter set **3** Crypto counter set **4** Extended counter set **5** z/OS counter set **6** MT-diagnostic counter set
2	2	SMF113_1_Flags	2	binary	Record flags: **Bit** **Meaning when set** **0** This counter set's counter data section is mapped by the SMF113_1_LCDS data area. Otherwise, it is mapped by the SMF113_1_SCDS data area.
4	4	SMF113_1_CDOF	4	binary	Offset to counter data section for this counter set, from the beginning of the record. This can be to a section mapped by the SMF113_1_SCDS data area or a section mapped by the SMF113_1_LCDS data area, depending on bit 0 of SMP113_1_Flags.
8	8	SMF113_1_CDLN	2	binary	Length of counter data section.
10	A	SMF113_1_CDON	2	binary	Number of counter data sections.

Short counter data section, based on the address of SMF record type 113 + the offset value in field SMF113_1_CDOF

Offsets		Name	Length	Format	Description
0	0	SMF113_1_SCR	4	binary	Event counter value delta. This is the number of times a particular counter event has occurred since either the start of the HIS collection run, or the previous SMF 113 type 1 record was written.

Long counter data section, based on the address of SMF record type 113 + the offset value in field SMF113_1_CDOF

Offsets		Name	Length	Format	Description
0	0	SMF113_1_LCR	8	binary	Event counter value delta. This is the number of times a particular counter event has occurred since either the start of the HIS collection run, or the previous SMF 113 type 1 record was written.

Subtype 2

Subtype 2 of record type 113 contains hardware data event counters for IBM System z10 or later CPCs. You can calculate its location in the SMF record using the following formula:

```
(address of record type 113 + offset value in field SMF113DOF)
```

Subtype 2 records are CPU specific. For each hardware data event collection cycle, the system creates one subtype 2 for each active CPU.

Only a subset of the hardware data CPU event counters can be collected in subtype 2 records. (See the description of the SMF113_2_CST field for the supported counter sets.) IBM recommends using SMF type 113 subtype 1 records.

The system captures the valid counters and places them contiguously in subtype 2 of record type 113. For example, counter 0 of the first counter set, will be in the 1st slot. Counter 9 of the first counter set will be in slot 10 of the first counter set. Counter 0 of the second counter set will follow the last counter in the first counter set.

Header/self-defining section, based on the address of SMF record type 113 + the offset value in SMF113DOF

This section contains the common SMF subtype header fields and the triplet fields (offset/length/number), if applicable, that locate the other sections on the record.

Offsets		Name	Length	Format	Description
0	0	SMF113_2_CTS	8	binary	Time when the hardware data collection run started in STCK format
8	8	SMF113_2_CTM	8	binary	Time when this SMF record was written in STCK format.
16	10	SMF113_2_CPU#	1	binary	This field is deprecated, use SMF113_2_CpuId instead. Processor number for which the hardware counters in SMF113_2_CR are recorded. Note that zero is a valid processor number.
17	11	SMF113_2_CpuProcClass	1	binary	The processor type for which the hardware event counters are recorded. Is one of the following: **0** Standard CP **2** zAAP **4** zIIP
18	12	SMF113_2_CF	2	binary	Record flags: **Bit** **Meaning when set** **0** First SMF record for the hardware data collection run. The counter values are the initial values at the beginning of the run. **1** Intermediate SMF record, written by the system at defined intervals during the hardware data collection run. The counter values are intermediate values. The interval is based on the SMFINTVAL parameter specified at the start of the hardware data collection run. **2** Final SMF record written for this hardware data collection run. The counter values are the final values. **3** Indicates that the SMF record was written on non-standard hardware. **4** When ON, the hardware indicated the hardware has lost counter data during the current interval. **5-15** Reserved.
20	14	SMF113_2_CTRVN1	2	binary	First counter version number. This number is increased when there is a change to the meaning of a counter or a change to the number of the installed counters in the basic or problem-state counter sets.
22	16	SMF113_2_CTRVN2	2	binary	Second counter version number. This number is increased when there is a change to the meaning of a counter or a change to the number of the installed counters in the crypto-activity or extended counter sets.
Self-defining section					
24	18	SMF113_2_CSOF	4	binary	Offset to counter set section, from beginning of SMF record type 113
28	1C	SMF113_2_CSLN	2	binary	Length of counter set sections
30	1E	SMF113_2_CSON	2	binary	Number of counter set sections
32	20	SMF113_2_CDOF	4	binary	Offset to counters section, from beginning of SMF record type 113
36	24	SMF113_2_CDLN	2	binary	Length of counters sections
38	26	SMF113_2_CDON	2	binary	Number of counter sections

Offsets		Name	Length	Format	Description
CPU information section					
40	28	SMF113_2_CPSP	4	binary	Processor speed for which the hardware event counters are recorded. Speed is in cycles/microsecond.
44	2C	SMF113_2_MachType	4	EBCDIC	The machine type.
48	30	SMF113_2_MachModel	16	EBCDIC	The machine model.
64	40	SMF113_2_CpuId	2	binary	Processor ID for which the hardware event counters are recorded. Note that zero is a valid processor number.
66	42	*	2	binary	Reserved
68	44	SMF113_2_SeqCode	16	EBCDIC	The machine sequence code.

Note: For more information on machine type and machine model, see Resource Link home page (www.ibm.com/servers/resourcelink).

Counter set section, based on the address of SMF record type 113 + the offset value in field SMF113_2_CSOF

Offsets		Name	Length	Format	Description
0	0	SMF113_2_CST	1	binary	Indicates the counter set type for counters recorded in field SMF113_2_CR: **1** Basic counter set **2** Problem-state counter set **3** Crypto counter set **4** Extended counter set
1	1		1		Reserved
2	2	SMF113_2_CSN	2	binary	Number of counter sections.
4	4		8		Reserved

Counters section, based on the address of SMF record type 113 + the offset value in field SMF113_2_CDOF

Offsets		Name	Length	Format	Description
0	0	SMF113_2_CR	8	binary	Hardware event counter value. This is the absolute number of times a particular hardware event counter event has occurred.

Record type 115 (X'73') — IBM MQ statistics

IBM MQ writes record type 115 to record statistics information. For more information about record type 115, see IBM MQ in IBM Documentation (www.ibm.com/docs/en/ibm-mq).

Record type 116 (X'74') — IBM MQ accounting

IBM MQ writes record type 116 to record accounting information. For more information about record type 116, see IBM MQ in IBM Documentation (www.ibm.com/docs/en/ibm-mq).

Record type 117 — WebSphere Message Broker and IBM Integration Bus

WebSphere Message Broker (WMB) and IBM Integration Bus (IIB) generate type 117 records to record message flow accounting and statistics data. For additional information about record type 117, see z/OS

SMF records for message flow accounting and statistics data (www.ibm.com/support/knowledgecenter/SSMKHH_10.0.0/com.ibm.etools.mft.doc/ac19040_.htm).

Note: The GTZ version of the type 117 record is replaced with type 125. See the "Record type 125 (X'7D') — Generic Tracker data persistence" on page 1111 section of this publication for information on record type 125.

Record type 118 (X'76') — TCP/IP Statistics

Transmission Control Protocol/Internet Protocol (TCP/IP) writes type 118 records to collect statistics about Telnet and FTP servers, API calls, and Telnet and FTP client calls. For more information about record type 118, see the topic about Type 118 SMF records in *z/OS Communications Server: IP Programmer's Guide and Reference*.

Record type 119 (X'77') — TCP/IP Statistics

Transmission Control Protocol/Internet Protocol (TCP/IP) writes type 119 records to collect statistics about Telnet servers and clients, FTP servers and clients, and API activity and stack usage information. For more information about record type 119, see the topic, "Type 119 SMF records," in *z/OS Communications Server: IP Programmer's Guide and Reference*.

Record type 120 (X'78') — WebSphere Application Server for z/OS Performance Statistics

WebSphere® Application Server for z/OS writes record type 120 to collect WebSphere performance statistics. For more information about record type 120, see the WebSphere Application Server IBM Documentation (www.ibm.com/docs/en/was).

Record type 121 (X'79') — Java runtime performance statistics

SMF record type 121 is written by the IBM JZOS batch launcher for z/OS and is used to record z/OS Java runtime performance statistics. For more information about the JZOS batch launcher, see JZOS Java Launcher and Toolkit Overview (www.ibm.com/systems/z/os/zos/tools/java/products/jzos/overview.html).

Record mapping

Header/self-defining section

Offsets		Name	Length	Format	Description
0	0	SMF121LEN	2	binary	Record length of the entire SMF record.
2	2	SMF121SEG	2	binary	Segment descriptor.
4	4	SMF121FLG	1	binary	System indicator.
5	5	SMF121RTY	1	binary	Record type 121 (X'79').
6	6	SMF121TME	4	binary	Time since midnight
10	A	SMF121DTE	4	packed	Date record was moved to SMF.
14	E	SMF121SID	4	EBCDIC	System identification.
18	12	SMF121SSI	4	EBCDIC	Subsystem identification.
22	16	SMF121STY	2	binary	Record subtype 1.

Offsets		Name	Length	Format	Description
24	18	SMF121SDS_TRIPLETS	2	binary	Number of triplets (offset/length/number combinations), currently three: • Java runtime • Garbage collector • Thread
26	1A	SMF121SDS_RSERVD	2	binary	Reserved.
28	1C	SMF121SDS_OFFJRS	4	binary	Offset to Java runtime section.
32	20	SMF121SDS_LENJRS	2	binary	Length of each Java runtime section.
34	22	SMF121SDS_NUMJRS	2	binary	Number of Java runtime sections. (There is only one Java runtime section.)
36	24	SMF121SDS_OFFGCS	4	binary	Offset to garbage collector section.
40	28	SMF121SDS_LENGCS	2	binary	Length of each garbage collector section.
42	2A	SMF121SDS_NUMGCS	2	binary	Number of garbage collector sections. This depends on how many garbage collectors are active in the JVM.
44	2C	SMF121SDS_OFFTS	4	binary	Offset to thread section.
48	30	SMF121SDS_LENTS	2	binary	Length of each thread section.
50	32	SMF121SDS_NUMTS	2	binary	Number of thread sections. This depends on the number of active Java threads.

Java runtime section

Triplet information: This section is located on the record using the following triplet fields, which are located in “Header/self-defining section” on page 1098:

Offset
SMF121SDS_OFFJRS

Length
SMF121SDS_LENJRS

Number
SMF121SDS_NUMJRS

Offsets		Name	Length	Format	Description
0	0	SMF121JRS_FDFLAGS	4	binary	Field flags: **Byte 1** **Bit** **Meaning when set** **0** Contains CPU usage summary fields, including: SMF121JRS_APPCPU SMF121JRS_SYSCPU SMF121JRS_GCCPU SMF121JRS_JITCPU **1-7** Reserved **Byte 2** Reserved **Byte 3** Reserved **Byte 4** Reserved

Offsets		Name	Length	Format	Description
4	4	SMF121JRS_NAME	80	EBCDIC	Formatted JVM name. If longer than 80 characters, string will be truncated.
84	54	SMF121JRS_STRTTME	8	binary	Start time, in milliseconds.
92	5C	SMF121JRS_UPTIME	8	binary	Up time, in milliseconds.
100	64	SMF121JRS_GCMODE	40	EBCDIC	Garbage collection mode. If longer than 40 characters, string will be truncated.
140	8C	SMF121JRS_PEAKTHRD	4	binary	Peak live thread count.
144	90	SMF121JRS_CURRTHRD	4	binary	Current number of live threads.
148	94	SMF121JRS_APPCPU	8	binary	Total CPU usage of all application threads, in microseconds. If not available, value is -1.
156	9C	SMF121JRS_SYSCPU	8	binary	Total CPU usage of all system threads, in microseconds. If not available, value is -1.
164	A4	SMF121JRS_GCCPU	8	binary	Total CPU usage of all GC threads, in microseconds. If not available, value is -1.
172	AC	SMF121JRS_JITCPU	8	binary	Total CPU usage of all JIT threads, in microseconds. If not available, value is -1.

Garbage collector section

Triplet information: This section is located on the record using the following triplet fields, which are located in "Header/self-defining section" on page 1098:

Offset

SMF121SDS_OFFGCS

Length

SMF121SDS_LENGCS

Number

SMF121SDS_NUMGCS

Offsets		Name	Length	Format	Description
0	0	SMF121GCS_FDFLAGS	4	binary	Field flags, currently all zeros.
4	4	SMF121GCS_NAME	40	EBCDIC	Garbage collector name. If longer than 40 characters, string will be truncated.
44	2C	SMF121GCS_COLLCNT	8	binary	Total number of collections.
52	34	SMF121GCS_COLLTME	8	binary	Approximate accumulated collection elapsed time, in milliseconds.
60	3C	SMF121GCS_TMEMFREED	8	binary	Cumulative total amount of memory freed, in bytes.
68	44	SMF121GCS_TCOMPACTS	8	binary	Cumulative total number of compacts performed.
76	4C	SMF121GCS_MEMUSED	8	binary	Snapshot of the amount of heap memory used, in bytes.

Thread section

Triplet information: This section is located on the record using the following triplet fields, which are located in "Header/self-defining section" on page 1098:

Offset

SMF121SDS_OFFTS

Length

SMF121SDS_LENTS

Number
SMF121SDS_NUMTS

Offsets		Name	Length	Format	Description
0	0	SMF121TS_FDFLAGS	4	binary	Field flags, currently all zeros.
4	4	SMF121TS_ID	8	binary	Thread ID.
12	C	SMF121TS_NAME	24	EBCDIC	Thread name.
36	24	SMF121TS_CAT	8	EBCDIC	Thread category. Possible values are: APP APP-U1 APP-U2 APP-U3 APP-U4 APP-U5 SYS GC JIT OTHER RM Empty string (""), if not available
44	2C	SMF121TS_CPU	8	binary	Total CPU time, in nanoseconds. If not available, value is -1.
52	34	SMF121TS_NATIVEID	8	binary	Native OS thread ID. If not available, value is -1.

Record type 122 (X'7A') — IBM Explorer for z/OS and dependent products

IBM Explorer for z/OS and the products that depend on it write subtypes of SMF type 122 records to collect various data. Each product individually documents the data it writes to its assigned subtype.

The record type 122 has the following subtype:

Subtype
Product / description

1
IBM Developer for z Systems

See *IBM Developer for z Systems Host Configuration Reference Guide* for information about SMF record 122 subtype 1. This publication is available at IBM Developer for z Systems in IBM Documentation (www.ibm.com/docs/en/developer-for-zos).

Record type 123 (X'7B') — IBM z/OS Connect EE

The audit interceptor included with IBM z/OS Connect Enterprise Edition (z/OS Connect EE) generates SMF type 123 records. For more information about record type 123, see Using SMF records to monitor requests (www.ibm.com/support/knowledgecenter/en/SS4SVW_3.0.0/monitoring/smf_intro.html).

Record type 124 (X'7C') — I/O Supervisor (IOS) information

Record type 124 has the following subtypes:

Subtype 1 — Link diagnostic information
This record is written for each FICON channel, switch entry port, switch exit port, and control unit port that is accessible to z/OS. It contains information that can be used to diagnose I/O errors and performance issues that might be caused by fiber optic infrastructure issues or incorrect I/O configurations. Subtype 1 records are created at every link diagnostic monitoring interval, which is every 24 hours and consist of a single section:

Port section
Contains link diagnostic information for a particular port. This includes operational information related to the optics, such as transmit and receive power, current and capable operating speed, and error counters. There is one port section for every port connected to an online FICON channel that is accessible to z/OS. For example, if a FICON channel is connected through a switch to three control unit ports, then eight port sections will appear in the SMF record: one for the channel port, one for the entry switch port, one for each of the three exit switch ports, and one for each of the three control unit ports.

Subtype 2 — Endpoint security information
This record is written for each FICON channel path that is accessible to z/OS. It contains information that can be used to determine the endpoint security state (none, authenticated, encrypted) of the channel paths. Subtype 2 records are initially created at IPL or when a channel path first comes online, and then whenever the endpoint security state of the channel path changes.

Endpoint security section
Contains endpoint security status information for a particular channel path. There is one section for each channel path associated with an online FICON channel that is accessible to z/OS. For example, if a FICON channel is connected to three control unit ports and a path has been established to each one, then three sections will appear in the SMF record, one for each channel path.

Subtype 3 — Endpoint security authentication key update
Periodically, based on the host policy, the authentication keys used between the processor and its peer nodes are refreshed. A peer node can be either a storage subsystem or, in the case of a CTC connection, another processor. This record is written when the authentication key is changed.

Authentication key update section
Contains information about an authentication key update between the current processor and one of its peer nodes. This information includes the peer node's worldwide node name (WWNN).

Subtype 4 — Endpoint security encryption key update
Periodically, based on the host policy, the encryption keys used between the channels and their endpoints are refreshed. An endpoint can either be a port on a storage system, such as the port on a host adapter card of a DASD storage subsystem, or a channel port, as in the case of a CTC connection.

Encryption key update section
Contains information representing an encryption key update between a particular channel and one of its endpoint connections. This includes information to identify the channel path, such as the channel path identifier (CHPID), destination link address, and the worldwide port names (WWPN) of the channel and its endpoint.

Subtype 5 — External key manager event record
This record is created when the availability of an external key manager (EKM) changes.

External key manager event record section
Contains information about the availability of the EKM. This includes an indication of whether the EKM is available or unavailable, as well as its IP address or host name.

Macro to symbolically address the record: The SMF record mapping macro for all SMF 124 records is IOSDS124. The mapping macro resides in SYS1.MACLIB.

Record environment

The following conditions exist for the generation of this record:

Macro
SMFWTM (record exit: IEFU83)

Mode
Task

Storage residency
31-bit

Record mapping

Header/self-defining section

This section contains the common SMF record header fields and, if applicable, the triplet fields (offset/length/number) that locate the other sections on the record.

Offsets		Name	Length	Format	Description
0	0	SMF124RCL	2	binary	Record length. This field and the next field (total of four bytes) form the record descriptor word (RDW). See "Standard and Extended SMF record headers" on page 162 for a detailed description.
2	2	SMF124SGD	2	binary	Segment descriptor (see record length field). This is zero, if the record is not spanned.
4	4	SMF124FLG	1	binary	System indicator flags: **Bit** **Meaning when set** **0** Subsystem identification follows system identification. **1** Subtypes are used. **2** Reserved. **3-6** Version indicators*. **7** Reserved. *See "Standard and Extended SMF record headers" on page 162 for a detailed description.
5	5	SMF124RTY	1	binary	Record type 124 (X'7C').
6	6	SMF124TME	4	binary	Time since midnight, in hundredths of a second, when the record was moved into the SMF buffer.
10	A	SMF124DTE	4	packed	Date when the record was moved into the SMF buffer, in the form `0cyydddF`. See "Standard and Extended SMF record headers" on page 162 for a detailed description.
14	E	SMF124SID	4	EBCDIC	System identification (from the SID parameter).
18	12	SMF124SSI	4	binary	Subsystem identification.
22	16	SMF124STY	2	binary	Record subtype: **Value** **Meaning** **1** Link diagnostic information **2** Endpoint security information **3** Endpoint security authentication key update **4** Endpoint security encryption key update **5** External key manager event record
24	18	SMF124Hdr_Len	2	binary	Length of header.
26	1A	SMF124Hdr_TrplCnt	2	binary	Number of triplets in header.
28	1C	SMF124_Hdr_Flags	2	binary	Header flags.

Offsets		Name	Length	Format	Description
30	1E	*	2	binary	Reserved.

The following fields are only included with subtype 1:

Offsets		Name	Length	Format	Description
32	20	SMF124S1_Port_Offset	4	binary	Offset to port section from start of record, including record descriptor word (RDW).
36	24	SMF124S1_Port_Len	2	binary	Length of port section.
38	26	SMF124S1_Port_Num	2	binary	Number of port sections.

The following fields are only included with subtype 2:

Offsets		Name	Length	Format	Description
32	20	SMF124S2_EPSECSTAT_OFFSET	4	binary	Offset of endpoint security status section from start of record.
36	24	SMF124S2_EPSECSTAT_LEN	2	binary	Length of endpoint security status section.
38	26	SMF124S2_EPSECSTAT_NUM	2	binary	Number of endpoint security status sections.

The following fields are only included with subtype 3:

Offsets		Name	Length	Format	Description
32	20	SMF124S3_AUTHKEYUPD_OFFSET	4	binary	Offset of endpoint security authentication key update section from start of record.
36	24	SMF124S3_AUTHKEYUPD_LEN	2	binary	Length of endpoint security authentication key update section.
38	26	SMF124S3_AUTHKEYUPD_NUM	2	binary	Number of endpoint security authentication key update sections.

The following fields are only included with subtype 4:

Offsets		Name	Length	Format	Description
32	20	SMF124S4_ENCRKEYUPD_OFFSET	4	binary	Offset of endpoint security encryption key update section from start of record.
36	24	SMF124S4_ENCRKEYUPD_LEN	2	binary	Length of endpoint security encryption key update section.
38	26	SMF124S4_ENCRKEYUPD_NUM	2	binary	Number of endpoint security encryption key update sections.

The following fields are only included with subtype 5:

Offsets		Name	Length	Format	Description
32	20	SMF124S5_EXTKEYMGRINFO_OFFSET	4	binary	Offset of external key manager information section from start of record.
36	24	SMF124S5_EXTKEYMGRINFO_LEN	2	binary	Length of external key manager information section.
38	26	SMF124S5_EXTKEYMGRINFO_NUM	2	binary	Number of external key manager information sections.

Subtype 1

Port section

Offsets		Name	Length	Format	Description
0	0	SMF124S1_RetDate	4	Packed	Date the link diagnostic information was retrieved, in the form `0`*cyydddF*.
4	4	SMF124S1_RetTime	4	Binary	Time since midnight, in hundredths of a second, that the link diagnostic information was retrieved.
8	8	SMF124S1_WWPN	8	Binary	Worldwide port name (WWPN) of the port.
16	10	SMF124S1_ReportSrc	1	Binary	Reporting source: **Value (Name)** **Meaning** **1 (SMF124S1_ReportSrc_Monitor)** Periodic monitoring.
17	11	SMF124S1_PortID	3	Binary	Port identifier. The format depends on the port type (SMF124S1_PortType) and the identifier size (SMF124S1_IdSize) fields. See the following entries for the different mappings based on whether the port type is a channel port, switch port, or control unit port.
17	11	SMF124S1_CHPID	1	Binary	For channel ports, the channel path identifier (CHPID) assigned to the port.
18	12	SMF124S1_PCHID	2	Binary	For channel ports, the physical channel identifier (PCHID) assigned to the port.
17	11	SMF124S1_ID_LA2	2	Binary	For entry and exit switch ports, the domain and area portions of the 2-byte link address, if the identifier size (SMF124S1_IdSize) is 2.
17	11	SMF124S1_ID_LA1	1	Binary	For entry and exit switch ports, the 1-byte link address, if the identifier size (SMF124S1_IdSize) is 1.
17	11	SMF124S1_INTID	2	Binary	For control unit ports, the control unit interface ID assigned to the port.
20	14	SMF124S1_PortType	1	Binary	Port type: **Value (Name)** **Meaning** **1 (SMF124S1_PortType_Channel)** Channel port. **2 (SMF124S1_PortType_EntrySwitch)** Entry switch port. **3 (SMF124S1_PortType_ExitSwitch)** Exit switch port. **4 (SMF124S1_PortType_CU)** Control unit port.
21	15	SMF124S1_AssocCHPID	1	Binary	The associated CHPID for switch and control unit ports.

Offsets		Name	Length	Format	Description
22	16	SMF124S1_Flag1	1	Binary	Flag byte 1: **Bit (Name)** **Meaning when set** **0 (SMF124S1_ValSpeed)** Port speed information is valid. **1 (SMF124S1_ValSFPDP)** SFP diagnostic parameters are valid. **2 (SMF124S1_ValBuff)** Buffer credit information is valid. **3 (SMF124S1_ValLESB)** Link error status block (LESB) information is valid. **4 (SMF124S1_ValFEC)** Forward error correction (FEC) information is valid. **5 (SMF124S1_ValAttWWPN)** Attached port name SMF124S1_AttWWPN is valid. **6-7 (SMF124S1_IdSize)** Port identifier size (1, 2 or 3).
23	17	SMF124S1_Flag2	1	Binary	Flag byte 2: **Bit (Name)** **Meaning when set** **0 (SMF124S1_ValThresh_Temp)** Temperature threshold values are valid. **1 (SMF124S1_ValThresh_Voltage)** Voltage threshold values are valid. **2 (SMF124S1_ValThresh_TxBias)** Transmitter laser bias current (Tx bias) threshold values are valid. **3 (SMF124S1_ValThresh_TxPower)** Optical transmit power (Tx) threshold values are valid. **4 (SMF124S1_ValThresh_RxPower)** Optical receive power (Rx) threshold values are valid. **5-7 (*)** Reserved.

Offsets		Name	Length	Format	Description
24	18	SMF124S1_Flag3	1	Binary	Flag byte 3: **Bit (Name)** **Meaning when set** **0 (SMF124S1_OpSpeedUnknown)** The operating speed is not known to the port. **1 (SMF124S1_OpSpeedUnRecog)** The operating speed is not recognized by z/OS. **2 (SMF124S1_OpSpeedNotEst)** The operating speed has not been established by the port. **3 (SMF124S1_CapSpeedUnknown)** The capable speed is not known to the port. **4 (SMF124S1_CapSpeedUnRecog)** The capable speed is not recognized by z/OS. **5 (SMF124S1_FECActive)** Indicates whether forward error correction (FEC) for a 16 Gbs port is active. If on, FEC for this 16 Gbs port is active. If off, FEC for the 16 Gbs port is not active or the state is unknown. This field is not relevant to ports whose operating link speed is not 16Gbs. FEC for ports with speeds 32 Gbs or higher, will always be active **6-7 (*)** Reserved.
25	19	SMF124S1_Flag4	1	Binary	Flag 4: **Bit** **Meaning when set** **0-7** Reserved.
26	1A	SMF124S1_Flag5	1	Binary	Flag 5: **Bit** **Meaning when set** **0-7** Reserved.
27	1B	SMF124S1_Flag6	1	Binary	Flag 6: **Bit** **Meaning when set** **0-7** Reserved.
28	1C	SMF124S1_Flag7	1	Binary	Flag 7: **Bit** **Meaning when set** **0-7** Reserved.
29	1D	SMF124S1_Flag8	1	Binary	Flag 8: **Bit** **Meaning when set** **0-7** Reserved.
30	1E	SMF124S1_PortSpeed	4	Binary	Port speed information. This information is valid if SMF124S1_ValSpeed is ON.
30	1E	SMF124S1_OperSpeed	2	Binary	Current operating speed, in gigabits per second (Gbps). If zero, see operating speed flags in SMF124S1_Flag3 for more information.

Offsets		Name	Length	Format	Description
32	20	SMF124S1_CapSpeed	2	Binary	Maximum capable speed, in gigabytes per second (Gbps). If zero, see capable speed flags in SMF124S1_Flag3 for more information.
34	22	SMF124S1_SFPDP	10	Binary	Optical transceiver/small form-factor pluggable (SFP) diagnostic parameters. This information is valid if SMF124S1_ValSFPDP is ON.
34	22	SMF124S1_SFP_Temp	2	Binary	Transceiver temperature. This field contains a signed, two's complement value in increments of 1/256 of a degree Celsius (C). The valid range is -128°C to 128°C (127.996°C).
36	24	SMF124S1_SFP_Voltage	2	Binary	Voltage. The value is in units of 100 microvolts (µV). The valid range is 0 - 6.55 volts (V).
38	26	SMF124S1_SFP_TxBias	2	Binary	Transmitter laser bias current (Tx bias). The value is in units of two microamps (µA). The valid range is 0 - 131 milliamps (mA).
40	28	SMF124S1_SFP_TxPower	2	Binary	Transmit power (Tx). The value is in units of 0.1 microwatts (µW). The valid range is 0 - 6.5 milliwatts (mW).
42	2A	SMF124S1_SFP_RxPower	2	Binary	Receive power (Rx). The value is in units of 0.1 microwatts (µW). The valid range is 0 - 6.5 milliwatts (mW).
44	2C	SMF124S1_BuffCred	16	Binary	Buffer credit and distance information. This information is valid if SMF124S1_ValBuff is ON.
44	2C	SMF124S1_ThisPort_B2BCredit	4	Binary	Number of buffer-to-buffer credits for this port.
48	30	SMF124S1_AttPort_B2BCredit	4	Binary	Number of buffer-to-buffer credits for the attached port.
52	34	SMF124S1_RTT	4	Binary	Round-trip time from this port to the attached port, in nanoseconds. A value of zero means that the round trip time is unknown.
56	38	SMF124S1_Est_Distance	4	Binary	Estimated distance, in meters, based on the round-trip time. A value of zero means that the estimated distance is unknown.
60	3C	SMF124S1_ErrorInfo	40	Binary	Error information. See the individual fields to determine how to check for validity.
60	3C	SMF124S1_LESB _LinkFailureCount	4	Binary	Link failure count for this monitoring interval. This information is valid if SMF124S1_ValLESB is ON.
64	40	SMF124S1_LESB _LossOfSyncCount	4	Binary	Loss-of-synchronization count for this monitoring interval. This information is valid if SMF124S1_ValLESB is ON.
68	44	SMF124S1_LESB _LossOfSignalCount	4	Binary	Loss-of-signal count for this monitoring interval. This information is valid if SMF124S1_ValLESB is ON.
72	48	SMF124S1_LESB _PrimitiveSeqProtocol	4	Binary	Count of primitive sequence protocol errors for this monitoring interval. This information is valid if SMF124S1_ValLESB is ON.
76	4C	SMF124S1_LESB _InvalidTransWord	4	Binary	Count of invalid transmission words for this monitoring interval. This information is valid if SMF124S1_ValLESB is ON.
80	50	SMF124S1_LESB _InvalidCRCount	4	Binary	Invalid CRC count for this monitoring interval. This information is valid if SMF124S1_ValLESB is ON.
84	54	SMF124S1_FEC _UnCorrected_Blks	4	Binary	Number of FEC uncorrected blocks for this monitoring interval. This information is valid if SMF124S1_ValFEC is ON.
88	58	*	12	Binary	Reserved.

Offsets		Name	Length	Format	Description
100	64	SMF124S1_Thresholds_Temp	8	Binary	Transceiver temperature thresholds. Each field contains a signed, two's complement value in increments of 1/256 of a degree Celsius (C). The valid range is -128°C to 128°C (127.996°C). This information is valid with SMF124S1_ValThresh_Temp on.
100	64	SMF124S1_Threshold _Temp_HighAlarm	2	Binary	High alarm threshold.
102	66	SMF124S1_Threshold _Temp_LowAlarm	2	Binary	Low alarm threshold.
104	68	SMF124S1_Threshold _Temp_HighWarn	2	Binary	High warning threshold.
106	6A	SMF124S1_Threshold _Temp_LowWarn	2	Binary	Low warning threshold.
108	6C	SMF124S1_Thresholds_Voltage	8	Binary	Voltage thresholds. Each field contains a value in units of 100 microvolts (µV). The valid range is 0 - 6.55 volts (V). This information is valid when SMF124S1_ValThresh_Voltage is ON.
108	6C	SMF124S1_Threshold _Voltage_HighAlarm	2	Binary	High alarm threshold.
110	6E	SMF124S1_Threshold _Voltage_LowAlarm	2	Binary	Low alarm threshold.
112	70	SMF124S1_Threshold _Voltage_HighWarn	2	Binary	High warning threshold.
114	72	SMF124S1_Threshold _Voltage_LowWarn	2	Binary	Low warning threshold.
116	74	SMF124S1_Thresholds_TxBias	8	Binary	Transmitter laser bias current (Tx bias) thresholds. Each field contains a value in units of two microamps (µA). The valid range is 0 - 131 milliamps (mA). This information is valid when SMF124S1_ValThresh_Bias is ON.
116	74	SMF124S1_Threshold _TxBias_HighAlarm	2	Binary	High alarm threshold.
118	76	SMF124S1_Threshold _TxBias_LowAlarm	2	Binary	Low alarm threshold.
120	78	SMF124S1_Threshold _TxBias_HighWarn	2	Binary	High warning threshold.
122	7A	SMF124S1_Threshold _TxBias_LowWarn	2	Binary	Low warning threshold.
124	7C	SMF124S1_Thresholds _TxPower	8	Binary	Tx power thresholds. Each field contains a value in units of 0.1 microwatts (µW). The valid range is 0 - 6.5 milliwatts (mW). This information is valid if SMF124S1_ValThresh_TxPower is ON.
124	7C	SMF124S1_Threshold _TxPower_HighAlarm	2	Binary	High alarm threshold.
126	7E	SMF124S1_Threshold _TxPower_LowAlarm	2	Binary	Low alarm threshold.
128	80	SMF124S1_Threshold _TxPower_HighWarn	2	Binary	High warning threshold.
130	82	SMF124S1_Threshold _TxPower_LowWarn	2	Binary	Low warning threshold.
132	84	SMF124S1_Thresholds _RxPower	8	Binary	Rx power thresholds. Each field contains a value in units of 0.1 microwatts (µW). The valid range is 0 - 6.5 milliwatts (mW). This information is valid if SMF124S1_ValThresh_RxPower is ON.

Offsets		Name	Length	Format	Description
132	84	SMF124S1_Threshold _RxPower_HighAlarm	2	Binary	High alarm threshold.
134	86	SMF124S1_Threshold _RxPower_LowAlarm	2	Binary	Low alarm threshold.
136	88	SMF124S1_Threshold _RxPower_HighWarn	2	Binary	High warning threshold.
138	8A	SMF124S1_Threshold _RxPower_LowWarn	2	Binary	Low warning threshold.
140	8C	SMF124S1_AttWWPN	8	Binary	Worldwide port name of the attached port. This information is valid if SMF124S1_ValAttWWPN flag is on.
141	94	*	108	Binary	Reserved.

Subtype 2

Endpoint security status section

Offsets		Name	Length	Format	Description
0	0	SMF124S2_CHPID	1	binary	CHPID.
1	1	SMF124S2_PCHID	2	EBCDIC	Physical channel ID of CHPID.
3	3	SMF124S2_CHPWWPN	8	EBCDIC	Worldwide port number (WWPN) of channel.
11	B	SMF124S2_LADDR	3	EBCDIC	Destination link address.
14	E	SMF124S2_INTID	2	EBCDIC	Interface ID of CU port.
16	10	SMF124S2_CUWWPN	8	EBCDIC	WWPN of CU port.
24	18	SMF124S2_REPORTSRC	1	binary	Reporting source. Constants: SMF124S2_ReportSrc_*x*
25	19	SMF124S2_EPSEC_CURR	1	binary	Current endpoint security status. Constants: SMF124S2_EpSec_*xxxxx*
26	1A	SMF124S2_CHPIDCAPABILITY	1	binary	Endpoint security capability of the CHPID. Constants: SMF124S2_EpSec_*xxxxx*
27	1B	SMF124S2_FLAG1	1	binary	Flag byte 1. **Bit (Constant)** **Meaning when set** **0 (SMF124S2_EPSEC_SUMM)** Summary flag. The following two flags are mutually exclusive. If neither flag is on, then no endpoint security is in effect. **1 (SMF124S2_EPSEC_AUTH)** Authentication is in effect. **2 (SMF124S2_EPSEC_ENCR)** Encryption is in effect. **3 - 7** Reserved.
28	1C	*	29	binary	Reserved.

Subtype 3

Endpoint security authentication key update section

Offsets		Name	Length	Format	Description
0	0	SMF124S3_PEERWWNN	8	EBCDIC	World wide node name (WWNN) of peer node.
8	8	*	32	binary	Reserved.

Subtype 4

Endpoint security encryption key update section

Offsets		Name	Length	Format	Description
0	0	SMF124S4_CHPID	1	EBCDIC	CHPID associated with the event.
1	1	SMF124S4_PCHID	2	EBCDIC	Physical channel ID of the CHPID.
3	3	SMF124S4_CHPWWPN	8	EBCDIC	WWPN of the CHPID.
11	B	SMF124S4_LINKADDR	2	EBCDIC	Link address associated with the event.
13	D	SMF124S4_CUINTID	2	EBCDIC	Interface ID of the CU port.
15	F	SMF124S4_CUWWPN	8	EBCDIC	WWPN of the CU port.
23	17	*	32	binary	Reserved.

Subtype 5

External key manager event section

Offsets		Name	Length	Format	Description
0	0	SMF124S5_AVSTATUS	1	EBCDIC	Availability status of the external key manager. Constants: SMF124S5_AvStatus_*xx*
1	1	SMF124S5_IDTYPE	1	EBCDIC	Identifier type of the external key manager. Constants: SMF124S5_IdType_*xx*
2	2	SMF124S5_ID_LENGTH	1	binary	Length of identifier when ID type is 3 (hostname).
3	3	SMF124S5_IDENTIFIER	255	EBCDIC	External key manager identifier.
258	102	*	32	binary	Reserved.

Record type 125 (X'7D') — Generic Tracker data persistence

The SMF record type for Generic Tracker (GTZ) data is 125, with one subtype of value 1. Subtype 1 records contain persisted TRACKDATA information. Mapping macro GTZZSMF1 for these fields is available in MACLIB and can also be requested through IAZSMFR 125. See also the utility programs GTZSMFU2 and GTZSMFU3 in the The generic tracker facility topic in *z/OS MVS Diagnosis: Tools and Service Aids*, which can be used to format type 125 records in text form.

Note: The GTZ version of the type 117 record is replaced with type 125. See the "Record type 117 — WebSphere Message Broker and IBM Integration Bus" on page 1097 section of this publication for information on record type 117. The GTZ record type 125 is mapped the same as the previous GTZ record type 117. The difference between record type 125 and the previous GTZ record type 117 are the field names all begin with SMF125 instead of SMF117, or with GTZSMF125 instead of GTZSMF117.

Record mapping

Header/self-defining section

Table 22. Record 125 mapping header/self-defining section

Offset s - dec	Offset s - hex	Name	Alias	Length	Format	Description
0	x00	SMF125LEN	-	2	Binary	Record length. This field and the next field (total of four bytes) form the RDW (record descriptor word). See "Standard SMF record header" on page n for a detailed description.
2	x02	SMF125SEG	-	2	Binary	Segment descriptor (see record length field).
4	x04	SMF125FLG	-	1	Binary	System indicator. See "Standard SMF record header" on page n for details.
5	x05	SMF125RTY	-	1	Binary	Record type 125 (X'7D').
6	x06	SMF125TME	-	4	Binary	Time since midnight, in hundredths of a second, that the record was moved into the SMF buffer.
10	x0A	SMF125DTE	-	4	Packed	Date when the record was moved into the SMF buffer, in the form 0cyydddF. See "Standard SMF record header" on page n for details.
14	x0E	SMF125SID	-	4	EBCDIC	System identification (from the SID parameter).
18	x12	SMF125SSI	-	4	EBCDIC	Subsystem identification: 'GTZ'.
22	x16	SMF125STY	-	2	Binary	Record subtype. Value of 1 indicates TRACKDATA.
24	x18	SMF125TVR	GtzSmf125TVersion	1	Binary	Version: 1 (GtzSmfVersionTRACKDATA1).
25	x19	SMF125TF1	-	1		Flags byte 1. Bit 0: If ON, use SOURCEPATH, with SMF125TSPL and SMF125TSPO, otherwise use SOURCE, with SMF125TSO. Bit 1: If ON, use PROGRAMPATH, with SMF125TPPL and SMF125TPPO, otherwise use PROGRAM, with SMF125TPR. Bit 2: If ON, the tracked EVENT ran authorized.
26	x1A	-	-	7		Reserved
33	x21	SMF125TFT	GtzSmf125TFirstTOD	8	Binary	The time stamp when the first instance of this unique tracked instance was recorded.
41	x29	-	-	7		Reserved
48	x30	SMF125TOW	GtzSmf125TOwner	16	EBCDIC	OWNER value.
64	x40	SMF125TSO	GtzSmf125TSource	8	EBCDIC	SOURCE value. Only valid if SMF125TFS is OFF.
72	x48	SMF125TSPL	GtzSmf125TSourcePathLen	2	Binary	Length of SOURCEPATH value. Only valid if SMF125TFS is ON.
74	x4A	SMF125TSPO	GtzSmf125TSourcePathOffset	2	Binary	Offset from the start of this GtzSmf125 record to the SOURCEPATH value of the offset 72 length. Only valid if SMF125TFS is ON.
76	x4C	SMF125TEDL	GtzSmf125TEventDescLen	2	Binary	Length of EVENTDESC value.

Table 22. Record 125 mapping header/self-defining section (continued)

Offset s - dec	Offset s - hex	Name	Alias	Length	Format	Description
78	x4E	SMF125TEDO	GtzSmf125TEventDescOffset	2	Binary	Offset from the start of this GtzSmf125 record to the EVENTDESC value of the offset 76 length.
80	x50	SMF125TED	GtzSmf125TEventData	16	Binary	EVENTDATA value.
80	x50		GtzSmf125TEventData1	8	Binary	First half of EVENTDATA value.
88	x58		GtzSmf125TEventData2	8	Binary	Second half of EVENTDATA value.
96	x60	SMF125TEJ	GtzSmf125TEventJob	8	EBCDIC	Derived EVENTJOB-name value.
104	x68	SMF125THJ	GtzSmf125THomeJob	8	EBCDIC	Derived HOMEJOB-name value.
112	x70	SMF125TPR	GtzSmf125TProgram	8	EBCDIC	Derived PROGRAM-name value. Only valid if SMF125TFP is OFF.
120	x78	SMF125TPO	GtzSmf125TProgramOffset	8	Binary	Derived PROGRAMOFFSET value.
128	x80	SMF125TPPL	GtzSmf125TProgramPathLen	2	Binary	Length of PROGRAMPATH value. Only valid if SMF125TFP is ON.
130	x82	SMF125TPPO	GtzSmf125TProgramPathOffset	2	Binary	Offset from the start of this GtzSmf125 record to the PROGRAMPATH value of the offset 128 length. Only valid if SMF125TFP is ON.
132	x84	SMF125TEA	GtzSmf125TEventASID	2	Binary	EVENTASID value.
134	x86	SMF125THA	GtzSmf125THomeASID	2	Binary	HOMEASID value.
136	x88	SMF125SYN	GtzSmf125TSystemName	8	EBCDIC	Name of system on which this tracked instance was recorded.
144	x90	SMF125SXN	GtzSmf125TSysplexName	8	EBCDIC	Name of sysplex on which this tracked instance was recorded.
152	x98	-	-	40		Reserved
192	xC0	-	-			

Appendix A. Accessibility

Accessible publications for this product are offered through IBM Documentation (www.ibm.com/docs/en/zos).

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Accessibility features

Accessibility features help users who have physical disabilities such as restricted mobility or limited vision use software products successfully. The accessibility features in z/OS can help users do the following tasks:

- Run assistive technology such as screen readers and screen magnifier software.
- Operate specific or equivalent features by using the keyboard.
- Customize display attributes such as color, contrast, and font size.

Consult assistive technologies

Assistive technology products such as screen readers function with the user interfaces found in z/OS. Consult the product information for the specific assistive technology product that is used to access z/OS interfaces.

Keyboard navigation of the user interface

You can access z/OS user interfaces with TSO/E or ISPF. The following information describes how to use TSO/E and ISPF, including the use of keyboard shortcuts and function keys (PF keys). Each guide includes the default settings for the PF keys.

- *z/OS TSO/E Primer*
- *z/OS TSO/E User's Guide*
- *z/OS ISPF User's Guide Vol I*

Dotted decimal syntax diagrams

Syntax diagrams are provided in dotted decimal format for users who access IBM Documentation with a screen reader. In dotted decimal format, each syntax element is written on a separate line. If two or more syntax elements are always present together (or always absent together), they can appear on the same line because they are considered a single compound syntax element.

Each line starts with a dotted decimal number; for example, 3 or `3.1` or `3.1.1`. To hear these numbers correctly, make sure that the screen reader is set to read out punctuation. All the syntax elements that have the same dotted decimal number (for example, all the syntax elements that have the number `3.1`) are mutually exclusive alternatives. If you hear the lines `3.1 USERID` and `3.1 SYSTEMID`, your syntax can include either `USERID` or `SYSTEMID`, but not both.

The dotted decimal numbering level denotes the level of nesting. For example, if a syntax element with dotted decimal number 3 is followed by a series of syntax elements with dotted decimal number 3.1, all the syntax elements numbered 3.1 are subordinate to the syntax element numbered 3.

Certain words and symbols are used next to the dotted decimal numbers to add information about the syntax elements. Occasionally, these words and symbols might occur at the beginning of the element itself. For ease of identification, if the word or symbol is a part of the syntax element, it is preceded by the backslash (\) character. The * symbol is placed next to a dotted decimal number to indicate that the syntax element repeats. For example, syntax element `*FILE` with dotted decimal number 3 is given the format `3 \* FILE`. Format `3* FILE` indicates that syntax element `FILE` repeats. Format `3* \* FILE` indicates that syntax element `* FILE` repeats.

Characters such as commas, which are used to separate a string of syntax elements, are shown in the syntax just before the items they separate. These characters can appear on the same line as each item, or on a separate line with the same dotted decimal number as the relevant items. The line can also show another symbol to provide information about the syntax elements. For example, the lines `5.1*, 5.1 LASTRUN, and 5.1 DELETE` mean that if you use more than one of the `LASTRUN` and `DELETE` syntax elements, the elements must be separated by a comma. If no separator is given, assume that you use a blank to separate each syntax element.

If a syntax element is preceded by the % symbol, it indicates a reference that is defined elsewhere. The string that follows the % symbol is the name of a syntax fragment rather than a literal. For example, the line `2.1 %OP1` means that you must refer to separate syntax fragment OP1.

The following symbols are used next to the dotted decimal numbers.

? indicates an optional syntax element
The question mark (?) symbol indicates an optional syntax element. A dotted decimal number followed by the question mark symbol (?) indicates that all the syntax elements with a corresponding dotted decimal number, and any subordinate syntax elements, are optional. If there is only one syntax element with a dotted decimal number, the ? symbol is displayed on the same line as the syntax element, (for example `5? NOTIFY`). If there is more than one syntax element with a dotted decimal number, the ? symbol is displayed on a line by itself, followed by the syntax elements that are optional. For example, if you hear the lines `5 ?, 5 NOTIFY`, and `5 UPDATE`, you know that the syntax elements `NOTIFY` and `UPDATE` are optional. That is, you can choose one or none of them. The ? symbol is equivalent to a bypass line in a railroad diagram.

! indicates a default syntax element
The exclamation mark (!) symbol indicates a default syntax element. A dotted decimal number followed by the ! symbol and a syntax element indicate that the syntax element is the default option for all syntax elements that share the same dotted decimal number. Only one of the syntax elements that share the dotted decimal number can specify the ! symbol. For example, if you hear the lines `2? FILE, 2.1! (KEEP), and 2.1 (DELETE)`, you know that `(KEEP)` is the default option for the `FILE` keyword. In the example, if you include the `FILE` keyword, but do not specify an option, the default option KEEP is applied. A default option also applies to the next higher dotted decimal number. In this example, if the `FILE` keyword is omitted, the default `FILE(KEEP)` is used. However, if you hear the lines `2? FILE, 2.1, 2.1.1! (KEEP)`, and `2.1.1 (DELETE)`, the default option KEEP applies only to the next higher dotted decimal number, `2.1` (which does not have an associated keyword), and does not apply to `2? FILE`. Nothing is used if the keyword `FILE` is omitted.

*** indicates an optional syntax element that is repeatable**
The asterisk or glyph (*) symbol indicates a syntax element that can be repeated zero or more times. A dotted decimal number followed by the * symbol indicates that this syntax element can be used zero or more times; that is, it is optional and can be repeated. For example, if you hear the line `5.1* data area`, you know that you can include one data area, more than one data area, or no data area. If you hear the lines `3* , 3 HOST, 3 STATE`, you know that you can include `HOST, STATE`, both together, or nothing.

Notes:

1. If a dotted decimal number has an asterisk (*) next to it and there is only one item with that dotted decimal number, you can repeat that same item more than once.
2. If a dotted decimal number has an asterisk next to it and several items have that dotted decimal number, you can use more than one item from the list, but you cannot use the items more than once each. In the previous example, you can write `HOST STATE`, but you cannot write `HOST HOST`.
3. The * symbol is equivalent to a loopback line in a railroad syntax diagram.

+ indicates a syntax element that must be included
The plus (+) symbol indicates a syntax element that must be included at least once. A dotted decimal number followed by the + symbol indicates that the syntax element must be included one or more times. That is, it must be included at least once and can be repeated. For example, if you hear the line `6.1+ data area`, you must include at least one data area. If you hear the lines `2+, 2 HOST, and 2 STATE`, you know that you must include `HOST, STATE,` or both. Similar to the * symbol, the + symbol can repeat a particular item if it is the only item with that dotted decimal number. The + symbol, like the * symbol, is equivalent to a loopback line in a railroad syntax diagram.

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