

IBM IMS Performance Analyzer for z/OS
4.5

Report Reference



Note:

Before using this information and the product it supports, read the "Notices" topic at the end of this information.

Second Edition (January 2023)

This edition applies to Version 4 Release 5 of IBM® IMS Performance Analyzer for z/OS® (product number 5655-R03) and to all subsequent releases and modifications until otherwise indicated in new editions.

This edition replaces SC19-4366-03.

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About this information

IBM IMS Performance Analyzer for z/OS (also referred to as IMS Performance Analyzer) is a performance analysis and tuning aid for Information Management System Database (IMS DB) and Transaction Manager (IMS TM) systems.

These topics describe all IMS Performance Analyzer reports and extracts in detail, what they contain, and how to use them. The IMS Log, Monitor, IMS Connect, and OMEGAMON® for IMS Application Trace Facility (ATF) data that is processed by IMS Performance Analyzer are also described.

Related reading: For information about how to generate the reports using the dialog or batch commands, and a detailed description of the report options, see the *IBM IMS Performance Analyzer for z/OS User's Guide, SC19-4365*.

These topics are designed for managers, database administrators, system programmers, application programmers, and system operators responsible for monitoring and improving the performance of IMS systems.

To use these topics, you should have an understanding of basic IMS concepts and your installation's IMS systems, and a working knowledge of:

- The z/OS operating system
- ISPF
- IMS Database and Transaction Monitor systems
- IMS Connect and IMS Connect Extensions, if applicable

Always check the IMS Tools Product Documentation page for the most current version of this information:

<http://www.ibm.com/software/data/db2imstools/imstools-library.html>

Part 1. Introduction

IBM IMS Performance Analyzer for z/OS (also referred to as IMS Performance Analyzer, or by the abbreviation IMS PA) is a performance analysis and tuning aid for DB and TM systems for IMS.

The topics in this section provide you with an overview of IMS Performance Analyzer concepts, the reports and extracts that can be generated from Report Sets, and the data that is used to produce them.

Chapter 1. IMS Performance Analyzer overview

IBM IMS Performance Analyzer for z/OS (IMS PA) is a performance analysis tool to help you monitor, maintain and tune your Information Management System Database (IMS DB) and Transaction Manager (IMS TM) systems.

Related reading: There are several IMS Redbooks® that provide additional performance and tuning information for your IMS systems. The *IBM IMS Version 7 Performance Monitoring and Tuning Update* (SG24-6404) is recommended because it contains additional information on how to interpret many of the IMS Performance Analyzer reports to help you make tuning decisions. This information, although not exhaustive, is generally applicable to later releases of IMS. Supplementary information is provided in *IBM IMS Performance and Tuning Guide* (SG24-7324).

What's new in IMS Performance Analyzer

This topic summarizes the technical changes that were introduced in or incorporated into IMS Performance Analyzer 4.5.

New and changed information is indicated by a vertical bar (|) to the left of a change. Editorial changes that have no technical significance are not noted.

When migrating from a previous release of IMS Performance Analyzer, customers should also review the upgrade instructions in the User's guide before proceeding.

Fifth edition (SC19-4366-06)

IMS Version 15.5 support (APAR PH60599)

IMS Performance Analyzer now supports IMS version 15.5.

Enhancements to the IRUR report (APAR PH59018)

The Internal Resource Usage report (IRUR) of IMS Performance Analyzer is enhanced to provide the following additional reports:

- Member OTMA TPIPE Statistics
- Global OTMA TPIPE Statistics

The IMS Internal Resource Usage Member OTMA TPIPE Statistics presents comprehensive information concerning the TPIPEs and YTIBs of each OTMA Member. In contrast, the Global OTMA TPIPE Statistics report provides a consolidated summary of TPIPE and YTIB information for all OTMA Members. See [“OTMA TPIPE Statistics” on page 154](#).

Fourth edition (SC19-4366-05)

IMS Version 15.4 support (APAR PH54443)

IMS Performance Analyzer now supports IMS version 15.4.

Third edition (SC19-4366-04)

IMS Version 15.3 support (APAR PH46483)

IMS Performance Analyzer now supports IMS version 15.3.

Enhancements to Monitor reports (APAR PH43942)

When the field values are higher than 999.99, then the Monitor Program Trace report now displays the field values in the 99.9K format. See [“Program Trace report” on page 376](#).

Updates to Enqueue/Dequeue report (APAR PH51656)

The Enqueue/Dequeue report is now updated to correctly report the output messages as dequeued in an IMS Shared Queues environment.

Second edition (SC19-4366-03)

Form-based reporting enhancements for analytics applications

The following enhancements facilitate the import of machine readable data produced by IMS Performance Analyzer into third-party analytics platforms.

- **New ALLINTERVALS option to explicitly include intervals in extracts where no activity was recorded (APAR PH35307)**

The ALLINTERVALS form-based reporting option explicitly includes intervals in extracts where no activity was recorded. This option is useful for importing extract data into third-party tools and analytics platforms where an explicit value of "0" may be required for periods of system inactivity.

- **New ALLFIELDS option to explicitly include all fields in extracts (APAR PH35307)**

The ALLFIELDS form-based reporting option explicitly includes all fields in extracts when reporting on multi-value fields from the DATABASE, ESAF, and ODBM categories.

New form field DLIUOWSQ (APAR PH38381)

New form field DLIUOWSQ provides the ODBM UOW relative sequence number. For more information, see Chapter 42, [“Glossary of Report Form field names,”](#) on page 515.

New Enqueue/dequeue report (APAR PH35027)

The new enqueue/dequeue report summarizes the number of messages enqueue and dequeue by IMS. For more information, see [“Enqueue/Dequeue report”](#) on page 193.

Enhancements to the System Checkpoint reports

- **CSV extract option (APAR PH33880)**

System Checkpoint reports can now be requested in CSV format.

- **Transaction Definitions report (APAR PH38149)**

The Transaction Definitions report in the System Checkpoint report has been reformatted to accommodate the new serial (SER) indicator in the Options column. For more information, see [“Checkpoint Transaction Definitions report”](#) on page 182.

Enhancements to Internal Resource Usage reports

- **CSV extract option (APAR PH32765)**

Internal Resource Usage reports can now be requested in CSV format.

- **Virtual Storage Usage report (APAR PH38149)**

The Virtual Storage Usage report now contains a DLI/SAS section. For more information, see [“Virtual Storage Usage”](#) on page 148.

- **Logger Statistics report (APAR PH38149)**

The Logical Logger report has been expanded to include additional statistics. For more information, see [“Logger Statistics”](#) on page 137.

First edition (SC19-4366)

Simplified ISPF dialog

The primary option menu of the IMS Performance Analyzer ISPF dialog has been restructured to improve ease of use. Option 10 Report Forms has been moved to option 2. Other less frequently used features can now be accessed under option 4.

Form-based reporting enhancements, changes to defaults, and deprecated features

IMS Performance Analyzer form-based reporting now comes with the following enhancements:

- **Request a report or CSV extract directly from a report form**

Generate report and CSV extract JCL directly from list of report forms or from the report form itself. With this feature you no longer need to add a report form to a report set for ad hoc reporting.

- **Report filters**

Add a filter to your form-based report that focuses the report on a specific set of conditions. Report filters can be found in the **Controls** menu under option 4.

- **New sample forms**

Dozens of new sample forms have been added to assist you with common analysis tasks. To add the new samples to your sample library, use the SAMPLES command on the Report Form panel. To view additional information for each sample form, use line action U.

- **Field search**

Use the field search facility on a report form or report filter to help you locate form fields related to your area of enquiry.

- **Changes to the default precision and digit grouping options**

When not specified, the default time reporting precision for form-based reports has changed from 3 (millisecond precision) to 6 (microsecond precision). The default precision for fields that display count averages in summary reports has changed from 0 decimal places to 2. The default digit grouping has changed from NOGROUP (no 1000s separators in count fields) to SECGROUP (separators applied).

- **Limit the number of lines produced in a summary report form**

Use the report limit option to limit the number of lines in a summary report to a specified value. This is useful, for example, if you want to report the top 10 transactions for your chosen sort fields.

- **New reporting option for program switch sequences initiated from a BMP**

The new PROGRAMSWITCH(BMP) option is similar to PROGRAMSWITCH(YES) but also reports the BMP transaction at the head of the group if the switch sequence was initiated from a BMP.

- **New form fields for reporting on program switch sequences, Open Database activity, DL/I call counts, and more**

New form fields are now available for reporting. New areas of reporting include Open Database from IMS Connect Extensions journals and DL/I call statistics.

- ALIAS: ODBM alias name.
- CEXHICOD: IMS Connect log code for high return code.
- CEXHIRC: IMS Connect high return code.
- CEXHIRSN: IMS Connect reason code for high return code.
- CEXTYPE: IMS Connect transaction type.
- DBDEQ: Number of DLI/I DB DEQ calls.
- DBGUR: Number of DL/I GUR calls.
- DBIR: Number of DL/I IR calls.
- DBMR: Number of DL/I MR calls.
- DBRLSE: Number of DL/I DB RLSE calls.
- DCAUTH: Number of DL/I message queue AUTH calls.
- DCCHNG: Message queue Change (CHNG) call count.
- DCCMD: Message queue Command (CMD) call count.
- DCGCMD: Message queue Get Command (GCMD) call count.
- DCSETO: Number of DL/I message queue SETO calls.
- DLICOMTM: ODBM UOW commit time.
- DLIDBNM: ODBM DLI call database name.
- DLIDISP: ODBM UOW disposition.
- DLIFROWS: ODBM DLI rows updated count.
- DLIFUNC: ODBM DLI function call.

- DLIFUNCT: ODBM DLI function call count.
- DLIMSGTM: ODBM DLI call message elapsed time.
- DLIPCBNM: ODBM allocate PSB time.
- DSAPSB: Number of DL/I APSB calls.
- DSCHKP: Number of DL/I CHKP calls.
- DSDPSB: Number of DL/I DPSB calls.
- DSGMSG: Number of DL/I GMSG calls.
- DSICMD: Number of DL/I ICMD calls.
- DSINIT: Number of DL/I INIT calls.
- DSINQY: Number of system service inquiry (INQY) calls.
- DSLOG: Number of system service log (LOG) calls.
- DSRCMD: Number of DL/I RCMD calls.
- DSROLB: Number of DL/I ROLB calls.
- DSROLS: Number of DL/I ROLS calls.
- DSSETS: Number of DL/I SETS calls.
- DSSETU: Number of DL/I SETU calls.
- DSXRST: Number of DL/I XRST calls.
- EXCLDEQ: Number of DL/I exclusive dequeue calls.
- EXCLENQ: Number of DL/I exclusive enqueue calls.
- EXCLWAIT: Number of DL/I waits on DL/I exclusive enqueue calls.
- EXPRESS: Type of Express program.
- FFCHNG: Number of full function Lock Change requests.
- FFLOCK: Number of full function Lock requests.
- FFUNLK: Number of full function Unlock requests.
- FPCHGN: Number of Fast Path Lock Change requests.
- FPCOMB: Fast Path count of combinations logged.
- FPDEQ: Fast Path DEDB Dequeue (DEQ) count.
- FPLGCI: Fast Path count of whole control intervals (Cs) logged.
- FPLOCK: Fast Path lock requests.
- FPRLSE: Fast Path Release Locks (RLSE) call count.
- FPUNLK: Fast Path Unlock requests.
- FPWTNOC: Fast Path IRLM internal suspend count, or suspends not related to lock requests.
- ODBALPSB: ODBM allocate PSB time.
- ODBCORTK: ODBM correlation token.
- ODBDEPSB: ODBM deallocate PSB time.
- ODBMNAME: ODBM name.
- ODBMSGTM: ODBM message elapsed time.
- OLR: Indicates that a batch message processing (BMP) region is scheduled for Online Reorganization.
- ORGRGTYP: Region type of the originating transaction in a program switch sequence.
- OUTALIAS: Target ODBM alias name.
- OUTODBNM: ODBM output name.
- PARRGTYP: Region type of the parent transaction in a program switch sequence.

- PARTOKEN: System where the parent transaction is processed in a program switch sequence. Last 8 bytes of the IMS unit of recovery token.
- PARTOKID: System where the parent transaction is processed in a program switch sequence. First 8 bytes of the IMS unit of recovery token.
- PSBNAME: ODBM PSB name.
- QCMDDEQ: Number of DL/I queue command dequeues.
- QCMDENQ: Number of DL/I queue command enqueues.
- QCMDWAIT: Number of DL/I waits on queue command enqueues.
- REGOCCUP: Region occupancy time.
- SECCHK: ODBM security check code
- SCOTPIPE: Sync Callout tpipe name.
- SOCKETTYPE: Socket type.
- SRBTIME: Program execution SRB time.
- SVRCOD: ODBM severity code.
- TESTDEQ: Number of DL/I test dequeues.
- TESTENQ: Number of DL/I test enqueues.
- TESTWAIT: Number of DL/I waits on test enqueues.
- UPDDEQ: Number of DL/I update dequeues.
- UPDENQ: Number of DL/I update enqueues.
- UPDWAIT: Number of DL/I waits on updates and enqueues.
- XQRYCOPY: Number of XQuery COPY calls.
- XQRYRSTR: Number of XQuery RSTR calls.
- XQRYSAVE: Number of XQuery SAVE calls.

For more information, see [Chapter 42, “Glossary of Report Form field names,”](#) on page 515.

• **Changes to the calculation of syncpoint phase 2 elapsed time**

Previously, the value for syncpoint phase 2 elapsed time for DBCTL and other non-message driven transactions was calculated by measuring the elapsed time between the X'3730' and X'07' log records.

To more accurately reflect syncpoint phase 2 elapsed time in this case, the calculation has changed to report the elapsed time between the X'3730' and X'5612' log records, except when the value in log record X'5937'.SYNCOTHR is greater than 0 in which case the elapsed time between log records X'3730' and X'5937' is used. The calculation for Fast Path transactions remains unchanged.

This change impacts on the SYNCPH2E and SYNCELAP form fields. For more information, see [Chapter 42, “Glossary of Report Form field names,”](#) on page 515.

• **Deprecation of NOMATCH parameter in IMS Connect form-based reporting**

The **NOMATCH** parameter of the **IMSPACEX LIST** command has been removed. The default behavior is now to include transactions for which full end-to-end data is available for combined IMS and IMS Connect reporting.

BMP Checkpoint report enhancements

The BMP Checkpoint report has been enhanced with new options:

• **Average Checkpoint Frequency**

The Average Checkpoint Frequency is used to establish a desired checkpoint rate. This rate is then compared to the actual rate in the BMP Checkpoint report to determine if BMP jobs are issuing application checkpoints too frequently, or not often enough. This option is only applicable to Summary reports.

• **Report update activity only**

This option reports only BMP jobs with database update activity. This option is only applicable to Summary reports. List (or Trace) reports will contain events for all BMP jobs.

For more information, see [“BMP Checkpoint report”](#) on page 187.

Open Database enhancements to the IMS Connect transaction index CA20 record

The IMS Connect transaction index CA20 record has been enhanced to support Open Database workloads. For more information, see [“IMS Connect transaction index”](#) on page 436.

Open Database event trace

The IMS Connect Transit Event Trace report can now be used to report on Open Database activity recorded in the IMS Connect Extensions journal. For more information, see [“IMS Connect Transit Trace report: Open Database activity”](#) on page 478.

Db2 and extract enhancements

There are several enhancements related to Db2®:

- You can create an extract directly from a report form using line action J.
- You can create extracts with time stamp fields that include time zone information using the ISO 8601 option.
- You can use a report set to create an extract and load it into Db2 in a single operation, provided the table exists in Db2 to hold the data.
- You can output numerical fields to an extract in decimal format.

ATF Exception Transaction Extract changes

The Exception Transaction Extract in an ATF report set now works with IBM OMEGAMON for IMS on z/OS Application Trace Facility (ATF) log stream extracts rather than journals. Consequently, it produces only a single type of extract and the ISPF dialog for Exception Transaction Extract shows only a single extract data name field rather than two. Also, some options that are no longer required have been removed from the IMS Performance Analyzer ISPF dialog.

Inflight data set record changes

The structure of records stored in inflight data sets has changed. To use the inflight facility, customers must terminate any running report jobs that use inflight processing and restart them with the new release of IMS Performance Analyzer using an empty input data set. Existing inflight data sets created using the previous release can not be used as input.

Change in length of Fast Path Transaction Exception extract

The Fast Path Transaction Exception extract has been adjusted to correct for a historical increase in PST size. As a result, the length of a record has increased. Customers who use this facility will need to take this into account when upgrading.

Deprecation of Transaction Reporting Facility (TRF) of IBM OMEGAMON for IMS on z/OS.

Removed support for the deprecated Transaction Reporting Facility (TRF) of IBM OMEGAMON for IMS on z/OS. The following form fields are therefore no longer supported and must be removed from your existing report forms or batch reports (where applicable):

- DB2CPU
- PGMSIZE
- PRMEM24
- PRMEM31
- SRBTIME

What does IMS Performance Analyzer do?

IMS Performance Analyzer (IMS PA) provides a comprehensive suite of reports to help you manage the performance and resource utilization of your IMS systems.

IMS Performance Analyzer processes IMS log, IMS monitor, IMS Connect event data written to IMS Connect Extensions journals, and IBM OMEGAMON for IMS Application Trace Facility (ATF) data to provide comprehensive reports for use by IMS specialists to tune their IMS systems, and managers to verify service levels and predict trends.

Tip: Input logs provided to IMS Performance Analyzer may contain sensitive information that may be reproduced in IMS Performance Analyzer report output. Use IBM IMS Problem Investigator for z/OS to assist you in scrubbing sensitive or confidential information from log records before they are processed by IMS Performance Analyzer. For more information, see *Scrubbing sensitive data from log files* in the IMS Problem Investigator User's Guide.

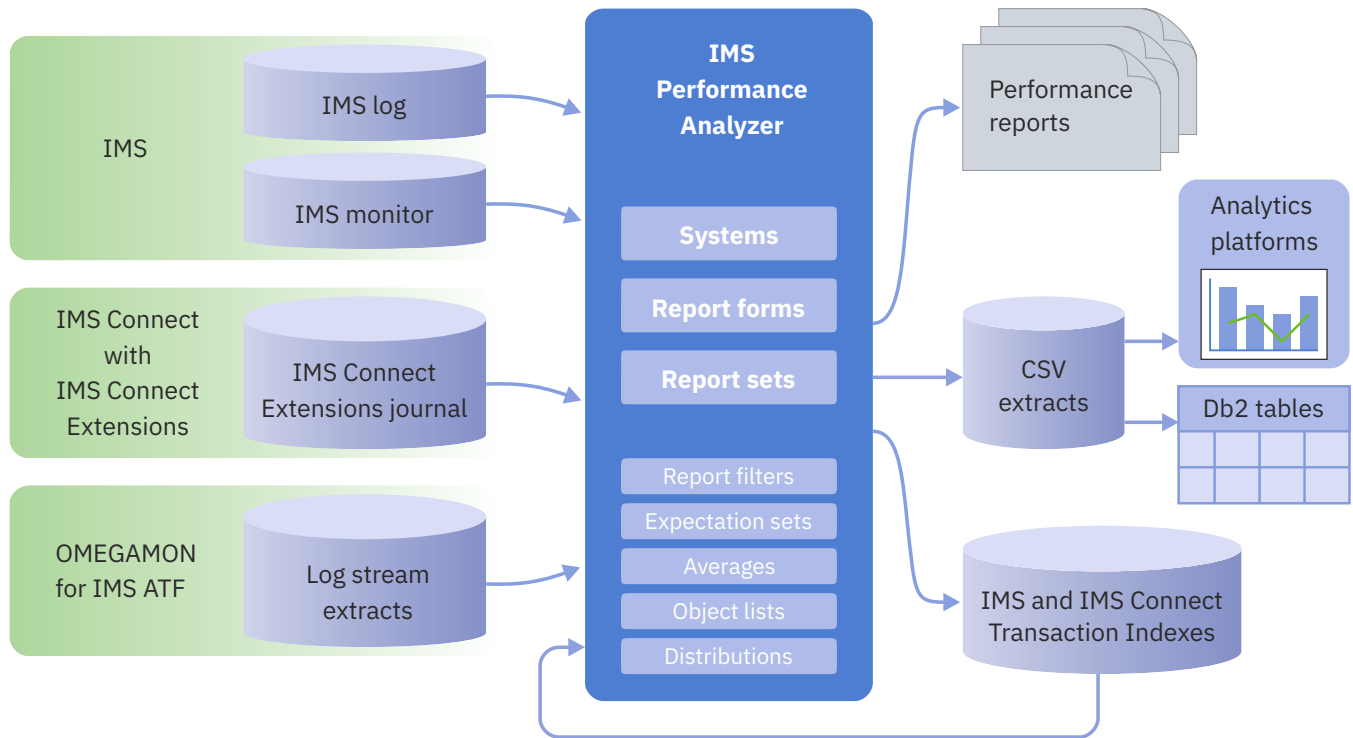


Figure 1. Overview of IMS Performance Analyzer operation

IMS Performance Analyzer provides an ISPF dialog to create your report requests and to generate the JCL to run them using your specified systems and the following types of input data:

IMS log data

From IMS log data, IMS Performance Analyzer provides comprehensive information about transit times (actual system performance time), and IMS resource usage and availability. IMS Performance Analyzer can process logs from a single IMS system, or from multiple IMS subsystems running in a sysplex and using shared queues. You can specify log files explicitly or let IMS Performance Analyzer use Database Recovery Control (DBRC) and IMS RECON data sets to automatically locate the files for your required reporting interval. User-defined performance thresholds allow you to set goals and report exceptions. A history of transaction performance can be maintained in Transaction History Files.

Extracts of transit time by time interval data can be created from log files then exported using IMS Performance Analyzer facilities. Extracts of total transaction traffic or exception transactions (MSGQ or Fast Path), CPU usage and database update activity can also be created for direct import by external programs such as Db2 or for use in analytics platforms. CSV extracts can be written to a data set or streamed as JSON lines to a TCP listener.

Report forms can be used to tailor transit summary and list reports to include only the data fields of interest. Form-based extracts can be created then directly loaded into Db2 tables.

IMS monitor data

From IMS monitor¹ data, IMS Performance Analyzer creates summary and analysis reports for regions, resources, programs, transactions, databases, and the total system, to analyze your IMS

system environment. IMS Performance Analyzer provides comprehensive reporting for the IMS Fast Path monitor, including data entry databases (DEDB), balancing group (BALG), expedited message handler (EMH), Fast Path Buffer, OTHREAD processing, and Virtual Storage Options (VSO). External Subsystem (ESS) call activity can be incorporated in applicable reports. Alternative sequencing of reports by region occupancy, calls or delay can be requested to highlight bad performance.

IMS Connect data

IMS Performance Analyzer provides comprehensive reporting from the IMS Connect performance and accounting data collected by IBM IMS Connect Extensions for z/OS (5655-S56). You can specify IMS Connect Extensions journal data sets explicitly, or you can use IMS Performance Analyzer Journal File Selection and the IMS Connect Extensions definitions repository to automatically locate the required IMS Connect Extensions journals. Summary and detailed reports analyze IMS Connect transaction internal and external transit times and latencies, highlighting critical events for message processing. They also provide information about significant processing events with the potential to impact performance, including resource availability and session errors.

You can obtain a complete end-to-end picture of transaction transit performance by using IMS Performance Analyzer to combine and report on both IMS and IMS Connect event data

OMEGAMON for IMS ATF data

IBM OMEGAMON for IMS Application Trace Facility (ATF) reporting provides application-level detailed monitoring of DLI calls and Db2 calls, and also provides information about DLI call times and CPU utilization in each IMS region.

Complementary IBM products

IMS Performance Analyzer complements the following IBM products in the investigation of transaction performance related problems.

IBM IMS Performance Solution Pack

IMS Performance Solution Pack provides a comprehensive portfolio of IBM IMS performance management tools that combine IBM IMS Problem Investigator, IMS Performance Analyzer, and IMS Connect Extensions into a single offering.

IBM IMS Connect Extensions for z/OS (5655-S56)

IMS Connect Extensions provides instrumentation for IMS Connect. The tool continuously records IMS Connect events, which you can analyze with IMS Performance Analyzer using the suite of reports provided in **CEX** Report Sets. The input data for reporting is provided by explicitly specifying IMS Connect Extensions journal data sets, or by requesting the IMS Performance Analyzer automated file selection utility to automatically select the journal data sets for your specified systems and report period.

IBM IMS Problem Investigator for z/OS (5655-R02)

IMS Problem Investigator (IMS PI) allows you to interactively investigate IMS and related logs. It helps you pinpoint the cause of problems highlighted by IMS Performance Analyzer. Transaction tracking is facilitated by using the IMS transaction index (X'CA01' record) and IMS Connect transaction index (X'CA20' record) created by IMS Performance Analyzer. To make the two products easier to use together, they share definitions for systems and groups: you only need to maintain the definitions in one of the tools.

The following diagram illustrates the cooperation between IMS Performance Analyzer, IMS Problem Investigator, and IMS Connect Extensions. When IMS Connect event details in IMS Connect Extensions journals are merged with IMS (and related) logs, IMS Performance Analyzer and IMS Problem Investigator can provide a comprehensive insight into the lifecycle of IMS transactions.

¹ In this book, the term *monitor* applies to both the IMS monitor used in the IMS TM environment and the IMS DB monitor used in the IMS DB environment. In cases where information applies to only one of the monitors, the term *IMS monitor* or *DB monitor* is used.

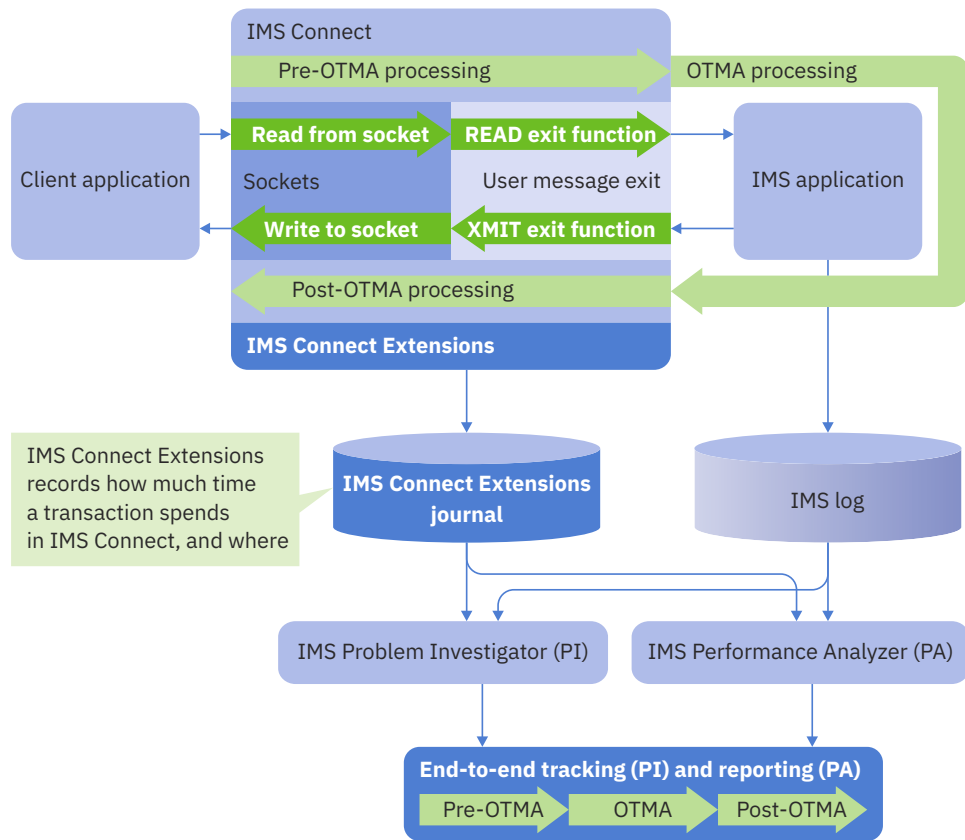


Figure 2. IMS Performance Analyzer, IMS Problem Investigator, and IMS Connect Extensions cooperation

IMS Performance Analyzer can highlight problem transactions which can then be investigated in detail using IMS Problem Investigator.

Because IMS processes large workloads, records from the same transaction can be separated by thousands of records from other transactions, making it difficult to trace the flow of only one of those transactions. Moreover, different record types have different fields that relate them to a transaction, making them inaccessible using conventional filtering and searching techniques. With the IMS Problem Investigator tracking facility, you can find a record from the relevant transaction, and then display just the records from that transaction. IMS Problem Investigator tracks all transaction records, finding the related IMS log and monitor, CQS, IMS Connect, ATF, Db2, IBM MQ, and SMF records, hiding others that are not part of the transaction.

IBM OMEGAMON for IMS on z/OS (5698-A34)

IMS Performance Analyzer provides reporting on transaction activity data collected by the Application Trace Facility (ATF). OMEGAMON Application Trace Facility (ATF) collects data on external subsystem events (Db2, IBM MQ), BMP and MPP scheduling and termination events, the region where a transaction is executed, occurrence of DLI DB, IMS TM, and message queue calls. The ATF application-level accounting statistics are written to an ATF log stream. IMS Performance Analyzer provides a suite of reports and extracts in **ATF Report Sets**.

IBM Transaction Analysis Workbench for z/OS

Transaction Analysis Workbench is a tool for analyzing problems with the performance or behavior of z/OS-based transactions. Transaction Analysis Workbench provides a platform for investigating logs and other historical data collected during transaction processing and system operations. Transaction processing is often complex. Modern applications frequently interact with external subsystems and use system services. Pinpointing the cause of a problem can be difficult. Transaction Analysis Workbench extends the scope of traditional transaction analysis techniques, enabling you to more easily identify problems caused by external events. You can use Transaction Analysis Workbench with the following IBM tools:

- IMS Performance Analyzer - to look outside of IMS for the cause of problems, in particular Db2 and IBM MQ
- CICS® Performance Analyzer - to bridge the gap between CICS and IMS for CICS-DBCTL

Service updates and support information

Service updates and support information for this product, including software fix packs, PTFs, frequently asked questions (FAQs), technical notes, troubleshooting information, and downloads, are available from the web.

To find service updates and support information, see the following website:

http://www.ibm.com/support/entry/portal/Overview/Software/Information_Management/IMS_Tools

Product documentation and updates

IMS Tools information is available at multiple places on the web. You can receive updates to IMS Tools information automatically by registering with the IBM My Notifications service.

Information on the web

The IMS Tools Product Documentation web page provides current product documentation that you can view, print, and download. To locate publications with the most up-to-date information, refer to the following web page:

<https://www.ibm.com/support/pages/ims-tools-product-documentation>

You can also access documentation for many IMS Tools from IBM Documentation:

<https://www.ibm.com/docs/en>

IBM Redbooks publications that cover IMS Tools are available from the following web page:

<http://www.redbooks.ibm.com>

The IBM IMS Tools Solutions web page shows how IBM solutions can help IT organizations maximize their investment in IMS databases while staying ahead of today's top data management challenges:

<https://www.ibm.com/it-infrastructure/z/ims/tools/>

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4. Click **Continue** to specify the types of updates that you want to receive.
5. Click **Submit** to save your profile.

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Accessibility features

Accessibility features help a user who has a physical disability, such as restricted mobility or limited vision, to use a software product successfully.

The major accessibility features in this product enable users to perform the following activities:

- Use assistive technologies such as screen readers and screen magnifier software. Consult the assistive technology documentation for specific information when using it to access z/OS interfaces.
- Customize display attributes such as color, contrast, and font size.
- Operate specific or equivalent features by using only the keyboard. See the following publications for information about accessing ISPF interfaces:
 - *z/OS ISPF User's Guide, Volume 1*
 - *z/OS TSO/E Primer*
 - *z/OS TSO/E User's Guide*

These guides describe how to use the ISPF interface, including the use of keyboard shortcuts or function keys (PF keys), include the default settings for the PF keys, and explain how to modify their functions.

Chapter 2. Reports produced by IMS Performance Analyzer

IMS Performance Analyzer provides a comprehensive suite of reports to help you to manage transaction performance and to monitor resource utilization in IMS TM and DB systems. Reports and extracts can be produced from IMS logs, IMS monitor files, IMS Connect Extensions journals, and IBM OMEGAMON for IMS Application Trace Facility (ATF) data.

IMS log reports

IMS Performance Analyzer provides a variety of fixed-format reports that use IMS log data as a source of information, as well as the ability to design your own reports using report forms.

Message Queue transaction and Full Function database reports

IMS Performance Analyzer can be used to report on IMS Message Queue (MSGQ) transaction and Full Function database activity.

Form-based transaction transit reports

IMS Performance Analyzer form-based reporting provides you with the ability to customize your reports using report forms. To request reports using form-based reporting, see the *IMS Performance Analyzer User's Guide*. For a comprehensive list of fields that you can add to a report form, see [Chapter 42, "Glossary of Report Form field names,"](#) on page 515.

The following sample forms produce a list of IMS transactions for the desired reporting period:

ALLLIST: Transaction list report

List all IMS transactions in the reporting period with their performance characteristics, database call counts, and VSAM and OSAM read and write counts. Both general performance information and Fast-path specific information is included. Transactions are identified by a number of characteristics, including IMS transaction arrival time, transaction code, program name, IMS completion level, queue type, region type and PSD ID, transaction class and priority, user ID, and Output LTERM.

BMPCHKPT: BMP Checkpoint Detail list report

This report shows transaction details, including the batch messaging processing checkpoint ID, of individual transactions.

BMPCPDBD: BMP Job Checkpoint by Database list report

This report shows which transactions, job names, and programs accessed databases, the names of those databases and the database access method.

ESAF: Transaction Transit Log DBD/ESAF list report

This report shows details of individual transactions including details of interactions with databases and other external subsystems.

ESAFLIST: Transaction Transit Log with ESAF call count list report

This report shows originating LTERM, DB call count, and ESAF call count for individual transactions.

INFLIGHT: List Inflight data set list report

This report lists the transactions in the inflight data set. See also the related sample member IPIIFLST, which contains JCL to report the contents of the inflight data set.

OLRLIST: HALDB online reorganization list report

This report shows HALDB Online Reorganization (OLR) statistics. To limit the report output to the relevant programs, you must apply a report filter of Program INC 0* to the report in the report set. The reason for this requirement is that during online reorganization, IMS dynamically builds a PSB whose name is constructed using the 7-byte HALDB partition name and prefixed with a numeric character zero ('0').

Tip: You can further limit the filter by adding the partition id after the zero (for example, Program INC OPART1*).

PRGREG: Transactions with region, class, and priority list report

This report lists transactions in the reporting period together with their region PST ID, transaction code, program or PSB name, transaction class, and priority.

SMQLIST: SMQ Transaction Transit Log list report

The SMQ Transaction Transit Log report lists all transactions processed in a shared queues sysplex environment. The report highlights standard transit information, information specific to sysplex processing including the originating and processing systems, and time spent by the input and output messages on the shared message queue.

SWITLIST: Program-Switch list report

This report examines program switches in transactions processed by IMS.

Note: To track transactions involved in program switch sequences, ensure the Transaction Transit option for program switches is set to 2.

SYNCCOUT: Synchronous Callout list report

The Synchronous Callout List report provides a detailed analysis of synchronous callout activity in regions and by application programs.

SYNCPCTL: Transaction Syncpoint list report

This report lists transactions in the reporting period with a component breakdown for syncpoint elapsed times. Also shown is the CPU time, processing time, DB call count, ESAF call count, and the IMS completion level.

TRANLIST: Transaction Transit Log list report

This report lists all transactions processed by IMS systems including shared queues sysplexes. The report provides identification information including transaction code, user id and start time, as well as a breakdown of IMS response time into its transit time components.

TRNELAPS: Transaction Elapsed Time list report

This report provides a list of transactions with the transaction's start time, transaction code, elapsed time, and response time.

TRNLIST2: Transaction Transit Log list report

This report provides a performance overview for each transaction in the reporting period and indicates OTMA transaction source and completion level.

VRMLIST: Version Transaction list report

This report provides a list of transactions with arrival time, transaction class and priority, DC and DB call counts, and essential performance information.

The following reports provides summarized information on IMS transaction activity:

ALLSUMM: Transaction summary report

The Transaction Summary report provides a summary of transaction activity grouped by time and transaction code. For each transaction, the report includes a transaction count and averages for CPU time, input queue time, processing time, and output queue time.

ALLSUMMX: Transaction Extract summary report

The Transaction Summary extract provides a transaction summary grouped by date, time and transaction code suitable for an extract. It provides transaction counts, and CPU time averages.

BADRESP: Bad Transaction Response Time summary report

The Bad Transaction Response Time report provides an analysis of transaction response time by reporting the longest response times first. Instead of reporting in the usual transaction code sequence, the report is sorted in descending response time sequence so those transactions with the worst response time can be easily identified. The breakdown of transit time is provided to identify the reasons for the long response time.

BMPDTL: BMP Checkpoint Detail summary report

This report shows BMP checkpoint count, average CPU time, and average DB call and wait counts summarized by transaction code, program name, and BMP user checkpoint ID.

BMPSTAT: BMP Statistics summary report

This report shows DB call count, CPU time, DB wait count, and database IO elapsed and locking times summarized by transaction code, program name, and region type.

CHARGE: Transactions by User ID summary report

This report shows transaction count summarized by user ID and transaction code.

CNTOTMA: Count of OTMA Transactions summary report

This report provides a transaction count summarized by transaction code and OTMA client type (if known).

CNTTMEMB: Transaction Rates by Tmember summary report

This report provides a transaction count with rates per second and per minute summarized by the originating OTMA Tmember name.

COMPLVL: Transaction Completion summary report

The Transaction Completion Summary report provides a breakdown of transaction activity on the IMS log for each region type, such as MPP, or BMP. The breakdown by completion level indicates for each type of transaction, how far they progressed towards completing. For more information on IMS completion levels, see [COMPLVL](#).

CPUHEAVY: CPU heavy hitters summary report

Report on IMS transaction CPU usage, processing times, and transaction counts summarized by program name.

CPUHIGH: High CPU Usage Transactions summary report

The High CPU Usage Transactions report provides an analysis of transaction CPU usage by reporting the highest CPU times first. Instead of reporting in the usual transaction code sequence, the report is sorted in descending CPU time sequence so those transactions with the highest CPU usage can be easily identified.

DASH: Transaction Dashboard summary report

The Transaction Dashboard report provides a high-level overview of the type of activity in your IMS environment. Transaction activity is broken down by region type (such as MPP, or BMP) and transaction type (OTMA, IMS Connect, or APPC MSC).

DASHRATE: Transaction Dashboard with rates summary report

This dashboard-style report shows transaction rates, counts, and performance averages broken down by component, ESAF and DB calls counts, database update rates, and abend counts summarized by transaction code.

DBDCALLS: Database Calls by Transaction/DBD summary report

Reports on IMS database calls summarized by transaction code and database.

ESAFCALL: ESAF Calls for Transaction summary report

Reports on ESAF calls summarized by transaction code

FINDIMSL: IMS level and Basic DB Calls summary report

Summarizes basic IMS activity by region, IMS ID, and IMS version.

HISTGRAM: Region Histogram by Class summary report

Summarizes region activity by class.

LOGQUICK: Quick Look Transaction Evaluation summary report

Provides a quick overview of transaction activity summarized by interval with basic performance criteria.

LTERMOUT: Output LTerm by Transaction summary report

Provides an interval summary of transaction activity by originating terminal.

MSGLEN: Message Length Analysis summary report

The Message Length Analysis report shows for each transaction code, statistical information about the number and length of all input and output messages.

OLRSUMM: HALDB Online Reorg summary report

The HALDB Online Reorganization (OLR) report summarizes the number of high availability large database (HALDB) updates and inserts performed by transactions, which programs were called, and the average total IMS time for each program in the time period you specify. To limit the report output

to the relevant programs, you must add selection criteria of Program INC 0* to the report in the report set. The reason for this requirement is that during online reorganization, IMS dynamically builds a PSB whose name is constructed using the 7-byte HALDB partition name and prefixed with a numeric character zero('0').

Tip: You can further limit the program selection criteria by adding the partition id after the zero (for example, 'OPART1*').

ORIGID: Transaction by Originating Term and Processing IMS ID summary report

Report on transaction counts summarized by originating LTERM, transaction code, program or PSB name, and processing IMS ID.

OTMATYPE: Transaction count by OTMA type summary report

Report on whether transactions originated from OTMA, and whether their origin is via IMS Connect, IBM MQ, or via an unknown client.

QTYPE: Queue-type summary report

The Queue Type Summary report provides a breakdown of how transactions are processed in a shared queues sysplex environment. For each region type, you can see at a glance the performance characteristics of transactions processed globally versus those processed locally in a shared queues environment. You can compare input queue times for transactions that were processed locally against those that required putting onto the CQS shared queue for processing on the back-end system.

REGOCCUP: Transaction Count by Region summary report

For each time interval and region, this report shows the count of transactions and the total transaction processing time.

RESPDIST: Response Time Distribution summary report

The Response Time Distribution % report shows the percentage of transactions within a series of pre-defined ranges. You can use this form to create your own report that, for example, shows the percentage of transactions with a response time within a required service level. Range values (distributions) can be reported as counts or percentages.

RGBYCLPR: Region by Class and Priority summary report

This report shows transaction counts for each time, region, class, and priority combination, and minimum, average, and maximum input queue times and processing times. When you see an unexpectedly input queue time or processing time value, it can be useful to know the region, class, priority and time, when trying to identify the cause of poor performance.

RGBYTRAN: Transaction by Region with Input Queue summary report

This report highlights which transaction codes had high input queue times and what percentage of occurrences of that transaction count were within each range of input queue times.

RGBYTRN1: Transaction by Region summary report

This report shows details of each transaction codes for each region and time interval, including details about input queue times, CPU times, processing times, DB call counts and Fast Path call counts.

SMQTCOD: SMQ Transaction Analysis summary report

The SMQ Transaction Analysis report summarizes transaction activity in a shared queues sysplex environment. For each transaction code, the number of transactions processed and standard transit information is reported. Information specific to sysplex processing including originating and processing systems, as well as time spent by the input and output messages on the shared message queue is also reported.

SWITSUMM : Program Switch Summary summary report

The Program Switch Summary report provides an analysis of transaction transit performance by transaction code. The report form uses field ORGTRAN to group all program switch transactions by their originating transaction code.

SYNCSUMM: Syncpoint Summary by Transaction summary report

Provides a syncpoint summary by transaction code.

TRANCLAS: Transit Analysis by Class summary report

The Transit Analysis by Class report provides a breakdown of transaction transit performance by transaction class, as specified by the TRANSACT macro MSGTYPE parameters.

TRANDIST: Transaction Distribution by Input Queue/Total Time summary report

This report summarizes transaction distributions by input queue time and by total transaction time.

TRANINTV: Interval Transaction Analysis summary report

The Interval Transaction Analysis report summarizes transaction activity for each user-specified time interval. For example, the performance characteristics of each transaction is reported for every 15 minute interval during the day so that you can identify how transaction performance varies over time.

TRANPRTY: Transit Analysis by Priority summary report

The Transit Analysis by Priority report provides a breakdown of transaction transit performance by transaction priority, as specified in the TRANSACT macro PRTY parameter.

TRANRESU: Transaction Resource Usage DLI Call summary report

The Transaction Resource Usage DLI Call Report provides, for each transaction code, a summary of IMS database (DB) and data communications (DC) calls, together with resource usage including CPU time.

TRANRESU: Transaction Resource Usage summary report

The Transaction Resource Usage report provides, for each transaction code, a breakdown of IMS response time together with resource usage including CPU time and DB/DC DLI call activity.

TRANRES1: Transaction Resource Usage summary report

The Transaction Resource Usage report provides, for each transaction code, an analysis of IMS response time together with resource usage including CPU time, and database (DB) and data communications (DC) call activity.

TRANSUMM: Transaction Transit summary report

Transaction Transit Summary.

TRANTCOD: Transit Analysis by Trancode summary report

The Transit Analysis by Trancode report provides a breakdown of transaction transit performance by transaction code. For each transaction code, you can see at a glance how the transaction performed, and if necessary identify the phase of processing that caused excessive response time.

TRNBGRGN: Transaction by Region summary report

Report on average and maximum input queue, processing time, and total transaction elapsed time summarized by transaction start time, region PST ID, transaction priority, transaction code, and region type.

TRNBGRGR: Transaction by Region (ranges) summary report

Report on average and maximum processing time and breakdown input queue time based on pre-defined ranges.

TRNBGRGS: Transaction by Region (short interval) summary report

Reports on input queue and processing time based on pre-defined ranges.

TRNBUID: Transaction by User ID summary report

Summarize transaction code and program by user id.

TRNESAF: Transactions by ESAF Calls summary report

Report on ESAF calls, input queue and processing time by interval, region PST ID, call and transaction code.

TRNRANGE: Transaction Response by Range summary report

Report on input queue and processing times based on pre-defined ranges.

VRMCOMP: Compare IMS Systems/Versions summary report

This report summarizes basic transaction transit statistics by IMS version. Intended for performance comparisons between IMS releases.

Management reports

Management reports let managers know whether IMS is working within expected limits.

“Dashboard report” on page 93

The IMS Dashboard report provides a quick overview of critical system performance indicators, including transaction throughput and IMS system resources. Use this IMS Performance Analyzer

report to highlight potential performance problems quickly, providing a springboard to other reports that provide more detailed information.

“Management Exception report” on page 97

The IMS Management Exception report shows whether critical values are within specified limits, and it gives summary values of indicative information. Use this IMS Performance Analyzer report to measure today's transaction performance against agreed benchmarks, such as service level agreements and benchmark averages. Then, when a problem occurs, you can go to other IMS Performance Analyzer reports for additional, more detailed information.

“Transaction Transit Graphic Summary report” on page 75

The IMS Transaction Transit Graphic Summary report generates a set of character-based graphs, summarizing daily transaction processing for mean transit time, user-specified percentile transit time, transaction response count, and responses per second.

“Transaction Transit Extract by Interval” on page 75

The IMS Transaction Transit Extract by Interval allows creation of extract files of transaction transit time by time interval data. You can use this IMS Performance Analyzer extract to get pictures of system performance by exporting for manipulation by external programs.

“Transaction Exception report and extract” on page 79

The IMS Transaction Exception report and extract shows transaction performance information that affects response time. This IMS Performance Analyzer report can be ordered by Transaction Code, User ID, Message Class, or Time of Input, optionally with a breakdown by transaction code. Optionally, two extract files can be produced containing detail records of all transaction activity, or exception transactions only.

Analysis reports

Analysis reports are intended for administrators and analysts who want operating information in easy-to-read, summary format.

“Transaction Transit Analysis report” on page 64

The IMS Transaction Transit Analysis report shows the components of transaction transit time ordered by transaction code, LTERM, transaction code within LTERM, message class, line or VTAM node, or time of day. This IMS Performance Analyzer report reveals transaction input queue time (local or CQS), processing time, output queue time, output shared queue (CQS) time, output local queue time and program switch time. The display of transit time by time period helps you identify periods of poor response.

“Transaction Transit Statistics report” on page 70

The Transaction Transit Statistics report is a graphical representation of the information in the Transaction Transit Analysis report.

“Transaction Resource Usage report” on page 105

The IMS Transaction Resource Usage report provides a comprehensive overview of transaction resource usage. The resources reported on by IMS Performance Analyzer include scheduling statistics (including WFI), CPU usage, DL/I call statistics, enqueue statistics, and DBCTL DB and I/O usage.

“Resource Availability report” on page 115

The IMS Resource Availability report indicates the relative amount of time a specific resource is active, idle, or unavailable. Use this report to get general availability information, a summary of how frequently each resource is used, to plan more efficient scheduling, and to identify when remedial action is required. Resource Availability reports can be generated in IMS Performance Analyzer for any combination of regions, programs (PSBs), transaction codes, databases, or lines or VTAM nodes.

“CPU Usage report and extract” on page 120

The IMS CPU Usage report gives statistics for CPU time and elapsed time during a specified period for regions, transactions, and programs. It can help you determine who is using too much CPU time or, conversely, what programs or transactions in which regions are in a wait state too long. The report can optionally be written by IMS Performance Analyzer to an extract data set as a CSV file.

“Internal Resource Usage reports” on page 125

The IMS Internal Resource Usage reports provide statistics on the use of various IMS pools and resources. From the statistics produced by IMS Performance Analyzer, you can determine how they are being used and where inefficiencies exist.

“MSC Link Statistics report” on page 155

The IMS MSC Link Statistics report provides summary information on the overall usage of MSC links and a detailed breakdown of Send and Receive data for each MSC link. The MSC Link Statistics report can help you validate and tune MSC links bandwidth.

“Message Queue Utilization report” on page 157

The IMS Message Queue Utilization report contains information on the use of message queues. This IMS Performance Analyzer report can help you balance the I/O between long and short message data sets and adjust record and buffer sizes for the most efficient use of these two data sets. Thus this report helps you reduce storage and minimize I/O.

“Database Update Activity report and extract” on page 160

The IMS Database Update Activity report can help you determine the cost of database calls. It indicates the number of purge writes at sync point time to a database and provides a count of actual updates made to each database in the time period being reported. If your database is a HALDB, you can also report on specific HALDB partitions because the name of the partition is found on the database name field of the various records used in this report. This IMS Performance Analyzer report can optionally be written to an extract data set as a CSV file.

“OSAM Sequential Buffering report” on page 166

The IMS OSAM Sequential Buffering report provides detailed I/O and buffer-usage statistics that allow you to assess the benefit of OSAM sequential buffering. You should use the OSAM Sequential Buffering report to determine whether sequential buffering is providing a benefit to each application that uses it.

“Deadlock report” on page 170

The IMS Deadlock report provides a comprehensive analysis of deadlock events. In addition the report summarizes deadlock activity to show the frequency of each losing transaction/database combination and the associated winning transaction/database combinations. This IMS Performance Analyzer report is a useful aid for tuning applications and adjusting scheduling parameters to avoid this expensive overhead. Deadlocks involving Db2 are also reported.

“System Checkpoint report” on page 180

The IMS System Checkpoint report provides a detailed analysis of IMS internal checkpoint activity. This IMS Performance Analyzer report provides details of your IMS resources, including databases (with system definition information), transactions (with system definition information and basic usage indicators), and terminals (with system definition information and basic usage indicators). The report also provides a summary of checkpoint activity, including breakdown of checkpoint records by type, and frequency and overhead of internal checkpoint processing.

“BMP Checkpoint report” on page 187

The IMS BMP Checkpoint report provides an analysis of BMP checkpoint frequency that can affect online performance and system restartability. The detailed List report provides a breakdown of individual BMP checkpoint activity. The Summary report provides an overview of each BMP program.

“Log Gap Analysis report” on page 191

The IMS Log Gap Analysis report shows periods of time where log records are not being cut, potentially highlighting an external system event that may have caused IMS to slow down.

“Cold Start Analysis report” on page 192

The IMS Cold Start Analysis report provides a snapshot of in-train activity in the event of a cold start to determine what transactions were lost from the IMS message queue, what were the incomplete units of work, what database changes were made and not backed-out, and what external subsystem activity was left in doubt.

“Enqueue/Dequeue report” on page 193

The IMS Enqueue/Dequeue report shows IMS message enqueue/dequeue activity. The Outstanding Messages List report provides detail of input messages queued, but not processed and bended or otherwise requeued to the IMS message queue, and output messages enqueued to a destination

but not dequeued and/or deleted from the IMS message queue. The Dequeue Messages List report provides details for each message counted in the destination summary report. The Destination Summary report provides an overview of the volume of input and output messages which have been queued to each destination (SMB/CNT).

“ESAF Trace report” on page 256

The External Subsystem Attach Facility (ESAF) Trace report provides a chronological listing of all external subsystem connects and disconnects for the specified time period. Use this IMS Performance Analyzer report to determine when external subsystems were connected.

Detail reports

Detail reports help analysts and programmers solve problems.

“Transaction Transit Log report” on page 71

The IMS Transaction Transit Log report shows the transit activity of each message originating from a logical terminal and shows any program-to-program switches caused by the input message and all output messages resulting from the input. This IMS Performance Analyzer report provides shared queue reporting for multiple IMS subsystems. For multi-subsystem log input, IMS Performance Analyzer assumes shared queue processing and produces a composite report by merging data from all subsystems in the sysplex.

“Region Histogram report” on page 166

The IMS Region Histogram report is a graphic display of region activity. It shows the times a region is active or idle, and the patterns of transaction scheduling in each region. The Region Histogram report highlights parallel scheduling issues. It lets you view which transactions are scheduled into which regions and when. You can quickly tell whether some regions are heavily scheduled while others are relatively idle. You can also tell which transactions are waiting on which other transactions.

“DC Queue Manager Trace report” on page 247

The IMS DC Queue Manager Trace report shows a time-sequenced list of each TM event, such as input, message enqueue, get unique, output, and free device relative record number (DRRN). This IMS Performance Analyzer report also shows the content of each input message. The DC UOW Tracker report option allows you to trace transaction message flow using the IMS tracking UOW.

“Database Trace (Full Function) report” on page 251

The IMS Database Trace (Full Function) report provides a record of all database changes by application programs as recorded on the IMS log. Backout changes caused by emergency restart are also reported and identified separately, but changes due to the reorganization utilities are not reported. Log records created by pseudo-abends are included in the report. This IMS Performance Analyzer report shows the content of segments, prefix pointers, and free space elements, and shows both the *before* and *after* versions of these as appropriate. The report also identifies the time of the change and the name of the program (PSB) making the change.

Transaction History

“Transaction History File” on page 89

The IMS Transaction History File is used to collect historical performance data, useful for long-term trend analysis and capacity planning. Information is summarized for each transaction code over a short time interval, including transaction transit, response and CPU times, as well as DLI call statistics. Data is provided in a format suitable for loading directly into Db2, from where you can run queries or produce reports.

Fast Path EMH transaction and Fast Path database reports

The Fast Path EMH transaction and Fast Path database reports are grouped by intended audience into Management reports, Analysis reports, and Detail reports.

Form-based transaction transit reports

IMS Performance Analyzer form-based reporting provides you with the ability to customize your reports using report forms. To request reports using form-based reporting, see the *IMS Performance Analyzer User's Guide*. For a comprehensive list of fields that you can add to a report form, see [Chapter 42, "Glossary of Report Form field names,"](#) on page 515.

The following samples forms produce a list of IMS Fast Path transactions for the desired reporting period:

FPLOG: Fast Path Transaction Transit Log list report

List all IMS Fast Path transactions in the reporting period with their performance characteristics and database call counts. Both general performance information and Fast-path specific information is included. Transactions are identified by a number of characteristics, including IMS transaction syncpoint time, transaction code, Fast Path routing code, originating Lterm, user ID, IMS ID and region PST ID.

FPTRANX: Fast Path Transaction list report

List all IMS Fast Path transactions and IMS message queue transactions that use Fast Path databases together with general performance characteristics and database call counts.

FPTRANXD: Fast Path Transaction Exception Detailed list report

List all IMS Fast Path transactions and IMS message queue transactions that use Fast Path databases together with detailed information on Fast Path call counts and buffer usage.

The following reports provides summarized information on IMS Fast Path transactions:

FPANAL: Fast Path Transit Analysis by Transaction Code summary report

Report on IMS Fast Path transaction activity summarized by transaction code and Fast Path routing code.

FPBUFUSE: Fast Path Buffer Usage summary report

Report on IMS Fast Path buffer usage summarized by transaction code, Fast Path routing code, and region job name.

FPDBCALL: Fast Path Database Calls summary report

Report on IMS Fast Path database call activity summarized by transaction code, Fast Path routing code, and region job name.

FPMMSG: Fast Path Message Statistics summary report

Report on IMS Fast Path message statistics summarized by transaction code and Fast Path routing code.

FPRESUSE: Fast Path Resource Usage summary report

Report on IMS Fast Path resource usage summarized by transaction code, Fast Path routing code, and region job name. Resources reported include VSO, buffers, GET and UPDATE counts.

Management reports

Management reports let managers know whether IMS is working within expected limits.

"Fast Path Transit Extract by Interval" on page 204

The IMS Fast Path Transit Extract by Interval report allows creation of extract files of Fast Path transit data by time interval. You can use the CSV extracts produced by IMS Performance Analyzer for further analysis in third-party tools.

Analysis reports

Analysis reports are intended for administrators and analysts who want operating information in easy-to-read, summary format.

“Fast Path Transit Analysis report” on page 198

The IMS Fast Path Transit Analysis report shows the times for the components of transaction transit time: Input queue time, Processing Time, Output queue time, and Global input and output queue times. The transaction code and routing code reports show areas in application design and region availability that may require attention. The userid report shows whether the distribution of service among system users is adequate. The time of sync point report notes performance problems caused by momentary surges of transaction input. The display of transit time by time period is useful in isolating time periods of high response.

“Fast Path Resource Usage and Contention report” on page 217

The IMS Fast Path Resource Usage and Contention report provides detailed statistics on the Fast Path resources used by IFP transactions and non-IFP programs. Use this report to view information on DEDB databases, area data sets, VSO, common buffers, locks, logging, sync point failures, and transaction throughput. Use this IMS Performance Analyzer report to gauge the performance of transactions that use DEDB databases. This report identifies transactions that issue excessive DL/I calls that cause area data set I/O, use excessive resources (including buffers and VSO), cause excessive contention, cause excessive logging, or fail during sync point processing.

“Fast Path Database Call Statistics report” on page 223

The IMS Fast Path Database Call Statistics report provides a breakdown of DL/I call function codes by transaction code, identifying transaction that issue excessive DL/I calls. After identifying transactions with poor response time (using the IMS Performance Analyzer Fast Path Transit Analysis report), or transactions using excessive resources (using the Fast Path Resource Usage and Contention report), use the Fast Path Database Call Statistics report to identify the DL/I call function codes most frequently used by the transactions. If your database is a HALDB, you can also report on specific HALDB partitions because the name of the partition is found on the database name field of the various records used in this report.

“IFP Region Occupancy report” on page 225

The IFP Region Occupancy report provides approximate region occupancy rates for IFP regions. You can use this IMS Performance Analyzer report to determine if an appropriate number of IFP regions is available for processing the workload.

“EMH Message Statistics report” on page 226

The EMH Message Statistics report contains information on the number and length of EMH messages that are processed by balancing groups and shared EMH queues. This IMS Performance Analyzer report can be used to gauge the size and frequency of transaction messages processed by IFP regions and the ratio of transactions processed locally versus those processed globally.

“DEDB Update Activity report” on page 227

The IMS DEDB Update Activity report can help you determine the cost of data entry database (DEDB) calls, and shows the rate of processing against your DEDB databases. This IMS Performance Analyzer report can be used to determine the most highly used DEDB databases (and their areas), allowing you to prioritize their tuning, reorganization, and other database administration tasks, and to view DEDB database update activity when diagnosing application performance problems. The report shows the number of sequential dependent (SDEP) and direct dependent (DDEP) segments updated, the segment update rate, the number of database opens, and the number of database errors.

“VSO Statistics report” on page 229

The IMS VSO Statistics report provides detailed statistics on VSO resource usage. This IMS Performance Analyzer report can be used to determine how well VSO is performing by comparing Data Space I/O with Area data set I/O, for SHARELVL 0/1, comparing Coupling Facility I/O with Area data set I/O, for SHARELVL 2/3, by checking the Lookaside hit rate, for SHARELVL 2/3, and by ensuring that Castout frequency and elapsed times are within expectations. The VSO resources include data spaces for SHARELVL 0/1, coupling Facility for SHARELVL 2/3, lookaside Buffers for SHARELVL 2/3, and DEDB Area data set I/O.

Detail reports

Detail reports help analysts and programmers solve problems.

“Fast Path Transit Log report” on page 201

The Fast Path Transit Log report is a chronological listing of all IFP transactions processed during the reporting interval. This report can help you diagnose problem areas and to isolate and diagnose problem transactions. It shows transit activity and DL/I call details of each IFP transaction. For multi-subsystem log input, IMS Performance Analyzer assumes global (shared EMHQ) processing, and produces a composite report by merging log data from all subsystems in the sysplex.

“Fast Path Transaction Exception report and extract” on page 205

The Fast Path Transaction Exception reports provide detailed and summary information about IFP transactions, as well as message queue transactions that use Fast Path databases. The series of reports provide detailed and summary information about IFP transactions, as well as message queue transactions that use Fast Path databases. Optionally, two extract files can be produced containing detail records of all IFP transaction activity, or exception transactions only.

“DEDB Update Trace report” on page 254

The IMS DEDB Update Trace report provides a record of all data entry database (DEDB) changes by application programs as recorded on the IMS log. Use this report to debug DEDB database problems and application program problems, and to diagnose performance problems and tune your applications. For example, you can monitor individual program or user updates to a particular database. This IMS Performance Analyzer report shows all DEDB segment updates (including the relative byte address (RBA) and contents of the modified data), DEDB Area data set Open and Close events, creation of Error Queue Elements (EQEs), and application sync points for all transactions that updated reported DEDBs.

IMS Database Control (DBCTL) log reports

IMS Database Control (DBCTL) has neither transactions nor terminal end users in the traditional IMS sense. It does, however, work on behalf of transactions entered by coordinator controller (CCTL) terminal users. DBCTL generates log data when a CCTL transaction schedules a program to access DBCTL databases.

Select from a form-based report (where you select the fields you wish to report on), or a number of "fixed-format" reports.

Form-based

IMS Performance Analyzer form-based reporting provides you with the ability to customize your reports using report forms. To request reports, CSV extracts, and streaming JSON lines using form-based reporting, see the *IMS Performance Analyzer User's Guide*. For a comprehensive list of fields that you can add to a report form, see [Chapter 42, “Glossary of Report Form field names,” on page 515](#).

The following samples forms produce a list of IMS DBCTL transactions for the desired reporting period:

DBCLIST: DBCTL Transaction list report

List all IMS DBCTL transactions in the reporting period, together with their performance characteristics and CICS identification information.

The following reports provides summarized information on IMS DBCTL transaction activity:

DBCDBUPD: DBCTL Database Updates by PSB summary report

Report on IMS DBCTL database updates summarized by PSB and database DBD name.

DBCRRATES: Transaction Rates per Minute/second summary report

The Rates report shows the number of CICS transactions of each transaction code that were enqueued onto the IMS message queue during a particular interval via CICS-DBCTL. The interval start time is shown, and the rate at which transactions were enqueued per minute or per second.

DBCSSUMM: DBCTL Transaction summary report

Report on IMS DBCTL transaction activity summarized by program or PSB name. Activity reported includes average processing and CPU times, full function and Fast Path database call counts broken down by type, as well as OSAM and VSAM call counts.

Fixed-format

The following reports provided information in a fixed format:

“Transaction Resource Usage report” on page 105

The IMS Transaction Resource Usage report provides a comprehensive overview of transaction resource usage. The resources reported on by IMS Performance Analyzer include scheduling statistics (including WFI), CPU usage, DL/I call statistics, enqueue statistics, and DBCTL DB and I/O usage.

“Resource Availability report” on page 115

The IMS Resource Availability report indicates the relative amount of time a specific resource is active, idle, or unavailable. Use this report to get general availability information, a summary of how frequently each resource is used, to plan more efficient scheduling, and to identify when remedial action is required. Resource Availability reports can be generated in IMS Performance Analyzer for any combination of regions, programs (PSBs), transaction codes, databases, or lines or VTAM nodes.

“CPU Usage report and extract” on page 120

The IMS CPU Usage report gives statistics for CPU time and elapsed time during a specified period for regions, transactions, and programs. It can help you determine who is using too much CPU time or, conversely, what programs or transactions in which regions are in a wait state too long. The report can optionally be written by IMS Performance Analyzer to an extract data set as a CSV file.

“Internal Resource Usage reports” on page 125

The IMS Internal Resource Usage reports provide statistics on the use of various IMS pools and resources. From the statistics produced by IMS Performance Analyzer, you can determine how they are being used and where inefficiencies exist.

“Database Update Activity report and extract” on page 160

The IMS Database Update Activity report can help you determine the cost of database calls. It indicates the number of purge writes at sync point time to a database and provides a count of actual updates made to each database in the time period being reported. If your database is a HALDB, you can also report on specific HALDB partitions because the name of the partition is found on the database name field of the various records used in this report. This IMS Performance Analyzer report can optionally be written to an extract data set as a CSV file.

“Fast Path Resource Usage and Contention report” on page 217

The IMS Fast Path Resource Usage and Contention report provides detailed statistics on the Fast Path resources used by IFP transactions and non-IFP programs. Use this report to view information on DEDB databases, area data sets, VSO, common buffers, locks, logging, sync point failures, and transaction throughput. Use this IMS Performance Analyzer report to gauge the performance of transactions that use DEDB databases. This report identifies transactions that issue excessive DL/I calls that cause area data set I/O, use excessive resources (including buffers and VSO), cause excessive contention, cause excessive logging, or fail during sync point processing.

“Fast Path Database Call Statistics report” on page 223

The IMS Fast Path Database Call Statistics report provides a breakdown of DL/I call function codes by transaction code, identifying transaction that issue excessive DL/I calls. After identifying transactions with poor response time (using the IMS Performance Analyzer Fast Path Transit Analysis report), or transactions using excessive resources (using the Fast Path Resource Usage and Contention report), use the Fast Path Database Call Statistics report to identify the DL/I call function codes most frequently used by the transactions. If your database is a HALDB, you can also report on specific HALDB partitions because the name of the partition is found on the database name field of the various records used in this report.

“DEDB Update Activity report” on page 227

The IMS DEDB Update Activity report can help you determine the cost of data entry database (DEDB) calls, and shows the rate of processing against your DEDB databases. This IMS Performance Analyzer report can be used to determine the most highly used DEDB databases (and their areas), allowing you to prioritize their tuning, reorganization, and other database

administration tasks, and to view DEDB database update activity when diagnosing application performance problems. The report shows the number of sequential dependent (SDEP) and direct dependent (DDEP) segments updated, the segment update rate, the number of database opens, and the number of database errors.

“VSO Statistics report” on page 229

The IMS VSO Statistics report provides detailed statistics on VSO resource usage. This IMS Performance Analyzer report can be used to determine how well VSO is performing by comparing Data Space I/O with Area data set I/O, for SHARELVL 0/1, comparing Coupling Facility I/O with Area data set I/O, for SHARELVL 2/3, by checking the Lookaside hit rate, for SHARELVL 2/3, and by ensuring that Castout frequency and elapsed times are within expectations. The VSO resources include data spaces for SHARELVL 0/1, coupling Facility for SHARELVL 2/3, lookaside Buffers for SHARELVL 2/3, and DEDB Area data set I/O.

“Database Trace (Full Function) report” on page 251

The IMS Database Trace (Full Function) report provides a record of all database changes by application programs as recorded on the IMS log. Backout changes caused by emergency restart are also reported and identified separately, but changes due to the reorganization utilities are not reported. Log records created by pseudo-abends are included in the report. This IMS Performance Analyzer report shows the content of segments, prefix pointers, and free space elements, and shows both the *before* and *after* versions of these as appropriate. The report also identifies the time of the change and the name of the program (PSB) making the change.

“DEDB Update Trace report” on page 254

The IMS DEDB Update Trace report provides a record of all data entry database (DEDB) changes by application programs as recorded on the IMS log. Use this report to debug DEDB database problems and application program problems, and to diagnose performance problems and tune your applications. For example, you can monitor individual program or user updates to a particular database. This IMS Performance Analyzer report shows all DEDB segment updates (including the relative byte address (RBA) and contents of the modified data), DEDB Area data set Open and Close events, creation of Error Queue Elements (EQEs), and application sync points for all transactions that updated reported DEDBs.

OMEGAMON ATF summary reports

The OMEGAMON for IMS ATF Summary reports contain statistics gathered from IBM OMEGAMON for IMS Application Trace Facility (ATF) summary records written to the IMS log. Analysis reports are intended for administrators and analysts who want operating information in an easy-to-read, summary format.

“ATF Summary Extract” on page 233

The OMEGAMON for IMS ATF Summary Extract creates comma separated values (CSV) file extracts of the OMEGAMON for IMS Application Trace Facility (ATF) summary record written to the IMS log. The CSV extract created by IMS Performance Analyzer contains a HEADER section and optional repeating sections for DATABASE, DLI DB, DLI TM, Db2, MQ, and OTHER.

“ATF Summary Transaction Analysis report” on page 234

The OMEGAMON for IMS ATF Summary Transaction Analysis report shows performance by transaction or by database using the OMEGAMON for IMS Application Trace Facility (ATF) summary record written to the IMS log. The report created by IMS Performance Analyzer is available in both List and Summary format.

“ATF Summary DLI Call Analysis report” on page 238

The OMEGAMON for IMS ATF Summary DLI Call Analysis report shows database activity within transactions using the OMEGAMON for IMS Application Trace Facility (ATF) summary record written to the IMS log. With IMS Performance Analyzer, you can produce a list report that breaks down database activity within each transaction by call type, or a summary report.

“ATF Summary Db2 Call Analysis report” on page 241

The OMEGAMON for IMS ATF Summary Db2 Call Analysis report is useful for showing Db2 SQL call activity within transactions using the OMEGAMON for IMS Application Trace Facility (ATF) summary record written to the IMS log. With IMS Performance Analyzer, you can produce a list report that breaks down Db2 activity within each transaction by call type, or a summary report.

“ATF Summary MQ Call Analysis report” on page 244

The OMEGAMON for IMS ATF Summary MQ Call Analysis report is useful for showing MQ activity within transactions using the OMEGAMON for IMS Application Trace Facility (ATF) summary record written to the IMS log. With IMS Performance Analyzer, you can produce a list report that breaks down MQ activity within each transaction by call type, or a summary report.

IMS monitor reports

IMS Performance Analyzer monitor reports use IMS Monitor data to produce region activity reports, system analysis reports, resource usage reports, Fast Path analysis reports, and monitor data analysis reports.

Reporting options let you tailor reports to your needs. They include:

- **ESAF Integration.** External Subsystem calls are integrated into all Region and Program/Trancode reports. When activated, ESAF call statistics are reported for each subsystem and contribute to the total call and IWAIT counts for regions and program/trancodes.
- **Alternate Sequencing.** Summarized monitor reports can be ordered in an alternate sequence. By default, the reports are ordered by name, such as Region ID, Program name, Transaction Code and Database name. Alternatively, you can request that the reports be ordered (in descending sequence) by any one of the following:
 - **Occupancy.** The elapsed time that the resource is scheduled or in use. For example, the busiest regions or programs.
 - **Calls.** The time spent by the resource performing DL/I or other types of calls. For example, transactions with the most DL/I call activity.
 - **Delay.** The time spent by the resource waiting for IWAIT events to complete. For example, the databases which had to wait the longest for I/O to complete.

When Alternate Sequencing is requested, a limit can also be specified to restrict the number of resources reported. You can specify a fixed number, for example the 10 worst performing databases, or you can specify a percentage, for example the top 10% busiest regions.

- **Report Interval.** Time ranges let you select a specific part of the monitor trace data. You can specify a time range which applies globally to all IMS Performance Analyzer monitor reports, and to restrict this time period further, you can specify a time range individually for the Transaction by Time Period, Region Histogram, and Program Trace reports.
- **Time Interval.** Reports can be printed for each *nn* minutes of trace, for each trace, or for the cumulative activity of multiple traces.
- **Reporting of VSAM IWAITs.** VSAM IWAITs with an elapsed time that is less than a specified value are not reported as I/O IWAIT activity. This lets you exclude VSAM IWAITs that do not result in actual I/O activity.
- **Distributions.** Optionally, distribution graphs can be produced by applicable reports. Distribution titles and intervals can be modified as required.
- **Application and DDgroup Selection.** Sets of PSB names can be reported separately as application groups. Likewise, sets of DDnames can be reported as DDgroups; for example, DDnames could be grouped by data set type (VSAM or OSAM) or data set placement (VOLSER), or application.
- **Program and I/O Performance Thresholds.** Thresholds can be set for monitoring three important program and I/O performance indicators: number of IWAITs per call, DL/I call elapsed time, and I/O IWAIT elapsed time. An Exception Listing report is printed each time a threshold value is exceeded.
- Defaults are provided to satisfy typical reporting requirements.

Region Activity Summary reports

IMS Performance Analyzer Region Activity Summary reports summarize and correlate region, program, transaction, and database activity for the IMS system using IMS Morton data. These reports provide an overview of system activity and a means of identifying problem areas for further investigation with

system and program level reports. Use these IMS Performance Analyzer monitor reports for trend analysis and day-to-day monitoring of the system is facilitated because reporting is in terms of rates, ratios, percentages, and elapsed times per event.

“Schedule/Transaction Summary report” on page 301

The IMS Schedule/Transaction Summary report presents a compact summary of total schedulings and transaction counts over all regions for the entire trace period.

“Region Summary report” on page 302

The IMS Region Summary report is an analysis of schedule, transaction, call, and IWAIT activity as well as an analysis of region idle time for each active MPP region. Summary distribution graphs of activity can also be provided. The report contains the same details as the Region Detail report (part of the Region Analysis report). The Region Summary report groups data by type (for example, schedule data for all regions) to provide convenient comparison of one measure across all regions. The Region Detail report groups data by region, to allow all the measures for a region to be viewed together.

“Program Summary report” on page 315

The IMS Program Summary report is an analysis of schedule, transaction, and call activity for each PSB-transaction code and each specified application group. A percentage comparison of the activities for each PSB-transaction code is also provided.

“Database IWAIT Summary report” on page 323

The IMS Database IWAIT Summary report is a summary of IWAIT activity for each data set and specified DDgroup. The report includes number of IWAITs, average elapsed time per IWAIT, and IWAITs per call. Only database and message queue IWAITs directly associated with dependent region activity are included in this report; the Total System IWAIT Summary report includes all IWAITs.

“Transactions by Time Period report” on page 326

The IMS Transactions by Time Period report presents for each PSB-transaction code (or application-transaction code if application groupings are active) the number or percentage of transactions occurring in the specified time periods. The overall transaction rate for each time period is also reported.

Region Activity Analysis reports

IMS Performance Analyzer Region Activity analysis reports analyze program activity for each active MPP, IFP, or BMP region and for specified application and data set groups. A Database IWAIT Analysis report gives details of program related IWAIT activity. Exception Listing report entries are provided when certain performance monitoring thresholds are exceeded. An Enqueue/Dequeue Trace report identifies program isolation bottlenecks. The Region Histogram report graphically presents the interrelationship of region activity. Optionally, distributions are used extensively throughout the reports.

“Region Analysis report” on page 329

The Region Analysis reports are a set of reports (Region Detail, Program Summary, Transactions by Time Period, Database IWAIT Summary) for each dependent region. These IMS Performance Analyzer reports are in the same format as the corresponding Summary reports described in the Region Activity Summary reports, except that they apply to each dependent region. The Summary reports group data by type to provide convenient comparison of one measure across all regions; for example, schedule data for the total system. The Region Analysis reports group data by region, to allow all the characteristics of a region to be viewed together.

“Application Detail report” on page 336

A separate Application Detail report is produced for each specified application (PSB) group. This IMS Performance Analyzer report can provide an analysis of program activity for each program group, including details for each PSB name that comprises the group, in the same format as the Program Summary report. Also provided are distribution graphs for the elapsed time per schedule, elapsed time per call, elapsed time per IWAIT, and number of IWAITs per call for each group and for each PSB within the group. You can also see the number or percent of transactions occurring, and overall transaction rate for specified time periods, in the same format as the Transactions by Time Period report.

“Database IWAIT Analysis report” on page 340

The Database IWAIT Analysis report produces IWAIT distribution graphs and IWAIT activity analysis by DDname and DDname Group for each dependent region. The report can be obtained from both IMS Monitor and DB Monitor data.

“DDgroup report” on page 343

The DDgroup report presents for each specified DDgroup, an analysis of database IWAIT activity for the group and for each data set in the DDgroup. The IMS Performance Analyzer DDgroup report is available from DB Monitor traces.

“Performance Exception reports” on page 345

The Performance Exception reports provide a list report of performance exceptions, and summary reports of intent failures, pool space failures, or deadlock events.

“Enqueue/Dequeue Trace report” on page 351

The Enqueue/Dequeue Trace report is a detailed trace of the database enqueue conflicts occurring during the reporting interval. A detail line is printed for each enqueue IWAIT interval recorded on the monitor data set. The PSB names active in the IMS region during the interval are displayed.

“Region Histogram report” on page 354

The Region Histogram report traces region activity by time interval. Activity for up to 13 regions is presented graphically in side-by-side format. Periods of region activity and inactivity can be seen at a glance from the visual presentation.

System Analysis reports

The System Analysis (Total System IWAIT) reports provide a summary and detailed account of the IWAIT activity of the entire IMS system. These IWAIT events include system data sets, databases (Full Function and Fast Path), ACBLIB Block loading, Message Format services, Scheduler, Checkpoints, Line/VTAM node, Storage Pools, and MSC.

“Total System IWAIT Summary report” on page 357

The Total System IWAIT Summary report describes the IWAIT activity for the entire IMS system including system data sets, databases (full function and Fast Path), block loading, format services, scheduler, checkpoints, line/node IWAITs, pools, multiple system transfers. Elapsed time per IWAIT distribution graphs for each category can be requested.

“Total System IWAIT Detail report” on page 361

The Total System IWAIT Detail report is a detailed breakdown of IWAIT activity for the entire IMS system. IWAIT activity is reported for Databases (full function and Fast Path), Block loading, Format services, Line/Node IWAITs. Elapsed time per IWAIT distributions for each detail line are optionally reported.

Program Analysis reports

The Program Analysis reports provide detailed information on all aspects of application processing. With these reports you can obtain a detailed analysis and documentation of the database activity of each MPP, IFP, or BMP, and the program activity against each database and data set, a trace of specified program schedules, and a breakdown of VSAM activity for IMS batch jobs.

“Program Activity Detail reports” on page 365

The Program Activity Detail reports provide a detailed breakdown of the database activity of each PSB name by PCB name, function code, DDname, and segment name feedback. Alternate report formats present the data organized by PCB name. No sorting of the input data is required to obtain the reports and they can be produced from either IMS Monitor or DB Monitor data.

“Program Trace report” on page 376

The Program Trace report is a detailed trace of the events associated with a program schedule. There is a detail line of information for each call and, optionally, each IWAIT occurring during the program schedule. There is also a summary of schedule activity. The Program Trace report is produced from DB Monitor and IMS Monitor traces. It can be used for problem isolation, to determine database use, and for program documentation.

“Batch VSAM Statistics report” on page 382

The Batch VSAM Statistics report provides VSAM usage statistics for batch applications, and is only produced for DB Monitor files built during the execution of the IMS batch system. VSAM Statistics are based on a specific application program PCB, a data set the application program is using, and the type of DL/I call the application program issued.

Resource Usage reports

The IMS Monitor Resource Usage reports provide a detailed analysis of the usage of IMS resources such as Buffer Pools (including Message Queue, OSAM, VSAM, and Message Formatting), Latches, Communication, Multiple Systems Coupling (MSC), External Subsystems, and Synchronous Callouts.

“Buffer Pool and Latch Statistics reports” on page 387

The Buffer Pool and Latch Statistics reports consist of the set of Buffer Pool Statistics reports, which show IMS buffer usage statistics for the Message Queue Pool, Database Buffer Pool, VSAM Buffer Pool, and Message Format Buffer Pool, and the Latch Statistics report which shows IMS latch usage counters. When requested, the Buffer Pool and Latch Statistics reports are always produced regardless of the global (or run-time) report interval specified as they provide summary statistics in the monitor start (90) and monitor end (91) records.

“Communication reports” on page 391

The IMS Monitor Communication reports consist of the Communication Summary report, the Communication IWAIT report, and the Communication Line Functions report. The Communication Summary report provides a summary of line or VTAM node activities. The Communication IWAIT report provides detailed information on IWAITs occurring while dispatching communication subtask to lines or VTAM nodes. The Communication Line Functions report provides the functions of lines and VTAM nodes.

“MSC reports” on page 398

The Multiple Systems Coupling (MSC) reports are the MSC Summary, MSC Traffic, and MSC Queuing Summary. The MSC Summary report provides summary information on the number of cross-system messages. The MSC Traffic report provides detailed information on local system IDs and cross-system traffic. The MSC Queuing Summary report provides detailed information on the cross-system message queue.

“ESAF report” on page 403

The IMS Monitor External Subsystem (ESAF) report provides a detailed analysis of external subsystem activity in regions and by application programs. This IMS Performance Analyzer report provides individual subsystem activity broken down by Region and Program, with statistics of ESAF activity per Transaction.

“Synchronous Callout report” on page 405

The Synchronous Callout report provides a detailed analysis of sync callout activity in regions and by application programs. This IMS Performance Analyzer report shows individual subsystem activity is broken down by Region and Program, with statistics of sync callout activity per Transaction.

Fast Path Analysis reports

The Fast Path analysis reports provide an analysis of all Fast Path resources and functions, including Fast Path buffers, balancing group (BALG) and shared EMHQ, output threads (OTHEADs), DEDB IWAITs, DEDB resource contention, and Virtual Storage Option (VSO). The reports are not available from DB Monitor data.

“DEDB Resource Contention report” on page 407

The DEDB Resource Contention report provides summary information about IWAITs on data entry database (DEDB) locks of various types, including CI, unit of work (UOW), segment level, area, buffer overflow, main storage database (MSDB), non-DBRC DB, command and dummy locks.

“Fast Path Buffer Statistics report” on page 411

The Fast Path Buffer Statistics report provides statistical information on activities in the Fast Path buffers, for all regions combined and for each region.

“BALG/Shared EMHQ Analysis report” on page 414

The BALG/Shared EMHQ Analysis report provides statistical information on Balancing Group (BALG) activities and the shared Expedited Message Handler queue (EMHQ).

“OThread Analysis report” on page 416

The OThread Analysis report is a summary analysis of activities in the output thread (OThread) queue.

“VSO Summary report” on page 419

The DEDB VSO Summary provides summary information on Virtual Storage Option (VSO) activity including VSO preload, VSO I/O activities for the various data base share levels, VSO Write IWAITS, VSO area castout operations, and VSO Coupling Facility I/O Waits.

Monitor Data Analysis report

The IMS Monitor Data Analysis report contains the Monitor Record Trace report.

“Monitor Record Trace report” on page 425

The Monitor Record Trace report formats the records on the monitor input file to produce a chronological listing of the data. The Monitor Record Trace can be used to understand the flow of internal IMS events (and the information that is recorded by IMS), retrieve more information from your monitor records not available from the standard reports and diagnosing problems with your IMS subsystem.

Batch Program reports

Although the entire collection of IMS Performance Analyzer monitor reports could conceivably be obtained from processing a DB Monitor trace, only a subset of the reports are meaningful for DB analysis. The rest of the reports are IMS TM related and would provide little or no relevant information about DB.

The following subset is available for analysis of DB Monitor data:

“Region Summary report” on page 302 and “Region Analysis report” on page 329 (Region 1)

Statistics and distributions for database calls and IWAITS. Most of this information is also available with the “Program Activity Detail reports” on page 365, however Calls/sec and IWTs/sec are unique values in this report.

“Database IWAIT Summary report” on page 323 (Region 1)

A summary of IWAIT activity for each data set and specified DDgroup.

“Database IWAIT Analysis report” on page 340 with distributions

A report of IWAIT activity by DDname or by Ddname for each user-defined DDgroup. This report can be used in place of, or in addition to, the “System Analysis reports” on page 30.

“Performance Exception reports” on page 345

Use the Exception Listing to obtain a listing of performance threshold violations. The other reports included in the suite of Performance Exception reports are applicable only to TM.

“Total System IWAIT Summary report” on page 357 and “Total System IWAIT Detail report” on page 361 with distributions

A complete accounting of IWAIT activity by data set type (OSAM, VSAM, DEDB, MSDB) and DDname.

“Program Activity Detail reports” on page 365

A comprehensive collection of reports for database call analysis, plus a detailed trace of batch program IWAIT and CALL events for analysis of program design problems.

“Program Trace report” on page 376

A detailed trace of the events associated with a program schedule.

“Batch VSAM Statistics report” on page 382

A detailed breakdown of VSAM activity for IMS batch jobs.

“Buffer Pool and Latch Statistics reports” on page 387

A report on the access status of IMS buffers and the contents of the IMS latch counters.

“ESAF report” on page 403

A summary of the external subsystem activity of IMS programs.

“Monitor Record Trace report” on page 425

The monitor input records are formatted and reported chronologically.

You should decide which reports best suit your requirements. The following reports are often the most useful:

- “Database IWAIT Analysis report” on page 340 and distributions.
- “Database IWAIT Analysis report” on page 340 with DDgroup Detail and distributions.
- “Program Analysis reports” on page 30 (either PSB Details or PSB-Tran Code Analysis provide the same information).

Note: CPU time is not collected for DB Monitor so CPU shows as 0.000 (zero).

- If a program or database problem requires more detail, you can do a separate run to obtain the “Program Trace report” on page 376. Use the From and To date and time report options to control the duration of the Program Trace.

DBCTL monitor reports

Database control (DBCTL) has neither transactions nor terminal end users in the traditional IMS sense. It does, however, work on behalf of transactions entered by coordinator controller subsystem (CCTL) terminal users. DBCTL monitoring provides data about the processing that occurs when a CCTL transaction accesses DBCTL databases.

The IMS Monitor reports that apply to DBCTL are:

- “Region Activity Summary reports” on page 28
- “Region Activity Analysis reports” on page 29
- “System Analysis reports” on page 30
- “Program Activity Detail reports” on page 365
- “Program Trace report” on page 376
- “Buffer Pool and Latch Statistics reports” on page 387
- “Fast Path Analysis reports” on page 31
- “Monitor Record Trace report” on page 425

IMS Connect reports

IMS Performance Analyzer can be used to report on IMS Connect using the IMS Connect Extensions journal. You can also combine this data with IMS log data to get a complete end-to-end picture of your IMS Connect transactions. The IMS Connect reports supplied with IMS Performance Analyzer are grouped into Transaction Transit reports, Resource Usage reports, and the Trace report.

Reporting options let you tailor reports to your needs. They include:

- Time Interval. Some reports can be summarized by time interval.
- Selection Criteria. You can filter the data based on field values thereby focusing your reports on the information that you are interested in.
- Report Interval. Time ranges let you select a specific part of the IMS Connect data. At run-time, you can specify a time range which applies to all the IMS Connect reports.
- Defaults are provided to satisfy typical reporting requirements.

IMS Connect transaction transit reports

IMS Connect transaction transit reports provide performance statistics to measure the performance of your IMS Connect OTMA transactions. Transaction Transit (response) time can be broken down into its components; Input, Processing (by OTMA), Acknowledgment from the client and Output. They can help identify any bottlenecks in transaction flow, and are used for monitoring system performance, gathering

diagnostic information, and tuning IMS. Select from a form-based report (where you select the fields you wish to report on), or a number of "fixed-format" reports.

Form-based

IMS Performance Analyzer form-based reporting provides you with the ability to customize your reports using report forms. To request reports and CSV extracts using form-based reporting, see the *IMS Performance Analyzer User's Guide*. For a comprehensive list of IMS and IMS Connect-based fields that you can add to a report form, see [Chapter 42, "Glossary of Report Form field names,"](#) on [page 515](#).

Tip: IMS Performance Analyzer allows to create a report form that contains both IMS and IMS Connect fields. If you use this form for reporting on a group of IMS and IMS Connect systems, you can get a complete end-to-end transit picture of IMS Connect transactions.

The following sample forms produce a list of IMS Connect transactions for the desired reporting period:

CEXIPA: Connect Transaction by IP address list report

List all IMS Connect transactions in the reporting period showing the start time, transaction code, client IP address, socket, target IMS data store, TCP/IP port number, response time, pre-OTMA input time, input read socket time, read message exit time, and SAF security call time. To produce a summary report, see CEXIPAS.

CEXLIST: Connect Transit Log list report

List all IMS Connect transactions in the reporting period highlighting identification information including transaction code, target IMS data store, transaction start time, as well as a breakdown of response time into its transit time components (pre-OTMA, OTMA, and post-OTMA).

COMBLIST: Combined IMS and IMS Connect list report

List all IMS Connect transactions in the reporting period, providing IMS Connect and IMS log information in a single report. For each transaction you can identify both IMS Connect and IMS system latencies that may be the cause of excessive response time. Only transactions identified in the IMS Connect Extensions journal with the associated transaction from the IMS log are reported. The combined information is reported as a single IMS Connect transaction instance.

SAFSGNON: Connect SAF Signon Time list report

List all IMS Connect transactions in the reporting period showing the start time, the associated user ID, and time spent in SAF calls.

The following reports provides summarized information on IMS Connect transactions:

CEXBYDST: Connect by IMS destination ID summary report

Report on average response times with a breakdown into transit time components (pre-OTMA, OTMA, post-OTMA) summarized by the IMS destination ID received in the client IMS request message (IRM).

CEXCLNT: Connect Count by Client ID summary report

Report on transaction counts summarized by IMS Connect client ID.

CEXIPAS: Connect Transaction by IP address/Socket summary report

Report on IMS Connect transaction performance summarized by client IP address and socket number. To produce a transaction list, see CEXIPA.

CEXNACK: Connect ACK/NAK summary report

Report on IMS Connect transaction performance and counts summarized by both IMS and IMS Connect client response (positively or negatively acknowledged). Acknowledgment must be provided by IMS to indicate that the transactions was either successfully processed (ACK) or failed to complete successfully (NAK). For SYNCLEVEL=CONFIRM only, the IMS Connect client must either accept the transaction response (ACK) or reject it (NAK).

CEXPLEX: Connect PLEX Usage summary report

Report on IMS Connect transaction performance and counts summarized by IMS Connect system name and target IMS data store, providing a high-level breakdown of IMS Connect transaction activity across all your IMS Connect systems and IMS data stores.

CEXRATE: Connect Transaction Rate by Interval summary report

Report on IMS Connect transaction processing rates per minute and per second summarized by transaction code.

CEXROUTE: Connect Datastore Routing summary report

Report on IMS Connect Extensions OTMA workload routing. Shows transaction counts summarized by original IMS data store (IMS destination ID supplied in the client IRM) and the target IMS data store (the final destination as determined by IMS Connect Extensions routing rules).

CEXSESS: Connect Sessions by Port/Interval summary report

Report on IMS Connect transaction counts summarized by IMS Connect TCP/IP port number and socket.

CEXONLY: Connect Send-only Transactions summary report

Report on IMS Connect transaction performance summarized by client ID and transaction code.

CEXSUMM: Connect Analysis by Transaction Code summary report

Report on IMS Connect transaction performance summarized by transaction code.

CEXSUMM1: Connect Analysis by Transaction Code summary report

Report on minimum, maximum, and average IMS Connect transaction response times, counts, and other performance averages summarized by transaction code.

CEXTCODE: Connect Analysis by Transaction Code summary report

Report on IMS Connect transaction performance summarized by transaction code. For each transaction code, you can see at a glance how the transaction performed, and if necessary identify the phase of processing that caused excessive response time in IMS Connect, including socket IO, message exit and SAF processing, OTMA, and client acknowledgment.

CEXTMOUT: Connect Count of Time-outs summary report

Report on IMS Connect transaction performance and counts summarized by the transaction time-out status and transaction code.

CEXUSER: Connect Tran by User ID summary report

Report on IMS Connect transaction counts summarized by user ID, client ID, and transaction code.

CEXXML: Connect XML Transaction summary report

Report on IMS Connect transaction performance and counts summarized by the name of the XML adapter passed by the SOAP gateway and the transaction code.

COMBSUMM: Combined IMS and IMS Connect summary report

Report on IMS and IMS Connect transaction activity in a single report. For each transaction code, the number of transactions processed is reported enabling you to identify both IMS Connect and IMS system latencies that may be the cause of excessive response time. Only transactions identified in the IMS Connect Extensions journal with the associated transaction from the IMS log are reported. The combined information is reported as a single IMS Connect transaction instance.

COMBSUM1: Connect and IMS Summary by Transaction summary report

Report on IMS and IMS Connect transactions summarized by transaction code.

SAFSUMM: Connect SAF Analysis by Client ID summary report

Report on IMS and IMS Connect transactions and SAF performance and usage summarized by Client ID.

TIMEOUTS: Connect Timeouts by Original IMS data store and Target IMS data store summary report

Report on IMS Connect transaction timeouts summarized by original IMS data store (IMS destination ID supplied in the client IRM) and the target IMS data store (the final destination as determined by IMS Connect Extensions routing rules).

TRNBYLTM: Connect Count by Lterm and Tpipe summary report

Report on IMS Connect transaction counts and output messages dequeued summarized by input Lterm and IMS Connect Tpipe name.

Fixed-format

The following reports provided information on OTMA transactions in a fixed format:

“IMS Connect Transaction Transit Analysis report” on page 439

The IMS Connect Transit Analysis report provides a summary of IMS Connect OTMA transaction performance. Performance data can be summarized by one or two sort keys including Time of Day, Transaction Code, User ID, IMS data store (original and target), Port number, and Connect Client ID. Performance statistics are provided as averages, and optionally, peak percentiles. For example, you can use IMS Performance Analyzer to report on the elapsed time within which 90% of transactions completed.

“IMS Connect Transaction Transit Log report” on page 445

The IMS Connect Transit Log report provides performance details about every OTMA transaction processed by IMS Connect using event records captured in the IMS Connect Extensions journal. The order of transactions in this IMS Performance Analyzer report is based on when they end, and not when they start.

“IMS Connect Transaction Transit Extract” on page 449

The IMS Connect Transit Extract provides performance details about every OTMA transaction processed by IMS Connect. You can request a List or Summary Extract, or both. The List Extract provides similar details to the Connect Transit Log report, while the Summary Extract summarizes these details over a specified time interval. The extract data produced by IMS Performance Analyzer is suitable for importing into Db2 or third-party tools from where you can run queries or produce reports and graphs.

IMS Connect resource usage reports

IMS Connect resource usage reports contain detailed and summary information on the use and availability of various IMS Connect resources including TCP/IP Ports and Tpipes.

“IMS Connect Port Usage Report” on page 455

The IMS Connect Port Usage report provides a summary of the TCP/IP ports used by the IMS Connect system. For each port, average statistics are provided for port depth, message processed count, and ACCEPT, READ and WRITE Socket counts. IMS Performance Analyzer provides peak percentile statistics for Input READ and ACK/NAK READ Socket counts.

“IMS Connect Resume Tpipe report” on page 457

The IMS Connect Resume Tpipe report provides a summary of RESUME TPIPE command activity. The standard version of the report provides command statistics, including command count, and a breakdown by command type: Auto (with timeout), No Auto and Single. Command statistics produced by IMS Performance Analyzer include count of commands issued, IMS messages received, Negative responses (Tpipe queue empty), NAK and timeout interval. The extended version of this IMS Performance Analyzer report supports all of the different resume tpipe types and options.

“IMS Connect ACK/NAK report” on page 462

The IMS Connect ACK/NAK report provides a summary of acknowledgment activity for transactions that use Sync Level=CONFIRM. Positive acknowledgment (ACK) and negative acknowledgment (NAK) statistics are reported by IMS Performance Analyzer for each transaction code. NAK is further broken down as negative acknowledgment from either OTMA (NAK sense code) or from the Client.

“IMS Connect Exception Events report” on page 464

The IMS Connect Exception Events report provides details about events that cause transactions to fail or that signal critical resources are no longer available. This IMS Performance Analyzer report comes in two formats: List and Summary. The List report provides a list of all exception events in chronological order. The Summary report provides a recap of each exception event encountered and a count of the number of times it occurred.

“IMS Connect Gap Analysis report” on page 468

The IMS Connect Gap Analysis report searches for time periods where IMS Connect Extensions journal records are not being cut, potentially highlighting an external system event that may have caused IMS Connect to slow down. You can adjust this IMS Performance Analyzer report by specifying your desired gap threshold.

IMS Connect trace reports

IMS Connect trace reports provide detailed analysis of individual IMS Connect event records.

“IMS Connect Transit Event Trace report” on page 471

The IMS Connect Transit Event Trace report provides a list of transactions, each with detailed information about every event in the life of that transaction. At a glance, this IMS Performance Analyzer report allows you to see when a transaction starts, followed by all the events associated with the transaction in the order they occurred.

OMEGAMON for IMS ATF reports

IBM OMEGAMON for IMS Application Trace Facility (ATF) provides application-level accounting statistics of DLI, Db2, and MQ calls, call times, and CPU utilization. The analysis of the data collected by the ATF can be used by IMS Performance Analyzer to identify transaction response-time components, fine-tune applications, and understand how application programs operate. The ATF-based reports supplied with IMS Performance Analyzer are grouped into Transaction Transit reports, Trace reports, and Extracts.

ATF Transaction Transit reports

The OMEGAMON for IMS ATF transaction transit reports provide application-level accounting.

Chapter 34, “ATF Transit List report,” on page 481

The OMEGAMON for IMS ATF Transaction Transit List report provides a chronological list of transactions with their processing and CPU times from the ATF log stream data.

Chapter 35, “ATF Transit Summary report,” on page 483

The OMEGAMON for IMS ATF Transaction Transit Summary report provides a statistical analysis of transaction activity with average and maximum processing and CPU times, and number of abends from ATF log stream data.

ATF Trace reports

Chapter 36, “ATF Record Trace report,” on page 485

The OMEGAMON for IMS ATF Record Trace provides detailed application DLI, Db2, and MQ call analysis for selected transactions using ATF log stream data. There are three levels of trace that provide increasing level of detail: Trace Overview, Trace Detail, and Trace Detail (Expanded) with additional application call detail.

ATF Extracts

Chapter 37, “ATF Exception Transaction extract,” on page 491

The OMEGAMON for IMS ATF Exception Transaction extract produced by IMS Performance Analyzer is an ATF data reduction process. It creates a new ATF data set from ATF log stream data that contains only those records associated with transactions that generated an exception (abend or long response time).

Chapter 3. Extracts and CSV files in IMS Performance Analyzer

IMS Performance Analyzer can create various types of extract data set and CSV files for further processing and analysis by third-party analytics.

The following types of output can be produced:

Extract data sets (CSV)

Data formatted as a comma-separated values (CSV) file (or another delimiter of your choice) for use with external programs such as Db2 or third-party analytics platforms.

To load form-based extracts into Db2 tables or import into a charting application, see "Exporting data for Db2 or for third party tools" in the *IMS Performance Analyzer for z/OS: User's Guide*.

The following reports support exporting to this format:

IMS log reports

- ["Form-based Transaction Transit List reports" on page 53](#)
- ["Form-based Transaction Transit Summary reports" on page 55](#)
- ["Transaction Exception report and extract" on page 79 \(MSGQ\)](#)
- ["CPU Usage report and extract" on page 120](#)
- ["Internal Resource Usage reports" on page 125](#)
- ["Database Update Activity report and extract" on page 160](#)
- ["System Checkpoint report" on page 180](#)
- ["Enqueue/Dequeue report" on page 193](#)
- ["Fast Path Transaction Exception report and extract" on page 205](#)
- ["ATF Summary Extract" on page 233](#)

IMS Connect

- ["Form-based Transaction Transit List reports" on page 53](#)
- ["Form-based Transaction Transit Summary reports" on page 55](#)
- ["IMS Connect Transaction Transit Extract" on page 449](#)

OMEGAMON for IMS Application Trace Facility (ATF)

- ["ATF Summary Extract" on page 233](#)

IMS transaction index and IMS Connect transaction index data sets

The IMS transaction index contains an X'CA01' record for each transaction in the IMS log, accumulating all the information in the log about the transaction. The index is used to improve reporting efficiency in IMS Performance Analyzer and to streamline problem diagnosis in IMS Problem Investigator and Transaction Analysis Workbench.

The IMS Connect transaction index contains an X'CA20' record for each transaction in an IMS Connect Extensions journal, accumulating all the information in the journal about the transaction. The index can be used in IMS Problem Investigator to streamline problem analysis.

OMEGAMON for IMS Application Trace Facility (ATF) Exception Transaction extracts

The [Chapter 37, "ATF Exception Transaction extract," on page 491](#) can be processed subsequently by IMS Performance Analyzer in a similar but more efficient way to the original log stream extracts.

IMS log extract by interval data sets

Proprietary format for input to option 4.6 **Graphing & Export** of the IMS Performance Analyzer primary option menu can be created by the following reports in IMS log report sets:

- [“Transaction Transit Extract by Interval” on page 75](#)
- [“Fast Path Transit Extract by Interval” on page 204](#)

Part 2. Log reports

IMS Performance Analyzer provides a variety of fixed-format reports that use IMS log data as a source of information, as well as the ability to design your own reports using report forms.

IMS Performance Analyzer analyzes many different types of IMS log records. For details, see [Chapter 38, “IMS Log records,”](#) on page 495.

Report categories

The IMS Performance Analyzer ISPF dialog presents the menu of IMS Log reports and extracts in a tree structure which groups them by functional category. This allows you to request reports and extracts individually or by category. There is also a category containing Log Global Options. This is where you can specify options that apply to all or many reports and extracts in the Report Set.

Form-based Transaction Transit reports

Form-based reports provide flexibility in transaction transit reporting. By using Report Forms, you can tailor the format and content of your reports. You can request just the fields of interest, and control the presentation order and format. You can create Form-based extracts and load them into Db2. Like the fixed-format Transaction (MSGQ) Transit reports, the Form-based reports produce detail and statistics on transaction response times, and help you to identify bottlenecks in transaction flow, monitor system performance, gather diagnostic information, and tune IMS.

- Transit List
- Transit Summary
- Transaction Index

There is also a subcategory containing **Transaction Transit Options**. This is where you can specify options that apply to all Form-based Transaction Transit reports and all Transaction (MSGQ) Transit reports.

Fixed-format Transaction Transit reports

These reports contain detail and statistics on transaction response times. They can help identify any bottlenecks in transaction flow, and are used for monitoring system performance, gathering diagnostic information, and tuning IMS.

- Transaction Transit Analysis
- Transaction Transit Statistics
- Transaction Transit Log
- Transaction Transit Graphic Summary
- Transaction Transit Extract by Interval (for graphing and export)
- Transaction Exception (with extracts)
- Transaction History File

There is also a subcategory containing **Transaction Transit Options**. This is where you can specify options that apply to all Transaction Transit reports.

Resource Usage and Availability reports

These reports contain detailed and summary information on the use of various IMS resources (such as regions, transactions, programs (PSBs), lines, message queues, databases, and buffer pools) and on the availability of regions, transactions, programs, lines, VTAM nodes, and databases.

- Dashboard
- Management Exception

- Transaction Resource Usage
- Resource Availability
- CPU Usage (with extract)
- Internal Resource Usage
- MSC Link Statistics
- Message Queue Utilization
- Database Update Activity (with extract)
- Region Histogram
- OSAM Sequential Buffering
- Deadlock (similar to DFSERA30)
- System Checkpoint
- BMP Checkpoint
- Gap Analysis
- Cold Start Analysis

Fast Path (EMH) Transit reports

These reports contain detail and statistics on Fast Path transaction response time. They can help identify any bottlenecks in IFP transaction flow, and are used for monitoring system performance, gathering diagnostic information, and tuning IMS.

- Fast Path Transit Analysis
- Fast Path Transit Log
- Fast Path Transit Extract by Interval (for graphing and export)
- Fast Path Transaction Exception (with extracts, similar to DBFULTA0)

Fast Path Resource Usage reports

These reports contain detailed and summary information on the use of various Fast Path resources, such as regions, transactions, programs (PSBs), DEDB databases, and VSO.

- FP Resource Usage and Contention
- FP Database Call Statistics
- IFP Region Occupancy
- EMH Message Statistics
- DEDB Update Activity
- VSO Statistics

ATF Summary reports

These reports contain detail and statistics from the OMEGAMON ATF Summary record.

- Extract
- Transaction Analysis
- DLI Call Analysis
- Db2 Call Analysis
- MQ Call Analysis

Trace reports

These reports provide chronological listings of selected log records.

- DC Queue Manager Trace
- Database Trace (Full Function)
- DEDB Update Trace

- ESAF Trace

DBCTL log reports

DBCTL events are collected by the IMS log. DBCTL has neither transactions nor terminal end users. It does, however, work on behalf of transactions entered by CCTL terminal users. DBCTL generates log data when a CCTL transaction schedules a program to access DBCTL databases. For a more detailed description of the IMS resource usage by DBCTL, see [Chapter 20, “DBCTL monitor reports,” on page 283](#).

The log reports applicable to DBCTL users are:

- [“Form-based Transaction Transit List reports” on page 53](#) using a sample form for DBCTL reporting or a custom form of your own design.
- [“Form-based Transaction Transit Summary reports” on page 55](#) using a sample form for DBCTL reporting or a custom form of your own design.
- [“Transaction Resource Usage report” on page 105](#)
- [“Resource Availability report” on page 115](#)
- [“CPU Usage report and extract” on page 120](#)
- [“Internal Resource Usage reports” on page 125](#)
- [“Database Update Activity report and extract” on page 160](#)
- [“Fast Path Resource Usage and Contention report” on page 217](#)
- [“Fast Path Database Call Statistics report” on page 223](#)
- [“DEDB Update Activity report” on page 227](#)
- [“VSO Statistics report” on page 229](#)
- [“Database Trace \(Full Function\) report” on page 251](#)
- [“DEDB Update Trace report” on page 254](#)

Chapter 4. Transit time concepts for Message Queue transactions

IMS Performance Analyzer transit reports identify response time problems within the system. These reports are designed to collect true internal measurements that are not biased or distorted by human operator inefficiencies. Thus measurements begin when a transaction is inserted to the input queue and end with the Get Unique call that removes a response from the output queue.

Transit time versus response time

It is important to distinguish between transit time and response time.

Response time is the time that you see; that is, the time from your input end-of-transmission (EOT) until the first response is received at your terminal. Response time includes line transmission time, terminal and line malfunctions, and operator inefficiency.

Transit time is that part of response time internal to the computing system; that is, the time from when the first incoming message is placed on the message queue to when the first outgoing message to its destination terminal is started.

To help you pinpoint and solve response time problems, IMS Performance Analyzer provides comprehensive transit reports to help identify internal system bottlenecks. IMS Performance Analyzer also provides availability reports to help identify resource availability problems.

Transaction sets

Transit times are based on the concept of the transaction set. A *transaction set* is that set of transactions (the primary transaction and any resulting secondary transactions) invoked in a path from the initiating transaction to the first response back to the initiating logical terminal.

In the simplest case, a transaction that merely reads or updates some records and responds back to its terminal, is the transaction set.

However, if the primary transaction invokes secondary transactions (program switching), the concept can become more complex, as shown in this example:

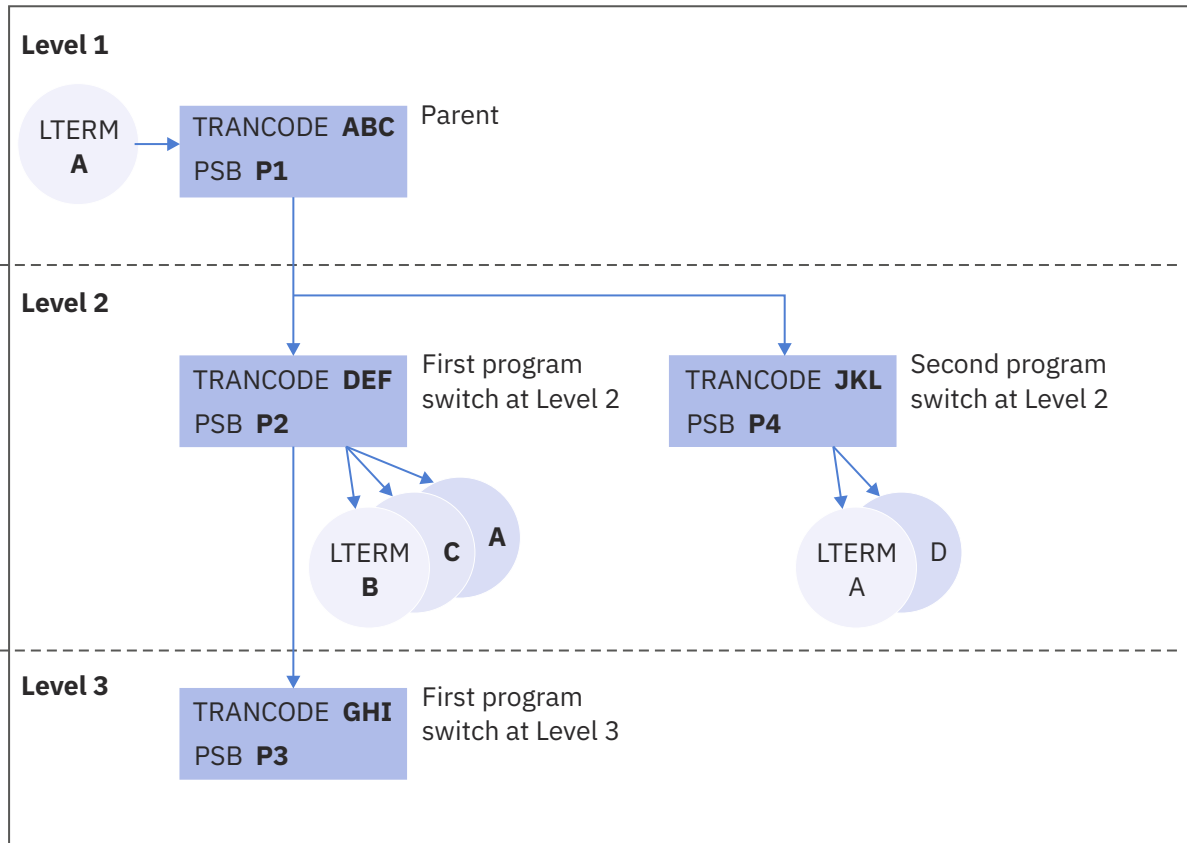


Figure 3. Concept of a Transaction Set

In this example, transaction code ABC is received from logical terminal A, and program P1 is invoked. Program P1, in turn, issues secondary transactions DEF and JKL, which invoke programs P2 and P4, respectively. Program P2 generates transaction GHI, which invokes program P3. Then program P2 sends responses to logical terminals B, C, and A. Program P4 sends responses to logical terminals A and D, but does not generate any additional transactions.

- If program P2 responds first to logical terminal A, the transaction set consists of transactions ABC and DEF, and the reported transit time is the time from the enqueueing of input transaction ABC to the Get Unique for the response from program DEF back to logical terminal A.
- If program P4 responds first to logical terminal A, the transaction set consists of transactions ABC and JKL, and the reported transit time is the time from input to program P1 to response from program P4.

Program P3 is not included in any of the possible transaction sets.

Note: Program switch transactions in a transaction set will not display any LTERM or ORGLTERM values in report output.

Transit times

The transit times reported in the Transaction Transit Analysis and Transaction Transit Statistics reports are based on the concept of transaction sets.

If only a single transaction is invoked, processing time pertains to that transaction, and program switch time is zero. If a secondary transaction is invoked and the initial response is from that secondary transaction, the processing time is the sum of the processing times of both transactions. The program switch time pertains to the enqueue and dequeue of the message between the two transactions. The times of any secondary transactions that are not in the response path (for example, transaction GHI in [Figure 3 on page 46](#)) are not included in the Transaction Transit Analysis and Transaction Transit Statistics reports.

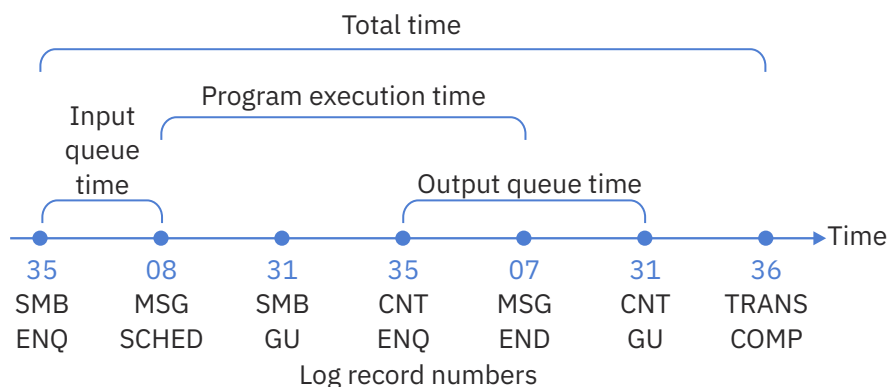
For the Transaction Transit Log report, each individual transaction is reported, with secondary transactions listed under the primary transaction. The primary transactions show input queue times but no program switch times, whereas secondary transactions show program switch times but no input queue times.

Input queue time and program execution time are measured in the same way as in DFSILTA0. Output queue time is measured from program end (normally the time the message is inserted into the permanent output queue at sync point) until the first Get Unique that sends the response to the originating terminal. Thus there is normally no overlap of program execution and output queue times. But when EXPRESS=YES is specified in the alternate PCB statement, output can occur before the end of program execution. In this case, the reported output queue times can be negative.

Special treatment is given to program switching and to transactions that abend and are re-queued for reprocessing. In addition, there are a number of variations in the sequence of events for normal transactions.

Comparing DFSILTA0 to IMS Performance Analyzer Transit reports

The IMS Log Transaction Analysis utility DFSILTA0 report looks at the times of six events in the life of a transaction.



35

SMB ENQ. The time when the incoming message is inserted to the input queue.

08

MSG SCHED. Usually the time when the program is scheduled into a message region. In the case of multiple transactions from a single program scheduling, MSG SCHED is the time of the Get Unique to retrieve the message from the input queue (31 record) after the first transaction.

31

SMB GU. The time when the program makes a Get Unique call to DL/I to get the message off the message queue.

35

CNT ENQ. The time when the response is inserted into the output queue.

07

MSG END. The time when the message region is freed (program termination). In the case of multiple transactions, this is the 31 record.

31

CNT GU. The time when the response is started from the output queue to the terminal.

36

TRANS COMP. The time when the output response is dequeued from the CNT.

This pattern shows the log record sequence: 35-08-31-35-07-31-36. The diagram shows that, to DFSILTA0, input queue time is the time taken from the 35 record to the 08 record: 35-08. Program execution time is the time taken from the 08 record to the 07 record: 08-31-35-07. Output queue time overlaps and is the time taken from the 35 record to the 31 record: 35-07-31. Total time is the time taken from the first 35 record to the 36 record: 35-08-31-35-07-31-36.

The first five of these times are printed in the report from DFSILTA0. The time for completing response transmission is not explicitly printed. Processing time and output queue time may be overlapping (sometimes a point of confusion), and input queue time, processing time, and output queue time do not add up to total time on this report. These three component times reflect response time components that are internal to the system, whereas total time includes both internal and external response components. Total time is measured from the insertion of the incoming message to the message queue (35 record) to the dequeue of the response from the message queue (36 record). This includes output transmission time, which can be biased by such factors as terminal unavailability, PC problems (for example: poor configuration, memory contention, disk errors, PC hanging), LAN bottlenecks, or telecommunication problems.

The IMS Performance Analyzer Transaction Transit Log, while similar to DFSILTA0, differs from DFSILTA0 in the following ways:

- Only the internal system aspects of transit time are treated.

Tip: The [“Resource Availability report” on page 115](#) and [“Region Histogram report” on page 166](#) can be used to help determine external inefficiencies.

- A fourth component, program switch time, is included
- Component times don't overlap
- Component times add up to total time
- IMS Performance Analyzer provides additional reports, which give tabular and graphical summaries of response times by selectable categories.
- IMS Performance Analyzer provides performance reporting on multiple IMS subsystems running in a sysplex and using shared queues.

Chapter 5. Shared Queues in an IMS sysplex

IMS Performance Analyzer can process log files from multiple IMS subsystems in a sysplex environment which uses shared queues. All of the IMS subsystems in a sysplex can share a common set of queues for input, output, and Fast Path messages. A message placed on a shared queue can be processed by any IMS subsystem that has access to the shared queue and is capable of processing the message. The Common Queue Server (CQS) is the facility which manages the shared queues.

In general, IMS handles messages in the following manner:

1. IMS subsystems register interest in those queues for which they are able to process messages (work).
2. When an IMS subsystem receives a message and places it on the shared queue, all IMS subsystems that have registered interest in that queue are notified.
3. One IMS subsystem retrieves the message and processes it.
4. The IMS subsystem that processes the message places a response on the queue.
5. The IMS subsystem that submitted the original message is notified that the response message was placed on the queue.
6. The IMS subsystem that submitted the original message sends the response message to the originating terminal.

Note: Without shared queue processing, each IMS subsystem has its own queues for both input and output messages, and has its own Expedited Message Handler for Fast Path messages. The IMS subsystem that receives a message processes it, unless that IMS is set up to send the message to another IMS subsystem using MSC, Message Requeuer, or some other means.

Chapter 6. Restrictions for Log reporting

Be aware of the following restrictions and cautions for IMS Performance Analyzer log reporting.

Multiple Systems Coupling (MSC) Transactions

IMS Performance Analyzer supports Multiple Systems Coupling (MSC) transactions on a system-by-system basis. Merged MSC logs are not supported. Using the MSC option, transit times within the local system are reported for transactions originating on a remote system. The time between the Get Unique from the input queue and the enqueue to the output queue is reported as process time.

Intersystem Communication (ISC) Transactions

IMS Performance Analyzer supports Intersystem Communication (ISC) transactions on a system-by-system basis. Intersystem transit times are not supported.

Batch Message Processing (BMP) Transactions

Batch Message Processing (BMP) transactions are supported by all IMS Performance Analyzer reports. However, be careful when including them in the transaction transit reports. BMP transactions are not designed for the rapid responses typical of Message Processing Program (MPP) transactions. A BMP generally has much more I/O and longer execution times than an MPP. Therefore, BMP times can bias IMS Performance Analyzer transit time results and invalidate their use as a measurement and tuning aid for the more critical MPP transactions. To help isolate these effects, use IMS Performance Analyzer form-based reporting.

Polling

Terminal queue times prior to polling cannot be captured.

Leap Second Offset (LSO) adjustment

The timestamp of IMS Performance Analyzer log reports are in Local time. The Local zone value is derived from the Universal Time Coordinated (UTC) zone value in the IMS Performance Analyzer input logs.

The LSO is an adjustment that applies to the STCK timestamp with the time zone offset to report accurate values in local time. The value of LSO is 27 seconds from January 1, 2017.

When UTC is available, its value, which is adjusted to the LSO, is compared with the STCK timestamp value. If the difference is higher than 15 seconds and lower than 60 seconds in the logs, then it is considered that the discrepancy is due to LSO. The LSO is then applied to the time formatting.

Chapter 7. Form-based Transaction Transit reports

“Form-based” reporting in IMS Performance Analyzer allows you to personalize the format and content of Transaction Transit reports and extracts to meet your individual requirements. They enable comprehensive, flexible analysis of transaction transit information giving you a good insight into different facets of response tuning.

For Log reporting, you can select fields from all the IMS fields available to IMS PA. This is done using Report Forms in the dialog or the **FIELDS** operand in batch commands.

List and Summary reports are available to run against IMS systems and Log files. You can request multiple reports in a single job and single pass of the data.

Form-based Transaction Transit List reports

IMS Performance Analyzer Form-based Transaction Transit List reports contain a detailed list of transaction transit records in transaction completion sequence.

To tailor the format and content of the reports and extracts, you can specify a Report Form, apply a report filter, include only the first or all output messages, or specify the minimum transaction Start Level and Completion Level, the data Precision, Transaction Mix, what Digit Grouping to use, and the Selection Criteria for filtering the input records. Additional extract options are delimiters, field labels, the format of numeric fields, and whether to include time zone information in timestamps.

See the information about log batch interface and log report operands in the *IMS Performance Analyzer for z/OS: User's Guide* for more detail on the options for this report.

Content: Default

The Form-based Transaction Transit List report is a detailed list of transaction transit records. The order of transactions in the report is based on when they end (not when they start). You can tailor the format and content of the reports and extracts by specifying Report Forms, filtering criteria, and other reporting options.

For field descriptions, refer to the [Chapter 42, “Glossary of Report Form field names,”](#) on page 515. Field help information is also available using dialog option 2 **Report Forms**. Edit or view the Report Form, then enter line action H for help information on a field, or press **Prompt (F4)** from a form field, then line action H for a field in the prompt list.

The default Form-based Transit List report can be requested with the following command:

```
IMSPALOG      LIST
IMSPALOG      EXECUTE
```

This produces the same result as the following command in which you can see the defaults explicitly specified:

```

IMSPALOG      LIST(
                DDNAME(LIST0001),
                SECGROUP,
                STARTLVL(2),
                COMPLVL(3),
                PRECISION(6),
                TRANMIX(1),
                FIELDS(ORGLTERM,
                      TRANCODE,
                      PROGRAM,
                      PSTID,
                      CLASS,
                      PRIORITY,
                      DBCALLS,
                      STARTIMS(TIME),
                      CPUTIME,
                      USERID,
                      LTERMOUT,
                      INPUTQ,
                      PROCESS,
                      OUTPUTQ,
                      TOTALTM,
                      RESPIMS))
IMSPALOG      EXECUTE

```

The following figure shows the default report format.

Note: Form-fields that result in a hyphen (-) being displayed in the corresponding report column indicate that the required information is not available in the input logs. This is normal behavior that can occur, for example, if the log records required to determine the value are not present.

IMS Performance Analyzer IMS List Report Default														
LIST0250 Printed at 09:11:03 30Jun2020					Data from 14.24.15 16Jan2018					Page 1				
Org	Trancode	Program	PST	Cls	Pr	DB Call Count	IMS Tran Start	CPU Time	Userid	Output LTERM	InputQ Time	Process Time	OutputQ Time	Total IMS...
IPI2	CEXTCONV	CEXTPGM	3	5	8	5	14.24.15.871157	0.013099	IPI2	IPI2	0.044983	0.151816	0.000000	0.196799 0.19...
IPI2	CEXTCONV	CEXTPGM	3	5	8	5	14.24.17.074726	0.002568	IPI2	IPI2	0.007642	0.010525	0.000000	0.018167 0.01...
IPI2	CEXTCONV	CEXTPGM	3	5	8	5	14.24.18.094647	0.002570	IPI2	IPI2	0.013308	5.011606	0.000000	5.024914 5.02...
IPI2	CEXTCONV	CEXTPGM	3	5	8	5	14.24.24.121574	0.003713	IPI2	IPI2	0.002742	10.01830	0.000000	10.02104 10.0...
IPI2	CEXTCONV	CEXTPGM	3	5	8	0	14.24.35.145376	0.000607	IPI2	-	0.006682	0.005020	-	0.011702 0.03...
	CEXSConv	CEXSPGM	3	15	8	5	14.24.35.153251	0.005878	IPI2	IPI2	0.011119	0.014871	0.000000	0.024886...
IPI2	CEXSConv	CEXSPGM	3	15	8	0	14.24.36.181913	0.000368	IPI2	-	0.010110	0.004158	-	0.014268 0.03...
	CEXTCONV	CEXTPGM	3	5	8	5	14.24.36.192434	0.003367	IPI2	IPI2	0.011594	0.014327	0.000000	0.025061...
IPI2	CEXTCONV	CEXTPGM	3	5	8	0	14.24.37.220822	0.000367	IPI2	-	0.007357	0.003972	-	0.011329 0.02...
	CEXSConv	CEXSPGM	3	15	8	5	14.24.37.228598	0.003285	IPI2	IPI2	0.008258	0.009020	0.000000	0.016984...
IPI2	CEXSConv	CEXSPGM	3	15	8	0	14.24.38.248831	0.000397	IPI2	-	0.012004	0.020115	-	0.032119 0.06...
	CEXTCONV	CEXTPGM	3	5	8	5	14.24.38.262068	0.003295	IPI2	IPI2	0.043383	0.012787	0.000000	0.055443...
IPI2	CEXTCONV	CEXTPGM	3	5	8	5	14.24.39.323708	0.002384	IPI2	IPI2	0.021307	0.016773	0.000000	0.038080 0.03...

Figure 4. IMS Performance Analyzer Form-based Transit List report (default)

Sample report forms

A Report Form is a user-defined template for the design of a report. The batch equivalent is the **FIELDS** operand. The following sample forms are supplied to demonstrate how Form-based Log Transaction Transit List reports can be tailored to meet your specific requirements.

For more information on the fields generated in the sample reports, you can use dialog option 2 **Report Forms** to display the list of sample forms, select the form you are interested in, then enter line action **H** for help information on any field.

For a complete list of samples supplied with IMS Performance Analyzer, see “IMS log reports” on page 15.

Form-based Transaction Transit Summary reports

IMS Performance Analyzer Form-based Transaction Transit Summary reports provides a summary of transaction performance.

You can tailor the format and content of the reports and extracts by specifying Report Forms, a report filter, the Time Interval for summarizing activity over time, the Totals Level to include the grand total and optional sub-totals, the minimum transaction Start Level and Completion Level, the data Precision, Transaction Mix, what Digit Grouping to use, and the Selection Criteria for filtering the input records. Additional extract options are delimiters, field labels, the format of numeric fields, and whether to include time zone information in timestamps.

See the information about log batch interface and log report operands in the *IMS Performance Analyzer for z/OS: User's Guide* for more detail on the options for this report.

Options

You can alter the level of summarization by changing the number of key fields.

You can specify up to 8 key fields to summarize and sort by, and you can request up to 7 levels of sub-totaling, illustrated in the following example.

Summarize and sort by						
Key field 1		Key field 2	Key field 3			
IMS Tran	Tran	Proc	Tran	Avg	Avg	
Start	Trancode	IMS ID	Count	Process Time	IMS Resp Time	
TOTALS(1)						
08.59.00	IVTNO	IMD3	2	1	2	
08.59.00	PART	IMD3	2	1744	77	
08.59.00	PART	I8D1	1	1906	266	
08.59.00			5	1079	85	Subtotals: level 1
09.00.00	IVTNO	I8D1	2	1	2	
09.00.00	IVTNO	I9D1	2	5	3	
09.00.00	PART	I8D1	1	1394	10	
09.00.00			5	281	4	Subtotals: level 1
09.01.00	PART	I9D1	2	1146	140	
09.01.00			2	1146	140	Subtotals: level 1
Total			12	758	60	Grand total
TOTALS(2)						
08.59.00	IVTNO	IMD3	2	1	2	
08.59.00	IVTNO		2	1	2	Subtotals: level 2
08.59.00	PART	IMD3	2	1744	77	
08.59.00	PART	I8D1	1	1906	266	
08.59.00	PART		3	1798	140	Subtotals: level 1
08.59.00			5	1079	85	Subtotals: level 1
09.00.00	IVTNO	I8D1	2	1	2	
09.00.00	IVTNO	I9D1	2	5	3	
09.00.00	IVTNO		4	3	3	
09.00.00	PART	I8D1	1	1394	10	
09.00.00	PART		1	1394	10	
09.00.00			5	281	4	Subtotals: level 1
09.01.00	PART	I9D1	2	1146	140	
09.01.00	PART		2	1146	140	
09.01.00			2	1146	140	Subtotals: level 1
Total			12	758	60	Grand total

Figure 5. IMS Performance Analyzer Form-based Summary report showing different levels of totaling

If you specify **NOTOTALS**, no totals are printed. TOTALS(0) provides only the grand total, no sub-totals. TOTALS(1) to TOTALS(7) provides the grand total and subtotals to the corresponding key level. The grand total line is labeled **Total** or **T*** if the column is narrow.

Content: Default

The Form-based Transaction Transit Summary report provides a summary of transaction performance. You can tailor the format and content of the reports and extracts by specifying Report Forms, filtering criteria, and other reporting options.

For field descriptions, refer to the [Chapter 42, “Glossary of Report Form field names,”](#) on page 515. Field help information is also available using dialog option 2 **Report Forms**. Edit or view the Report Form, then enter line action **H** for help information on a field, or press **Prompt (F4)** from a form field, then line action H for a field in the prompt list.

The default Form-based Transit Summary report can be requested with the command:

```
IMSPALOG      SUMMARY
IMSPALOG      EXECUTE
```

This produces the same result as the following command in which you can see the defaults explicitly specified:

```
IMSPALOG      SUMMARY(
                DDNAME(SUMM0001),
                SECGROUP,
                TOTALS(0),
                INTERVAL(00:01:00),
                STARTLVL(2),
                COMPLVL(3),
                PRECISION(6,2),
                TRANMIX(1),
                FIELDS(TRANCODE(ASCEND),
                    TRANCNT,
                    INPUTQ(AVE),
                    PROCESS(AVE),
                    OUTPUTQ(AVE),
                    TOTALTM(AVE),
                    INPUTQ(90),
                    PROCESS(90),
                    OUTPUTQ(90),
                    TOTALTM(90),
                    CPUTIME(AVE),
                    DBCALLS(AVE),
                    DBWAITS(AVE),
                    DCCALLS(AVE)))
IMSPALOG      EXECUTE
```

The following figure shows the default report format.

Note: Form-fields that result in a hyphen (-) being displayed in the corresponding report column indicate that the required information is not available in the input logs. This is normal behavior that can occur, for example, if the log records required to determine the value are not present.

IMS Performance Analyzer IMS Summ Default rpt															
SUMM0250 Printed at 09:39:50 30Jun2020 Data from 14.24.15 16Jan2018 to 14.31.46 16Jan2018 Page 1															
Trancode	Tran Count	Avg InputQ Time	Avg Process Time	Avg OutputQ Time	Avg Total IMS Time	90% InputQ Time	90% Process Time	90% OutputQ Time	90% Total IMS Time	Avg CPU Time	Avg DB Call Count	Avg DB Wait Count	Avg DC Call Count	Avg...	
ADDINV	5	0.019419	0.026187	0.000466	0.046072	0.041770	0.043767	0.001250	0.082476	0.004037	0.80	0.00	2.00...		
ADDPART	4	0.023442	0.018527	0.000425	0.042394	0.029605	0.027704	0.000893	0.049102	0.003830	1.50	0.00	2.00...		
CEXSNOVC	15	0.036413	0.723589	0.002015	0.761028	0.106629	3.094499	0.008545	3.130655	0.002645	3.00	0.00	4.40...		
CEXTNOVC	5	0.012738	0.009165	0.000144	0.021556	0.022573	0.014352	0.000394	0.033209	0.002239	3.00	0.00	2.60...		
CEXTNOVC	28	0.017754	1.466211	0.006083	1.488631	0.038250	5.339641	0.041612	5.380645	0.003703	4.11	0.00	4.18...		
DLETINV	9	0.009480	1.684074	0.000276	1.693675	0.015945	6.216233	0.000710	6.229154	0.004096	3.89	0.00	2.22...		
DLETINV	4	0.040619	0.029115	0.000732	0.070466	0.093977	0.049991	0.002425	0.144187	0.004251	2.00	0.00	2.00...		
DLETPART	3	0.055213	0.018569	0.004871	0.078653	0.147724	0.026534	0.014614	0.166832	0.004220	4.00	0.00	2.00...		
DSPALLI	4	0.005049	0.013199	0.000399	0.018647	0.009780	0.017072	0.001422	0.024130	0.004492	4.75	0.00	6.75...		
DSPINV	8	0.006307	0.016039	0.000024	0.022370	0.010188	0.020195	0.000109	0.030383	0.004756	3.88	0.00	9.00...		
IVTCV	48	0.034769	0.024165	0.000565	0.059498	0.134663	0.058948	0.002287	0.179418	0.001579	1.17	0.00	4.00...		
IVTCX	36	0.018918	0.067063	0.000245	0.086226	0.041542	0.173327	0.000812	0.200817	0.004748	1.25	0.00	4.00...		
IVTFD	11	0.000435	0.019161	0.000622	0.020218	0.001217	0.071014	0.001030	0.071825	0.000255	1.36	0.00	2.09...		
IVTFM	8	0.001672	0.000268	0.000689	0.002629	0.004347	0.000328	0.001251	0.005248	0.000073	0.00	0.00	2.13...		
IVTNO	11	0.022457	0.026258	0.000060	0.048775	0.072878	0.071745	0.000315	0.139824	0.000677	1.36	0.00	2.09...		
IVTNV	11	0.013003	0.019330	0.000321	0.032654	0.026817	0.048998	0.001443	0.068822	0.000592	1.36	0.00	2.09...		
MQATREQ1	4	0.014911	0.311680	0.002755	0.329346	0.019540	0.358530	0.009192	0.386055	0.013888	8.50	0.00	2.00...		
PART	9	0.031824	0.028437	0.000122	0.060383	0.090873	0.074922	0.000512	0.161240	0.003729	1.67	0.00	4.56...		
Total	223	0.021911	0.329416	0.001175	0.352373	0.078381	2.184135	0.012975	2.212819	0.002986	2.17	0.00	3.67...		

Figure 6. IMS Performance Analyzer Form-based Transit Summary report (default)

Sample report forms

A Report Form is a user-defined template for the design of a report. The batch equivalent is the **FIELDS** operand. The following sample forms are supplied to demonstrate how Form-based Log Transaction Transit Summary reports can be tailored to meet your specific requirements.

For more information on the fields generated in the sample reports, you can use dialog option 2 **Report Forms** to display the list of sample forms, select the form you are interested in, then enter line action H for help information on any field.

For a complete list of samples supplied with IMS Performance Analyzer, see [“IMS log reports” on page 15](#).

IMS program switch reporting

A program switch is an output message from an IMS transaction where the destination is an IMS scheduler message block (SMB) rather than a response to a logical terminal (LTERM). You can use IMS Performance Analyzer form-based reporting fields to report on program switch activity.

Typically, a program switch is used in one of the following ways:

- Single end-user transaction request, made up of multiple transactions that are processed serially, each performing their part of the overall business function, then finally delivering the response back to the end-user.
- Long-running transaction (MPP or BMP) that continuously spawns new transactions to process (external) incoming requests.

The IMS Performance Analyzer IMS log transit engine "replays" the lifecycle of each transaction from its log record events for the purpose of performance analysis. IMS transactions in the same program-switch group have a unique "originating tracking unit-of-work ID". This allows transit reporting to group related program switch transactions. Transactions that are part of the same program switch group are sequenced together and not reported until all transactions in the group have completed. IMS Performance Analyzer form-based transaction transit reports retain that grouping so that the entire program switch sequence can be analyzed together. An exception to this is that long-running program-switch sequences might cause IMS Performance Analyzer to exhaust virtual storage, in which case incomplete sequences are flushed (reported) to relieve the VS constraint, and the sequence will resume sometime later, albeit not adjacent to the previous sequence.

The following form fields provide information and formatting services specifically for program switch sequences:

ORGLTERM

Provides the input logical terminal (LTERM) of the originating transaction in the program switch sequence. Use ORGLTERM for list reports to see the start of a program switch sequence, followed by the program switches in sequence.

- For the first transaction in a program switch sequence, ORGLTERM is the input LTERM.
- For subsequent transactions in the program switch sequence, ORGLTERM is blank to delineate program switch sequences.

ORGTRAN

Provides the transaction code of the originating transaction in the program switch sequence.

PARTRAN

Provides the transaction code of the parent transaction in the program switch sequence.

PARTOKEN

Provides the recovery token of the parent transaction in the program switch sequence.

PGMSWIT

Provides the sequence number of the transaction in the program switch sequence, or in other words, the number of program-program message switches to get to this input.

SWITTIME

Provides the program switch time.

A program switch occurs when one transaction calls another by inserting a message (destination is SMB) onto the message queue. Program switch time is the elapsed time from when the program switch message is eligible for processing to when it actually starts processing in a dependent message processing region. It is attributed to the program switch transaction not the originating transaction, and is analogous to input queue time for transactions coming into IMS via Virtual Telecommunications Access Method (VTAM) or an Open Transaction Manager Access (OTMA) client.

Program-to-program transactions are discrete transactions with their own units of recovery. Their processing eligibility depends on the type of I/O program communications block (PCB) used to insert the message:

- For an I/O PCB defined with the EXPRESS=YES statement, the program-to-program transaction is immediately eligible for processing (asynchronously).
- Otherwise, the program-to-program transaction cannot start until the parent starts syncpoint phase 2 and transfers the message to its permanent (SMB) destination.

Tip: Program switch sequences can be reported as a group using the PROGRAMSWITCH(YES) option, or transactions can be reported separately using PROGRAMSWITCH(NO). The PROGRAMSWITCH(BMP) option is similar to PROGRAMSWITCH(YES) but also reports the BMP transaction at the head of the group if the switch sequence was initiated from a BMP.

Examples

The following form-based transit list reports show program switch examples generated using the following IMS Performance Analyzer commands:

```
IMSPALOG      LIST(DESC('Transaction Transit Log'),
                DDNAME(LIST0001),
                SECGROUP,COMPLVL(1),STARTLVL(2),PRECISION(6),
                FIELDS(ORGLTERM,
                    PGMSWIT,
                    TRANCODE,
                    ORGTRAN,
                    PARTRAN,
                    STARTIMS(TIME),
                    PSTID,
                    DBCALLS,
                    CPUTIME,
                    LTERMOUT,
                    INPUTQ,
                    SWITTIME,
                    PROCESS,
                    OUTPUTQ,
                    TOTALTM,
                    RESPIMS,
                    ORGUOWID))
IMSPALOG      EXECUTE
```

Single end-user transaction request

In the following example, transaction TC11 is requested from TERM1. Transaction TC11 performs a program switch to transaction TC12 which in turn performs a program switch to transaction TC13. TC13 completes the program switch sequence and responds back to the originating LTERM.

Org LTERM	Prog Switch	Trancode	Org Trancode	Parent Trancode	IMS Tran Start	PST	DB Call Count	CPU Time	Output LTERM	InputQ Time	PgmSwitch Time	Process Time	OutputQ Time	Total Time	IMS Time	IMS Resp Time
LTERM1	0	TC11	TC11		15.28.58.707695	79	29	0.001634	-	0.000038	-	0.002016	-	0.002054	-	0.075057
	1	TC12	TC11	TC11	15.28.58.709563	79	33	0.003524	-	0.001244	0.001244	0.014745	-	0.015989	-	-
	2	TC13	TC11	TC12	15.28.58.717966	124	81	0.006605	LTERM1	0.000187	0.000187	0.064554	0.000035	0.064776	-	-

Figure 7. IMS Performance Analyzer: Program switch for a single end-user transaction request

Observe the following:

- Each individual transaction is broken down into its transit time components. For the first transaction in a program switch sequence, input queue + processing + output queue = total IMS time. For subsequent transactions in a program switch sequence, program switch + processing + output queue = total IMS time.

- The program switch (transit set) sequence reports IMS response time, attributed to the first transaction TC11. Note that it is significantly more than the total time for TC11. Response time is the elapsed time from when IMS receives the initial input message for the starting transaction TC11 to when the output message is sent back to the originating LTERM by the final transaction in the sequence TC13 (we know this because TC13 was the only transaction to issue an output message as shown in the Output LTERM column).

Note that response time is reported **only** when the input and output LTERMs are the same. That is, when the end-user entered a transaction request at the terminal and received a response back.

- We know that TC11 spawned TC12 which in turn spawned TC13 because the program switch number increases with each new level of program switch nesting.

Single end-user transaction request, but no output message

In the following example no output message is issued so the response time cannot be calculated.

Org Resp LTERM	Prog Swit#	Org Trancode	Parent Trancode	IMS Tran Trancode	DB Call PST	CPU Count	Output Time	InputQ LTERM	PgmSwitc Time	Process Time	OutputQ Time	Total Time	IMS Time
LTERM2	0	TC21	TC21	TC21	01.40.07.604295	27	0.002284	-	0.029112	-	0.013478	-	0.013567
	1	TC22	TC21	TC21	01.40.07.642408	23	0.007626	-	0.003586	0.000060	0.092511	-	0.092571
	2	TC23	TC21	TC22	01.40.07.730375	39	0.003417	-	0.007129	0.000083	0.020045	-	0.020128
	3	TC24	TC21	TC23	01.40.07.752355	22	0.001713	-	0.004335	0.000045	0.012395	-	0.012440

Figure 8. IMS Performance Analyzer: Program switch for a single end-user transaction request, but no output message

Long running transaction that continuously spawns transactions

In the following example, a message arrives on an MQ message queue. This report reveals that transaction TC31 spawned all the TC32 transactions because the program switch number stops at 1 (that is, level 0 spawns all the level 1 transactions).

Org IMS Resp LTERM Time	Prog Swit#	Org Trancode	Parent Trancode	IMS Tran Trancode	DB Call PST	CPU Count	Output Time	InputQ LTERM	PgmSwitc Time	Process Time	OutputQ Time	Total Time	IMS Time
LTERM3	0	TC31	TC31	TC31	01.40.00.925694	45	0.002368	-	22.36779	-	0.032790	-	22.40073
	1	TC32	TC31	TC31	01.40.23.293632	20	0.000158	-	0.015618	0.000098	-	-	0.015716
	1	TC32	TC31	TC31	01.40.23.293650	20	0.000225	-	0.015762	0.015762	0.000098	-	0.015860
	1	TC32	TC31	TC31	01.40.23.293672	20	0.000225	-	0.015898	0.015898	0.000112	-	0.016010
	1	TC32	TC31	TC31	01.40.23.323907	27	0.000695	-	0.000051	0.000051	0.020900	-	0.020951
	1	TC32	TC31	TC31	01.40.23.323936	27	0.000695	-	0.021013	0.021013	0.000120	-	0.021133
	1	TC32	TC31	TC31	01.40.23.323987	27	0.000695	-	0.021144	0.021144	0.000101	-	0.021245

Figure 9. IMS Performance Analyzer: Program switch for a long running transaction that spawns new transactions to process requests

IMS transaction index

The IMS transaction index is a specialized extract file created by IMS Performance Analyzer batch reporting. Each record in the index represents an IMS transaction and contains cumulative information from the IMS log about that transaction.

To learn more about how to generate an IMS transaction index, see *Creating an IMS transaction index* in the IMS Performance Analyzer User's Guide.

Content

V2R5M0		IMS V15.4.0		IMS Problem Investigator - Log Report		Page 1	
+0004	Code...	CA01	Transaction				
+0056	STCK...	D77DF49A22AD792A	LSN....	0000000000000001	Record... 1		
	Date...	2020-02-18 Tuesday	Time...	08.46.34.015447.572			
+0000	LL.....	057C	ZZ.....	0000	Type.....	CA	Subtype.... 01
							Vers..... 'IPI450'
+00A4	ID.....	Transaction	Identification section				
+00A4	TranCode...	'CEXTN0NC'	Program....	'CEXTPGM '	Userid.....	'IPI2 '	ITerm..... 'IPI2 '
+00CC	LTermOut...	'IPI2 '	Terminal...	'VAPIPI2B'	LTermOvr...	' '	LTerm..... 'IPI2 '
+00EC	ParentTC...	'FPRoutCd...	'FPRoutCd...	'FPRoutCd...	OrgRegType..	' '	ParRegType.. ' '
+00FC	UTC.....	IMS transaction start time (UTC)					
+00FC	UTCDate....	2020049F	UTCTime....	004634015438	UTCZone....	032C	
+0108	ISO.....	IMS transaction start time (local)					
+0108	Date.....	'2020-02-18'	Time.....	'08.46.34.015438'			
+0124	LogonTK....	0000000000000000	OtmaSSN....	00000000	CommitMd...	' '	SynchLv1... ' '
+0050	Base.....	Transaction	Tracking section				
+0050	Org.....	Originating	Tracking Unit-of-Work (UOW) ID				
+0050	OrgID.....	'IFDE '	OrgTK.....	D77DF49A22A70644			
+0060	Pro.....	Processing	Tracking Unit-of-Work (UOW) ID				
+0060	ProID.....	'IFDE '	ProTK.....	D77DF49A22A70644			
+0132	RecToken...	IMS transaction recovery token					
+0132	RecTokID...	'IFDE '	RecTokOASN..	000003F8	RecTokCOMM..	00000000	IMSFE..... 'IFDE '
+0152	PSID.....	0004	TrSeq#.....	+1	TSSize.....	+1	RegType.... 'MPP'
+0167	StepName...	'REGION '	DDName.....	'LIFDE001'	Class.....	0005	Priority... 08
+0180	ORGTran...	' '	OrgVRM.....	1510	ProVRM.....	1520	JobName.... 'IFDEMPP3'
							PgmSwit.... +0
+0188	Transit....	Transaction	Transit accounting section				
+0188	InputQ.....	0.063810	Process.....	0.196585	OutputQ....	0.002709	OutputL.... 0.000034
+0180	TotalTm...	0.263104	RespIMS....	0.263104	SwitTime...	0	SchedTm.... 0.002026
+01E0	CM0Delay...	0	CM1Delay...	0	OutRTIMS...	0	TotRTIMS... 0
	CPUUSU.....	+720	WFItime....	0	FPPH2.....	0	FPEMHIIn... 0
+0220	FPTerm0t...	0	FPPH1Ph2...	0	SYNCELAP...	0.000043	FPEMHOut... 0
	SYNCPH2F...	0			SYNCPH1E...	0.000043	SYNCPH2E... 0
+0230	Events....	Transaction	Event Time section				
+0230	T01.....	2020-02-18	08.46.34.015438	StartIMS...	2020-02-18	08.46.34.015438	
+0240	T35In.....	2020-02-18	08.46.34.015438	T08.....	2020-02-18	08.46.34.040304	
+0250	T5607.....	2020-02-18	08.46.34.040308	T31DLI.....	2020-02-18	08.46.34.079248	
+0260	T5610.....	2020-02-18	08.46.34.275790	T37.....	2020-02-18	08.46.34.275833	
+0278	T5612.....	2020-02-18	08.46.34.276564	T31DLInx...	2020-02-18	08.46.34.275833	
+0290	T310ut1...	2020-02-18	08.46.34.278542	T31Resp....	2020-02-18	08.46.34.278542	
+02A8	FPT5937...	2020-02-18	08.46.34.275833	Local.....	+08:00	LogLSN.....	000000000000F41B
+02C0	LogRec#...	+458	Log#.....	+1	ApplName...	' '	ExtFlag1... EE
+02D2	ExtFlag3...	00	SchdmInt...	0	SchdmPol...	0	ExtFlag2... 38
+0300	FFDB50...	+18	FFDB5950...	+1	SUFactor...	4018886E5F0ABB03	FPOTelap... 0.000774
+0328	HiLocks...	+10					Regn0cc.... 0.239425
+0360	Calls.....	DB call summary section					
+0360	FFCalls...	+20	FFGets.....	+8	FFUpdats...	+12	FFWaits.... +0
+0374	FFGUs.....	+8	FPGUs.....	+5	FPGets.....	+2	FFGNs..... +0
+0388	FPGNs.....	+0	FPGUs.....	+2	FFUpdats...	+3	FPWaits.... +0
+0390	TPSection..	Accounting section (56FA)					
+0390	TPMCNT.....	+1	TPAGGCT....	+1			
+0394	TPACCT.....	Accounting	Statistics				
+0394	TPDGu.....	+0	TPDGN.....	+0	TPDGNP.....	+0	TPDGHU..... +8
+03A8	TPDGHNP...	+0	TPDISRT....	+4	TPDDLET....	+4	TPDGHN..... +0
							TPCLCNT.... +20

Figure 10. IMS Problem Investigator: Viewing detailed information in an IMS transaction index CA01 record (partial record shown)

Chapter 8. Fixed-format Transaction Transit reports

IMS Performance Analyzer fixed-format Transaction Transit (MSGQ) reports break down transit time into its components, reporting these times for the average transaction and for a peak load situation, as defined by you.

You can use IMS Performance Analyzer fixed-format transaction transit reports for the following purposes:

Monitoring system performance

On a daily basis, you probably want to know whether anything happened in the system that significantly affected transaction response time. You'd like to determine this at a quick glance, rather than having to study pages of tabulated listings. The Transaction Transit reports are designed for this purpose.

You'll probably want to look first at the Transaction Transit Graphic Summary report and then at the Transaction Transit Analysis report (by transaction code and by LTERM). Each of these reports is normally no longer than two to four pages. The Graphic Summary report shows any spikes in transit time and whether the overall pattern differs from the normal pattern. If there is a spike or deviation, then you may be directed to the Transit Analysis reports. You may also want to rerun IMS Performance Analyzer to produce other reports for the spike periods, to get more detailed perspectives or different views of the data. For example, the Transaction Transit Statistics report presents graphic distributions of the same information and is especially useful for comparing patterns with those obtained on previous days.

Some examples of how this process might occur follow.

Example 1

Suppose a transaction stays in a region for an unusually long time. The Mean Response Time graph shows a spike for the time period in which the transaction is completed, and the spike indicates lengthy processing time. Further, the graph probably shows unusually long input queue times for the time periods that follow; this is because transactions must wait for the region to be free. By looking at the Transaction Transit Analysis report (by transaction code), you should easily spot the problem transaction.

You can get the Transaction Transit Log to determine which occurrences of the problem transaction caused the problem. Perhaps you will find that the problem occurrences all came from a particular terminal.

If necessary, you can consult the IMS Performance Analyzer detail reports to help determine the cause of the problem. For example, the Database Update Activity report shows update activity on the databases used by the problem transaction. The Database Trace report shows all database activity for each transaction. The CPU Usage report shows if CPU time required by the transaction was large compared with elapsed time. The Region Histogram report shows the status of region availability.

Example 2

If the graphic summaries indicate only long input queue times, this could mean your system is overloaded or that too few regions are available. The Transaction Transit Log, DC Queue Manager Trace report, and Region Histogram report should help you analyze this symptom. If the graphic summaries show long output queue times, this could mean:

- The lines are overutilized by various transaction responses
- Messages are longer than designed
- There is excessive MFS (Message Format Services) activity

After using the Transaction Transit reports to pinpoint the problem transaction, the DC Queue Manager Trace report may help you determine the cause of the problem.

Tuning IMS and gathering diagnostic information

The other way in which IMS Performance Analyzer Transaction Transit reports are used is as a source of system tuning and diagnostic information. The reports help you determine whether a line, terminal, transaction code, or a certain time of day contributes to poor transit time. The activity reports help you specifically identify problem areas.

Analyzing transaction transit time

The transaction transit time components are:

- Input queue time, which can be one of the following:
 - Input shared message queue time
 - Input local message queue time
- Processing time
- Output queue time
- Output shared message queue time
- Output local message queue time
- Program switching queue time (where appropriate)

Your analysis of these components can indicate whether corrective action is appropriate for transit time problems. For example, long input queue times might indicate a scheduling problem or a lack of MPP regions to process transactions; long processing times might indicate delays due to resource constraints.

Transaction transit reports, by default, do not include BMP transactions or message switches, which could bias transit times. However, BMP transactions or message switches or both can be included in all reports in the Transaction Transit group by selecting the corresponding options on the **Transaction Transit Options** panel.

Note: If BMP transactions or message switches or both are included, they override the settings for **Input Queue Time (INMAX)** and **Output Queue Time (OUTMAX)** specified on the **Transaction Transit Options** panel, so that all transactions, regardless of INMAX or OUTMAX, are included in the report.

Transaction transit reports, by default, do not include MSC transactions originating on a remote system and processed by the local system because their messaging log records are recorded only on the originating system. To include MSC transactions in all Transaction Transit reports, select the corresponding option on the **Transaction Transit Options** panel. Note that queue times on the remote system are not included.

Transaction transit reports, by default, do not include APPC and OTMA transactions. By selecting the corresponding option on the **Transaction Transit Options** panel, APPC/OTMA transactions are reported.

You can also choose to include all transactions regardless of whether there was a response to the originating LTERM. By selecting the corresponding option on the **Transaction Transit Options** panel, you can report on all transactions. For further details, see "Transaction Transit Options" in the *IMS Performance Analyzer for z/OS: User's Guide*.

For shared queues reporting, IMS Performance Analyzer produces composite transit time reports by merging the data from the log input of the multiple IMS subsystems in the sysplex. For efficient batch report processing, it is advisable to specify a global **Start** and **Stop** time period that intersects the log input from all IMS subsystems in the sysplex. For further details, see "Specifying the time period for Transit reports" in the *IMS Performance Analyzer for z/OS: User's Guide*.

Transaction Transit Analysis report

The IMS Transaction Transit Analysis report shows the components of transaction transit time ordered by transaction code, LTERM, transaction code within LTERM, message class, line or VTAM node, or time of day. This IMS Performance Analyzer report reveals transaction input queue time (local or CQS), processing time, output queue time, output shared queue (CQS) time, output local queue time and

program switch time. The display of transit time by time period helps you identify periods of poor response.

For multi-subsystem log input, IMS Performance Analyzer assumes a sysplex environment with shared queues and produces composite reports interrelating the data from the multiple subsystems.

Each of the reports that can be produced is designed to give a system analyst insight into a different facet of response tuning:

- The transaction code and message class reports show areas in application design and scheduling that may require attention.
- Logical terminal and user ID reports show whether the distribution of service among system users is adequate.
- Line or VTAM node reports highlight imbalances due to overcommitted communication facilities.
- The time of input report notes performance problems caused by momentary surges of transaction input. The display of transit time by time period is useful in isolating time periods of high response.

The reports are structured so that for a system with good performance, a daily glance at the reports is all that's needed; more detailed scrutiny can be done if a problem is noticed.

Note: The Transaction Transit Analysis report only reports transactions that are directly involved in end-to-end response. IMS Performance Analyzer tracks the flow of each transaction, across its program switches to the point where it responds back to the originating Lterm. Only then is the transaction considered for reporting. As a consequence, the Transit Time Analysis portion of the Transaction Transit Analysis report may not show all transaction activity. To analyst all transaction activity, use the [“Transaction Exception report and extract” on page 79](#) and [“Management Exception report” on page 97](#).

Log records: This report is derived from IMS log records: 01, 03, 06, 07, 08, 0A, 31, 32, 33, 34, 35, 38, 40, and 72.

Options

To specify the report options, select the Transaction Transit **Analysis** report in a Log Report Set.

Several reporting sequences are available for this report. It can be ordered by:

- Transaction Code
- Logical Terminal (LTERM) or User ID
- Transaction Code within Logical Terminal (LTERM-TRANCODE) or User ID within Logical Terminal (User ID-TRANCODE)
- Line or VTAM Node
- Message Class
- Time of Input

Selection Criteria can be specified for one or more of the following and are applied after filtering by the Transaction Code Selection Criteria specified on the **Transaction Transit Options** panel:

- Transaction Code
- Logical Terminal (LTERM)
- Line
- VTAM Node
- Message Class
- User ID

A report interval can be specified. This applies to the reduced data file after the Global (or Run-time) report interval is effected.

The report output is written to the data set specified by the Report Output DDname on the **Log Global Options** panel.

On the **Transaction Transit Options** panel, the following options are applicable:

- The percentile transit time
- options to include MSC, BMP, APPC and OTMA transactions, Message Switches, and to report all transactions
- The time increments
- Whether the time intervals begin with the first value encountered, or are adjusted to align on the hour
- The name of a Transaction Substitution Exit to change the Transaction Code name that is reported

Content: Standard

This example shows an IMS Performance Analyzer Transaction Transit Analysis report applicable to log data without shared queues.

IMS Performance Analyzer													
Transit Time Analysis By Transaction Code													
Log 10Jun2023 6.25.07.10													
Report 10.13 11Jun2023 Page 1													
Transact Code	PSB	Number of Responses	Minimum Transit Time	** Average Queue	Transit Queue	Time (msec) Exec	** Output Queue	Total	** 90% Peak Queue	Transit Queue	Time (msec) Exec	* Maximum Transit Time	Average CPU Time (msec)
TMENU	PMENU	70	100	105	0	318	0	424	358	0	576	740	2,600
	PLOGIN	1	200	0	0	200	0	200	0	0	200	200	17
	PTIME	18	200	0	6,394	288	0	6,683	0	26,666	394	26,896	58,300
	PSTART	8	100	0	0	262	0	262	0	0	414	414	500
TMENU	*TOTAL*	70	100	105	1,644	425	0	2,175	483	11,615	893	12,192	58,900
TSTOCK	PSTOCK	5	200	0	40	280	0	320	0	126	360	445	500
	PORDER	1	300	0	0	300	0	300	0	0	300	300	17
	PINVENT	28	300	3,217	0	407	0	3,625	14,389	0	578	14,787	42,000
	PSHIP	19	300	0	142	389	0	531	0	924	562	1,473	3,600
	PCOST	1	300	0	0	300	0	300	0	0	300	300	17
TSTOCK	*TOTAL*	28	500	3,217	103	742	0	4,064	13,888	718	1,042	14,953	42,300
System Totals		382	0	596	457	1,094	0	2,148	4,446	3,924	2,119	7,622	64,700
Transit Time Analysis By LTERM													
Log 10Jun2023 6.25.07.10													
Report 10.13 11Jun2023 Page 2													
Source LTERM	Transact Code	Number of Responses	Minimum Transit Time	** Average Queue	Transit Queue	Time (msec) Exec	** Output Queue	Total	** 90% Peak Queue	Transit Queue	Time (msec) Exec	* Maximum Transit Time	Average CPU Time (msec)
LTRM0001	TMENU	20	300	1,310	1,755	1,715	0	4,780	4,777	8,212	3,317	12,222	35,400
LTRM0002	TSTOCK	30	400	3	0	1,110	0	1,113	26	0	2,288	2,305	4,600
LTRM0003	TORDER	43	200	1,595	2,100	769	0	4,465	7,507	10,280	1,459	14,420	58,900
System Totals		382	0	596	457	1,094	0	2,148	4,446	3,924	2,119	7,622	64,700
Transit Time Analysis By Tran Code in LTERM													
Log 10Jun2023 6.25.07.10													
Report 10.13 11Jun2023 Page 3													
Source LTERM	Transact Code	Number of Responses	Minimum Transit Time	** Average Queue	Transit Queue	Time (msec) Exec	** Output Queue	Total	** 90% Peak Queue	Transit Queue	Time (msec) Exec	* Maximum Transit Time	Average CPU Time (msec)
LTRM0001	TMENU	2	600	0	17,450	550	0	18,000	0	48,906	640	49,366	35,400
LTRM0001	TSTOCK	15	300	0	0	1,660	0	1,660	0	0	3,937	3,937	5,700
LTRM0001	TORDER	3	900	8,733	66	2,766	0	11,566	19,010	209	6,753	25,425	23,300
LTRM0001	*TOTAL*	20	300	1,310	1,755	1,715	0	4,780	4,777	8,212	3,317	12,222	35,400
System Totals		382	0	596	457	1,094	0	2,148	4,446	3,924	2,119	7,622	64,700
Transit Time Analysis By Line													
Log 10Jun2023 6.25.07.10													
Report 10.13 11Jun2023 Page 4													
Line	Transact Code	Number of Responses	Minimum Transit Time	** Average Queue	Transit Queue	Time (msec) Exec	** Output Queue	Total	** 90% Peak Queue	Transit Queue	Time (msec) Exec	* Maximum Transit Time	Average CPU Time (msec)
NODE0001	TMENU	20	300	1,310	1,755	1,715	0	4,780	4,777	8,212	3,317	12,222	35,400
NODE0002	TSTOCK	30	400	3	0	1,110	0	1,113	26	0	2,288	2,305	4,600
NODE0003	TORDER	43	200	1,595	2,100	769	0	4,465	7,507	10,280	1,459	14,420	58,900
System Totals		382	0	596	457	1,094	0	2,148	4,446	3,924	2,119	7,622	64,700

Figure 11. IMS Performance Analyzer Transaction Transit Analysis report (standard)

IMS Performance Analyzer														
Transit Time Analysis							By Message Class							
Log 10Jun2023							6.25.07.10							
Report 10.13 11Jun2023 Page 5														
Message Class	Number of Responses	Minimum Transit Time	** Input Queue	Average Switch Queue	Transit Time (msec) Exec	Output Queue	** Total	** Input Queue	90% Peak Switch Queue	Transit Time (msec) Exec	Output Queue	* Total	Maximum Transit Time	Average CPU Time (msec)
1	116	100	63	1,347	465	0	1,876	364	10,026	859	0	10,587	58,900	32
2	223	300	987	82	1,363	0	2,434	7,161	1,145	2,637	0	9,307	64,700	201
3	41	400	0	0	1,465	0	1,465	0	0	3,917	0	3,917	10,500	155
System Totals														
	382	0	596	457	1,094	0	2,148	4,446	3,924	2,119	0	7,622	64,700	144

Transit Time Analysis														
Log 10Jun2023							By Time of Input							
6.25.07.10							Report 10.13 11Jun2023 Page 6							
Begin of Time Interval	Number of Responses	Minimum Transit Time	** Input Queue	Average Switch Queue	Transit Time (msec) Exec	Output Queue	** Total	** Input Queue	90% Peak Switch Queue	Transit Time (msec) Exec	Output Queue	* Total	Maximum Transit Time	Average CPU Time (msec)
7.00.00	58	100	3,803	3,012	936	0	7,751	13,564	11,897	2,034	0	21,063	64,700	118
7.15.00	61	200	42	0	1,191	0	1,234	362	0	2,286	0	2,338	5,700	158
7.30.00	13	600	0	0	1,207	0	1,207	0	0	2,477	0	2,477	3,900	156
7.45.00	47	200	21	0	851	0	872	116	0	1,612	0	1,611	3,200	103
System Totals														
	382	0	596	457	1,094	0	2,148	4,446	3,924	2,119	0	7,622	64,700	144

The first one or two columns in the report are ordering columns according to your selection. For example:

- If you select Transaction Code within Logical Terminal as the ordering operands, the first two column headers are **Source LTERM** and **Transact Code**.
Note: If the input message did not originate from a terminal, a **Source LTERM** value of FFFF is displayed.
- If you select Transaction Code within User ID as the ordering operands, the first two column headers are **User ID** and **Transact Code**.
- If you select Transaction Code as the ordering operand, the first two column headers are **Transact Code** and **PSB**. Each PSB within the transaction (not the PSB associated with the transaction) identifies a program that executed underneath the transaction, usually as a message switch. If there are program switches, the PSBs are ordered within the transaction codes and a total line follows. The value in the ***TOTAL*** line is the actual number of times the specified transaction was executed and responded back to the original terminal. For transactions with program switches, only the value for responses on the ***TOTAL*** line are accumulated in the **System Totals**. For example, in the Transaction Transit Analysis by Transaction Code report in [Figure 12 on page 69](#), 45 TIMMIDBM transactions executed program PIMMIDBP which responded to the original terminal. In the process, on 2 occasions, program PIMMIDBP performed a message switch which executed program PIM3INQA. This message switch is part of the transit time for the original transaction TIMMIDBM.
- If you request the report ordered by Line, there will be one ordering column with **Line** as its heading. VTAM node names (instead of line number) are reported in the Line column for VTAM terminals. The VTAM Node Object List, if specified, is used in this case. If there is no VTAM node, the line number is reported.

Specifying a Transaction Substitution Exit enables an alternate Transaction Code name to be substituted for the real one. Where Transaction Code and Program (PSB) Name are reported together as the report ordering sequence, then IMS Performance Analyzer changes the Program name to ***USERXIT**. This ensures that transactions with substituted names are grouped and reported in a single report line.

The date and time following the word **Log** in the report heading is from the first time stamp in the log being reported on, or the Start date and time specified on the Log Global Options panel, whichever is later. The date and time following the word **Report** is the date and time the report was generated.

The following fields appear in the report after the two ordering fields:

Number of Responses

The number of transaction sets completed during the time period being examined. For a discussion of transaction sets, see [Chapter 4, "Transit time concepts for Message Queue transactions," on page 45](#).

Minimum Transit Time

The shortest time (in milliseconds) required by any one transaction in the specified category.

Average Transit Time (msec)

The average (mean) time, in milliseconds, required to process the transaction in the category being reported. These transit times are broken down into their component parts:

- Input queue time
- Program switch time
- Program execution time
- Output queue time
- Total time

If large output queue times are distorting your end-user response time statistics, you can remove that influence by setting the transit global option OUTMAX to either:

88888

For all transactions, report output queue time as zero

77777

For all transactions, except MSC transactions, report output queue time as zero

nnn% Peak Transit Time (msec)

A statistical estimate, based on a normal distribution, that *nnn%* (between 50% and 100% as specified by you) of all transactions in the category being reported will have transit times less than the times shown. Times are in milliseconds. The estimated transit times are broken down into their component parts:

- Input queue time
- Program switch time
- Program execution time
- Output queue time
- Total time

The total time is a statistical estimate itself, rather than the sum of the component estimates.

The peak values are a statistical estimate only, so care should be taken when interpreting the values if the transaction volume is low.

Maximum Transit Time

The longest time (in milliseconds) required by any one transaction in the specified category.

Average CPU Time (msec)

The average CPU time, in milliseconds, required by the transactions in the specified category.

Content: Shared queues

This example shows a Transaction Transit Analysis report applicable to shared queue log data. IMS Performance Analyzer merges the log data from the multiple subsystems in the sysplex to produce a composite report of interrelated data.

The content of this report is similar to the standard report but with the following changes:

Output Queue

The portion of the transit time from when the program execution completes to the time the message is sent to the terminal. Output Queue time is calculated independently of the CQS and Local queue times.

Output CQS

The time from when the output message was put onto the shared message queue to the time it was read from the shared message queue by any IMS subsystem in the sysplex.

Output Local

The time from when the message was put (enqueued) onto the local IMS message queue (from the shared message queue, if CQS is active) to the time the message is sent to the terminal.

IMS Performance Analyzer																	
Transit Time Analysis By Transaction Code																	
Log 04Jun2023 16.10.15.93																	
Report 17.24 08Jun2023 Page 1																	
Transact Code	PSB	Resp Count	Min Tran Time	***** Input Queue	Average Swit Queue	Transit Pgm Exec Queue	Time (msec) ----- Output CQS Local	***** Total	***** Input Queue	90% Swit Queue	Peak Pgm Exec Queue	Transit Time (msec) ----- Output CQS Local	***** Total	Max Tran Time	Avg CPU		
TIMIDB	PIMMIDBP	41	90	218	0	394	0 36 4	612	870	0	1061	0 67 18	1513	4332	28		
TIM3MUUP	PIM3UTLP	1	993	692	0	300	0 24 0	993	692	0	300	0 24 0	993	993	51		
TIM3UUEP	PIM3UTLP	2	143	14	0	722	0 24 0	737	16	0	1787	0 34 0	1803	1331	38		
TIMMIDBM	PIMMIDBP	45	40	225	0	116	0 28 0	341	1108	0	503	0 43 1	1293	4793	14		
	PIM3INQA	2	217	0	0	507	0 40 0	507	0	0	1013	0 60 0	1013	797	46		
TIMMIDBM	*TOTAL*	45	40	225	0	139	0 30 0	364	1100	0	536	0 44 1	1309	4793	16		
TIMMSELM	PIMMSELP	25	40	22	0	43	0 31 1	66	44	0	57	0 43 1	93	217	12		
TIM3IDOP	PIM3AINA	16	90	319	0	3465	0 34 0	3785	1642	0	12140	0 56 0	12416	26448	124		
TIM3IDOP	*TOTAL*	14	90	365	0	3960	0 39 0	4326	1778	0	13408	0 56 0	13701	27332	142		
TIM3IPOP	PIM3INQA	14	89	292	0	1578	0 28 0	1871	1240	0	4397	0 45 0	4731	8681	69		
TIM3IPOP	*TOTAL*	12	95	341	0	1842	0 33 0	2183	1422	0	6095	0 47 0	6462	13590	80		
System Totals		485	40	327	35	1969	0 36 1	2332	1485	453	9665	0 70 11	10334	82087	73		
Transit Time Analysis By LTERM																	
Log 04Jun2023 16.10.15.93																	
Report 17.24 08Jun2023 Page 1																	
Source LTERM	Transact Code	Resp Count	Min Tran Time	***** Input Queue	Average Swit Queue	Transit Pgm Exec Queue	Time (msec) ----- Output CQS Local	***** Total	***** Input Queue	90% Swit Queue	Peak Pgm Exec Queue	Transit Time (msec) ----- Output CQS Local	***** Total	Max Tran Time	Avg CPU		
TP0003AA	TIMIDB	31	50	191	83	923	0 33 0	1198	695	374	3430	0 48 2	3787	13938	65		
TP0004AA	TIMIDB	28	90	383	2	660	0 33 0	1047	1109	13	1550	0 51 0	2097	4069	60		
TP0005AA	TIMIDB	28	53	113	25	709	0 36 3	848	391	108	2331	0 65 10	2636	7840	49		
		20	67	161	7	873	0 28 0	1042	730	38	2279	0 42 1	2533	5853	51		
System Totals		485	40	327	35	1969	0 36 1	2332	1485	453	9665	0 70 11	10334	82087	73		
Transit Time Analysis By Tran Code in LTERM																	
Log 04Jun2023 16.10.15.93																	
Report 17.24 08Jun2023 Page 1																	
Source LTERM	Transact Code	Resp Count	Min Tran Time	***** Input Queue	Average Swit Queue	Transit Pgm Exec Queue	Time (msec) ----- Output CQS Local	***** Total	***** Input Queue	90% Swit Queue	Peak Pgm Exec Queue	Transit Time (msec) ----- Output CQS Local	***** Total	Max Tran Time	Avg CPU		
TP0003AA	TIMIDB	1	743	36	0	706	0 69 0	743	36	0	706	0 69 0	743	743	40		
	TIMMIDBM	1	50	9	0	41	0 21 0	50	9	0	41	0 21 0	50	50	14		
	TIMLIXOP	7	61	15	0	145	0 28 0	161	23	0	244	0 43 0	256	318	36		
	TIMLUXOP	8	115	399	0	1915	0 36 2	2315	1344	0	7087	0 47 1	7443	13938	58		
	TIMMENUM	14	361	184	184	823	0 32 0	1192	510	579	1750	0 47 1	2417	5396	89		
TP0003AA	*TOTAL*	31	50	191	83	923	0 33 0	1198	695	374	3430	0 48 2	3787	13938	65		
		1	4069	73	0	3996	0 43 0	4069	73	0	3996	0 43 0	4069	4069	48		
System Totals		485	40	327	35	1969	0 36 1	2332	1485	453	9665	0 70 11	10334	82087	73		
Transit Time Analysis By Line																	
Log 04Jun2023 16.10.15.93																	
Report 17.24 08Jun2023 Page 1																	
Line	Transact Code	Resp Count	Min Tran Time	***** Input Queue	Average Swit Queue	Transit Pgm Exec Queue	Time (msec) ----- Output CQS Local	***** Total	***** Input Queue	90% Swit Queue	Peak Pgm Exec Queue	Transit Time (msec) ----- Output CQS Local	***** Total	Max Tran Time	Avg CPU		
NE9N01ZA	TIMIDB	31	50	191	83	923	0 33 0	1198	695	374	3430	0 48 2	3787	13938	65		
NE9N02ZA	TIMIDB	28	90	383	2	660	0 33 0	1047	1109	13	1550	0 51 0	2097	4069	60		
NE9N03ZA	TIMIDB	28	53	113	25	709	0 36 3	848	391	108	2331	0 65 10	2636	7840	49		
NE9N04ZA	TIMIDB	20	67	161	7	873	0 28 0	1042	730	38	2279	0 42 1	2533	5853	51		
		2	48	10	0	74	0 26 0	84	11	0	124	0 39 0	132	119	19		
System Totals		485	40	327	35	1969	0 36 1	2332	1485	453	9665	0 70 11	10334	82087	73		

Figure 12. Transaction Transit Analysis report (shared queues)

IMS Performance Analyzer																	
Transit Time Analysis By Message Class																	
Log 04Jun2023 16.10.15.93																	
Report 17.24 08Jun2023 Page 1																	
Message Class	Resp Count	Min Tran Time	***** Input Queue	Average Swit Queue	Transit Pgm Exec Queue	Time (msec) ----- Output CQS Local	***** Total	***** Input Queue	90% Swit Queue	Peak Pgm Exec Queue	Transit Time (msec) ----- Output CQS Local	***** Total	Max Tran Time	Avg CPU Time			
6	111	40	177	0	211	0 33 1	389	837	0	706	0 55 12	1200	4793	20			
7	49	48	365	240	3237	0 47 1	3843	1550	1428	9811	0 103 13	11149	44640	219			
8	5	363	636	62	32849	0 100 21	33548	2275	231	85427	0 274 27	85546	82087	215			
10	3	143	240	0	581	0 24 0	822	536	0	1066	0 28 0	1284	1331	42			
.	1	7321	6554	0	767	0 56 0	7321	6554	0	767	0 56 0	7321	7321	33			
System Totals		485	40	327	35	1969	0 36 1	2332	1485	453	9665	0 70 11	10334	82087	73		
Transit Time Analysis By Time of Input																	
Log 04Jun2023 16.10.15.93																	
Report 17.24 08Jun2023 Page 1																	
Begin of Time Interval	Resp Count	Min Tran Time	***** Input Queue	Average Swit Queue	Transit Pgm Exec Queue	Time (msec) ----- Output CQS Local	***** Total	***** Input Queue	90% Swit Queue	Peak Pgm Exec Queue	Transit Time (msec) ----- Output CQS Local	***** Total	Max Tran Time	Avg CPU Time			
16.10.00	20	43	71	81	1236	0 28 0	1389	300	475	3432	0 43 0	3917	7840	47			
16.11.00	62	50	431	81	2934	0 32 1	3446	1656	621	11363	0 56 8	12497	44640	66			
16.12.00	114	40	125	2	1089	0 35 1	1217	581	22	4233	0 62 11	4393	16927	57			
16.13.00	157	41	265	8	2864	0 40 1	3139	1453	61	15068	0 92 16	15665	82087	111			
16.14.00	132	40	565	67	1323	0 35 1	1956	1926	665	5451	0 54 5	6444	27018	50			
System Totals		485	40	327	35	1969	0 36 1	2332	1485	453	9665	0 70 11	10334	82087	73		

Transaction Transit Statistics report

The Transaction Transit Statistics report is a graphical representation of the information in the Transaction Transit Analysis report.

You can produce graphic representations of transit time statistics based on any combination of:

- Transaction Code
- Logical Terminal (LTERM) or User ID
- Transaction Code within Logical Terminal (LTERM-TRANCODE) or Transaction Code within User ID (User ID-TRANCODE)
- Line or VTAM Node
- Message Class
- Time of Input

Log records: This report is derived from IMS log records 01, 03, 06, 07, 08, 0A, 31, 32, 33, 34, 35, 38, 40, 72.

Options

To specify the report options, select the Transaction Transit **Statistics** report in a Log Report Set.

This report has the same choice of options as the “Transaction Transit Analysis report” on page 64 plus an additional option. You can specify a Distribution to control the attributes of the distribution graphs. A sample Distribution, LOGIN, is provided. If not specified, the following defaults are applied:

Ranges (Limits) = **2,4,6,8,10,15,20,30,60**
Title = **Sc Mil** for seconds and milliseconds
Multiplier = **1**
Edit Mask = **ZZZ,ZZZ.ZZ9**

Content

This example shows a Transaction Transit Statistics report. For reporting on shared queue log data, IMS Performance Analyzer merges the log data from the multiple subsystems in the sysplex to produce a composite report of interrelated data.

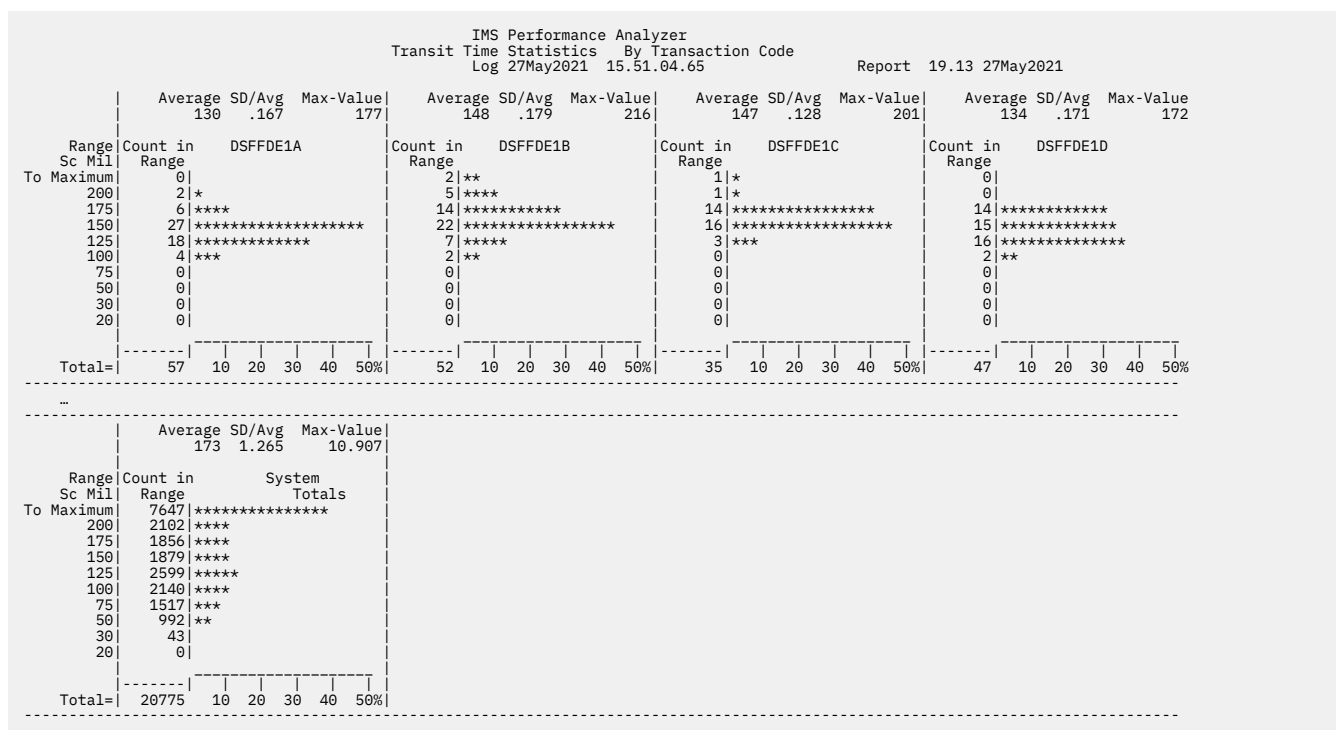


Figure 13. Transaction Transit Statistics report

Up to four distribution graphs with summary statistics can be printed on each horizontal row of the report. For a normal 60-line page, there are two rows of graphs per page. A graph of system totals appears on the last row of the report.

The sample report shows distributions of transit time by transaction code. For transaction code DSFFDE1A, the summary statistics show that the average transit time is 130 milliseconds with a normalized standard deviation of 0.167 milliseconds. The maximum transit time is 177 milliseconds. Graphically you can see that 4 transactions required more than 75 but not more than 100 milliseconds to complete, 18 transactions required more than 100 but not more than 125 milliseconds, 27 required 125–150, 6 required 150–175, and 2 transactions required more than 175 but not more than 200 (in fact, 177) milliseconds. The numbers at the bottom of the graph along the x-axis (10 20 30 40 50) are percentages of total transactions. Thus you can see at a glance that almost 50% of the transactions required 125–150 milliseconds to complete.

IMS Performance Analyzer calculates a normalized standard deviation (**SD/Avg**) equal to the standard deviation divided by the mean.

Transaction Transit Log report

The IMS Transaction Transit Log report shows the transit activity of each message originating from a logical terminal and shows any program-to-program switches caused by the input message and all output messages resulting from the input. This IMS Performance Analyzer report provides shared queue reporting for multiple IMS subsystems. For multi-subsystem log input, IMS Performance Analyzer assumes shared queue processing and produces a composite report by merging data from all subsystems in the sysplex.

Tip: Use form-based reporting and the **TRANLIST** sample report form to provides this style of transit list reporting but with improved coverage and precision. For more information on using the sample report form, see Chapter 7, “Form-based Transaction Transit reports,” on page 53.

Log records: This report is derived from IMS log records 01, 03, 06, 07, 08, 0A, 31, 32, 33, 34, 35, 38, 40, 72.

Options

To specify the report options, select the Transaction Transit **Log** report in a Log Report Set.

A report interval can be specified. This applies to the reduced data file after the Global (or Run-time) report interval is effected.

The report output data set is controlled by specifying a Report Output DDname.

Selection Criteria can be specified for one or more of the following and apply after the Transaction Code filtering specified on the **Transaction Transit Options** panel:

- Transaction Code
- Logical Terminal (LTERM)
- User ID

Limits on the messages to include in the report are controlled by specifying Input Queue Time (INMAX) and Output Queue Time (OUTMAX) on the **Transaction Transit Options** panel. You can select to include all messages in the report, to include only those messages with queue times *less* than those specified for INMAX/OUTMAX, or to include only those messages with queue times *greater* than INMAX/OUTMAX. If, on the **Transaction Transit Options** panel, you select to include BMP transactions or message switches or both, the settings for Input Queue Time (INMAX) and Output Queue Time (OUTMAX) are ignored, so that all messages, regardless of queue time, are included in the report. If messages with queue times *greater* than INMAX/OUTMAX are included in the report, any transactions with times greater than those specified for INMAX/OUTMAX are flagged with the character M. To deactivate the M suffix, specify INMAX/OUTMAX values of zero.

APPC and OTMA transactions can be reported if you select to include APPC/OTMA transactions on the **Transaction Transit Options** panel.

Content: Standard

This example shows a Transaction Transit Log applicable to log data (without shared queues).

IMS Performance Analyzer Transaction Transit Log Log 27May2023 15.51.04.65																	Report	19.56	27May2023	Page	1
Source LTERM	Source Transact Code	PSB	Region	Cls	Pr	Approx No DB Calls	Input Transact Arrival	CPU Time (msec)	Userid	Output LTERM	*****Elapsed Time (msec)*****	Input Queue	Program Exec	Output Queue	Total Time	Transit Time					
DSW00811	DSFFOE1F	DFSFOE1F	39	6	1	4	15.51.09.329	21	DSW00811	DSW01811	7	113	0	119	119						
DSW00005	DSFFOE2A	DFSFOE2A	32	1	1	4	15.51.09.326	16	DSW00005	DSW01005	8	76	0	84	84						
DSW00845	DSFFSC6C	DFSFC6C	51	3	1	4	15.51.09.072	16	DSW00845	DSW01845	261	114	0	375	375						
DSW00073	DSFFOE1D	DFSFOE1D	37	4	1	6	15.51.09.319	20	DSW00073	DSW01073	1	166	0	167	167						
DSW00589	DSFFOE1J	DFSFOE1J	27	16	1	6	15.51.09.359	20	DSW00589	DSW01589	52	87	0	139	139						
DSW00921	DSFFSC6M	DFSFC6M	29	25	1	4	15.51.09.394	16	DSW00921	DSW01921	5	92	0	96	96						
DSW00449	DSFFOE2M	DFSFOE2M	61	25	1	4	15.51.09.365	15	DSW00449	DSW01449	7	80	0	86	86						
DSW00755	DSFFOE5J	DFSFOE5J	10	16	1	16	15.51.09.311	51	DSW00755	DSW01755	1	267	0	268	268						
DSW00601	DSFFHR2D	DFSFHR2D	30	27	1	6	15.51.09.313	25	DSW00601	DSW01601	8	179	0	188	188						
DSW00750	DSFFIT2J	DFSFIT2J	11	16	1	34	15.51.09.071	53	DSW00750	DSW01750	240	218	0	458	458						
DSW00354	DSFFHR2C	DFSFHR2C	3	3	1	6	15.51.09.308	25	DSW00354	DSW01354	4	204	0	208	208						
DSW00199	DSFFHR2M	DFSFHR2M	28	25	1	6	15.51.09.319	26	DSW00199	DSW01199	37	177	0	214	214						
DSW00300	DSFFOE1I	DFSFOE1I	25	15	1	6	15.51.09.335	22	DSW00300	DSW01300	96	139	0	235	235						
DSW00557	DSFFSC6F	DFSFC6F	39	6	1	4	15.51.09.393	16	DSW00557	DSW01557	148	103	0	251	251						
DSW00550	DSFFPS2H	DFSFPS2H	24	14	1	36	15.51.09.383	91	DSW00550	DSW01550	18	304	0	322	322						
DSW00794	DSFFPS2E	DFSFPS2E	22	5	1	36	15.51.09.460	83	DSW00794	DSW01794	111	254	0	365	365						
DSW00334	DSFFPS3M	DFSFPS3M	62	25	1	68	15.51.09.412	86	DSW00334	DSW01334	104	313	0	417	417						
DSW00594	DSFFHR2H	DFSFHR2H	9	14	1	6	15.51.09.400	26	DSW00594	DSW01594	30	239	0	270	270						
DSW00857	DSFFHR2D	DFSFHR2D	21	4	1	6	15.51.09.496	25	DSW00857	DSW01857	84	212	0	296	296						
DSW00730	DSFFOE4M	DFSFOE4M	13	25	1	9	15.51.09.305	47	DSW00730	DSW01730	52	371	0	423	423						
DSW00780	DSFFPS3D	DFSFPS3D	20	4	1	68	15.51.09.282	84	DSW00780	DSW01780	28	422	0	449	449						
DSW00540	DSFFPS2C	DFSFPS2C	17	3	1	36	15.51.09.070	88	DSW00540	DSW01540	255	357	0	612	612						
DSW00134	DSFFHR2C	DFSFHR2C	52	3	1	6	15.51.09.457	23	DSW00134	DSW01134	59	224	0	283	283						
DSW00338	DSFFHR2P	DFSFHR2P	49	28	1	6	15.51.09.478	26	DSW00338	DSW01338	31	227	0	258	258						
DSW00632	DSFFPS3C	DFSFPS3C	19	3	1	68	15.51.09.065	83	DSW00632	DSW01632	254	510	0	764	764						
DSW00217	DSFFIT2I	DFSFIT2I	57	15	1	34	15.51.09.416	50	DSW00217	DSW01217	74	348	0	423	423						
DSW00581	DSFFPS2E	DFSFP2E	4	5	1	36	15.51.09.443	80	DSW00581	DSW01581	4	408	0	413	413						
DSW00853	DSFFOE2D	DFSFOE2D	16	27	1	4	15.51.09.494	16	DSW00853	DSW01853	95	249	0	344	344						
DSW00073	DSFFOE2D	DFSFOE2D	3	4	1	4	15.51.09.530	13	DSW00073	DSW01073	124	173	0	297	297						

Figure 14. IMS Performance Analyzer: Transaction Transit Log (standard)

A description of the information contained in this report follows.

Source LTERM

The logical terminal at which the input transaction is entered.

Source Transact Code

The transaction code specified in the input transaction.

PSB

The PSB associated with the transaction.

Region

The region into which the transaction is scheduled.

Cls

The transaction class.

Pr

The transaction priority.

Approx No DB Calls

Approximate number of database calls, irrespective of type, made by this transaction. This number is derived from the 07 (application schedule end) IMS log record.

This field is reported as “-” when the count is not available. If the 07 log record is not read prior to IMS Performance Analyzer reporting the transaction, then some transaction statistics, including DB calls and CPU time, cannot be reported. This is usually caused by WFI processing when many transactions are executed by the one program schedule.

IMS Performance Analyzer normally reports a transaction when all log records for that transaction have been read, including the 07 log record. In this case, all transaction statistics are available. But sometimes the IMS Performance Analyzer internal queues become full because many transactions are waiting for their associated 07 log record to complete their statistics. In this case, IMS Performance Analyzer frees space in its internal queues by reporting the oldest transactions with incomplete statistics.

Input Transact Arrival

The time at which the transaction first arrives on the IMS message queue. This is marked by log record types 01 and 35.

Observe that the records are not listed in order of arrival time, but rather transaction completion time.

Tip: Use Form-based reporting for a more complete understanding of when transactions start and end. For example, if analyzing a performance problem at a particular time of day, it is likely that processing start time is more useful than queue arrival time. For more information on Form-based reporting, see [“Form-based Transaction Transit List reports” on page 53.](#)

CPU Time (msec)

The program execution CPU time (as compared to the elapsed time).

Note: At completion level 5, resource usage metrics are obtained from the type 07 application termination record and apportioned equally among all transactions that executed under that schedule, regardless of their respective processing times. At completion level 6, resource usage metrics are obtained from the type 56FA transaction accounting record.

Userid

The userid associated with the message.

Output LTERM

The logical terminal to which each output message is sent.

Elapsed Time (msec)

The following elapsed times, in milliseconds, are recorded:

Input Queue

The elapsed time that the transaction input message is queued on the message queue (or shared queue) prior to it being processed in a dependent message processing region.

Progrm Exec

Processing time. The elapsed time that the transaction is processed in a dependent region, including syncpoint.

Output Queue

The elapsed time from when the transaction finishes processing to when the output message (response) is sent. A zero output queue time can indicate that the message was sent prior to the end of transaction processing:

- During syncpoint phase 2 processing, or
- Immediately after the message was issued by the application for a PCB with EXPRESS=YES or OTMA COMMIT MODE=1 (send-then-commit).

If the character E appears to the right of a value in this column, it indicates that the PCB associated with this message specified EXPRESS=YES. Output can occur before the end of program execution and the reported Output Queue time can be negative.

Total Time

Total transaction elapsed time. The total elapsed time that the transaction incurs in message queues and being processed by IMS. Total time consists of input queue, processing and output queue times.

Transit Time

IMS transaction end-user response time. The elapsed time from when the input transaction is enqueued by IMS (01/35) to when the response is sent back to the originating LTERM (31 Communications).

Note:

1. Only transactions that respond back to their originating LTERM incur a transit (response) time.
2. The response back to the originating LTERM can be issued by another transaction as a result of a program switch.

Content: Shared queues

This example shows a Transaction Transit Log applicable to shared queue log data.

IMS Performance Analyzer Transaction Transit Log Log 04Jun2023 16.10.15.93													Report 17.24 08Jun2023 Page 1			
Source LTERM	Source Transact Code	PSB	Org Id	Proc Id	Reg No	Approx DB Calls	Input Transact Arrival	CPU Time (msec)	Userid	*****Elapsed Time (msec)*****	Input Queue	Progrm Exec	Output Queue	--- CQS Local	--- Total Time	Transit Time
TP0003AA	TIMIDB	PIMMIDBP	IM02	IM02	2	16	16.10.15.927	40	TIMP03	37	707	0	69	0	743	743
	TIMULUDU	PIMULUDP		IM02	2	3	16.10.16.671	16	TIMP03	1,410	4,551	0	21	0	5,961	
TP0003AA	TIMMIDBM	PIMMIDBP	IM02	IM02	2	3	16.10.24.818	14	TIMP03	9	41	0	44	0	51	51
TP0004AA	TIMIDB	PIMMIDBP	IM02	IM03	27	16	16.10.22.393	48	TIMP04	73	3,997	0	18	0	4,070	4,070
	TIMULUDU	PIMULUDP		IM02	2	3	16.10.26.463	18	TIMP04	1	94	0	54	0	95	
TP0005AA	TIMIDB	PIMMIDBP	IM02	IM02	2	7	16.10.29.419	25	TIMP05	10	95	0	20	0	105	105
	TIMULUDU	PIMULUDP		IM03	27	3	16.10.29.524	15	TIMP05	13	2,285	0	54	0	2,298	
TP0004AA	TIMMIDBM	PIMMIDBP	IM02	IM02	2	1	16.10.34.486	13	TIMP04	12	94	0	54	0	106	106
TP0004AA	TIMMIDBM	PIMMIDBP	IM02	IM02	2	1	16.10.34.486	13	TIMP04	12	94	0	54	0	106	106
TP0003AA	TIMMENUM	PIMMENUM	IM02	IM02	21	8	16.10.33.019	53	TIMP03	77	1,512	0	25	0	1,589	1,589
	TIMULUDU	PIMULUDP		IM03	27	3	16.10.34.608	15	TIMP03	3	654	0	36	0	657	
	TIMULUDU	PIMULUDP		IM02	2	3	16.10.34.608	18	TIMP03	7	144	0	36	0	151	
TP0005AA	TIMMIDBM	PIMMIDBP	IM02	IM02	2	1	16.10.37.573	14	TIMP05	34	58	0	20	0	92	92
TP0006CA	TIMIDB	PIMMIDBP	IM03	IM03	27	7	16.10.36.650	30	TIMP06	7	2,262	0	20	0	2,270	2,270
	TIMULUDU	PIMULUDP		IM02	2	3	16.10.38.920	18	TIMP06	20	108	0	36	0	128	
TP0007AA	TIMIDB	PIMMIDBP	IM02	IM02	2	7	16.10.43.411	24	TIMP07	9	111	0	15	0	120	120
	TIMULUDU	PIMULUDP		IM02	2	3	16.10.43.531	19	TIMP07	28	86	0	15	0	114	
TP0004AA	TIMMENUM	PIMMENUM	IM02	IM02	21	10	16.10.42.614	58	TIMP04	26	251	0	23	0	276	276
	TIMULUDU	PIMULUDP		IM02	2	3	16.10.42.890	19	TIMP04	8	127	0	23	0	135	
	TIMULUDU	PIMULUDP		IM03	27	3	16.10.42.890	18	TIMP04	26	760	0	23	0	786	
TP0006CA	TIMMIDBM	PIMMIDBP	IM03	IM03	27	3	16.10.47.022	18	TIMP06	24	44	0	31	2	68	68
TP0003AA	TIMMENUM	PIMMENUM	IM02	IM03	25	7	16.10.42.639	53	TIMP03	92	871	0	31	2	963	
:	TIMLMBUP	PIMLUPDA		IM02	21	23	16.10.43.602	95	TIMP03	1,544	2,890	0	31	2	4,434	5,397

Figure 15. IMS Performance Analyzer: Transaction Transit Log (shared queues)

The content of this report is similar to the standard report but with the following changes:

Org Id

The IMS subsystem ID of the originating subsystem.

Proc Id

The IMS subsystem ID of the processing subsystem.

Output Queue

The portion of the transit time from when the program execution completes to the time the message is sent to the terminal. Output Queue time is calculated independently of the CQS and Local queue times. The Output Queue time is always blank for APPC/OTMA transactions. If the PCB associated with the message specified EXPRESS=YES, output can occur before the end of program execution and the reported Output Queue time can be negative.

Output CQS

The time from when the output message was put onto the shared message queue to the time it was read from the shared message queue by any IMS subsystem in the sysplex. The Output CQS time is always blank for APPC/OTMA transactions.

Output Local

The time from when the message was put (enqueued) onto the local IMS message queue (from the shared message queue, if CQS is active) to the time the message is sent to the terminal. The Output Local time is always blank for APPC/OTMA transactions.

Transaction Transit Graphic Summary report

The IMS Transaction Transit Graphic Summary report generates a set of character-based graphs, summarizing daily transaction processing for mean transit time, user-specified percentile transit time, transaction response count, and responses per second.

Log records: This report is derived from IMS log records 01, 03, 06, 07, 08, 0A, 31, 32, 33, 34, 35, 38, 40, 72.

The four graphs in the report show:

- Average (mean) transit time
- User-specified percentile transit time (*nnn%* where *nnn* is the value specified for **Peak Transaction Time Percentage** on the Transaction (MSGQ) Transit Options panel)
- Transaction response count
- Responses per second

Transaction Transit Extract by Interval

The IMS Transaction Transit Extract by Interval allows creation of extract files of transaction transit time by time interval data. You can use this IMS Performance Analyzer extract to get pictures of system performance by exporting for manipulation by external programs.

Log records: This extract is derived from IMS log records 01, 03, 06, 07, 08, 31, 32, 33, 34, 35, 38, 40, 72.

Options

To specify the extract options, select the Transaction Transit **Extract by Interval** in the Log Report Set.

Select whether to accumulate data by time interval for individual transactions or for all transactions. Specify the output data set which is to store the extract data. Optionally, specify an input data set containing previous extracts which are to be merged with the current extract. You can specify Selection Criteria nominating particular transaction codes to include or exclude from the extract. This filtering applies after the Selection Criteria specified on the **Transaction Transit Options** panel.

A report interval can be specified. This applies to the reduced data file after the Global (or Run-time) report interval is effected.

The output data set for the report which summarizes the extract processing is controlled by the Report Output DDname on the **Log Global Options** panel. The number of print lines per page is ignored as the size of the summary report is static.

All options on the **Transaction Transit Options** panel are applicable except the percentile transit time which is calculated by later IMS Performance Analyzer processing. In particular, note that the following options are relevant:

- The size of the time intervals
- Whether the time increments begin with the first value encountered, or are adjusted to align on the hour

Export of interval data and graphing

The graphing and export facility operates on transit time interval data previously extracted from log files.

The data is stored in the extract file in a proprietary format. IMS Performance Analyzer provides facilities to filter and convert the extract data to an export file for use by external programs or to download to PC. Use option 4.6 **Graphing & Export** from the Primary Option Menu for this purpose.

For more information about the export file, see [“Exporting interval data to CSV”](#) on page 76.

Content: Summary report

A report with a summary of the extract processing is produced at the end of processing. The **Start** date and time is that of the start of the first interval on the extract file. The **End** date and time is that of the start of the last interval on the extract file.

```
IMS Performance Analyzer
Extract by Time Interval

Extract Data Set: IMSPA.EXTRACT.DATA
Start           : 27May2021 07:00:00
End            : 27May2021 08:00:00
Record Count   : 12873
Time Interval  : 15 minutes
Time interval is aligned to even hour
Extract contains Trancode data
Extract contains Interval Totals
```

Figure 16. Transaction Transit Extract by Interval: Summary report

Exporting interval data to CSV

The facility makes selected transaction transit time by time interval data available to external programs. It is invoked by selecting option **E** on the Extract Graphing & Export panel. It creates an external format Export Data Set from a proprietary format Extract Data Set using filtering and processing options specified on the Extract Graphing & Export panel. The Extract Data Set was originally created during Log Report Set processing using the **Extract by Interval** report facility. The data can then provide input to your PC applications in the usual way to produce graphs or other analyses.

Content: Export file

This is an example of the contents of the Transit Extract by Interval export file.

```

Type,Date,Time,Trancode,Count,Min,Avg Input,Avg Switch,Avg Pgm Exec,Avg Output,Avg Out CQS,Avg Out Loc,Avg Total,90% Input ,...
2,2023/05/27,07:51:00,*TOTAL*,3384,22,5,0,168,0,0,0,174,32,0,261,...
2,2023/05/27,07:51:00,DSFFDE1A,8,94,2,0,134,0,0,0,137,4,0,166,...
2,2023/05/27,07:51:00,DSFFDE1B,10,134,5,0,154,0,0,0,159,15,0,176,...
2,2023/05/27,07:51:00,DSFFDE1C,7,125,2,0,142,0,0,0,145,3,0,160,...
2,2023/05/27,07:51:00,DSFFDE1D,9,105,2,0,144,0,0,0,147,4,0,175,...
2,2023/05/27,07:51:00,DSFFDE1E,7,122,4,0,146,0,0,0,150,9,0,172,...
2,2023/05/27,07:51:00,DSFFDE1F,4,149,90,0,197,0,0,0,288,312,0,277,...
2,2023/05/27,07:51:00,DSFFDE1G,8,128,2,0,160,0,0,0,162,3,0,197,...
2,2023/05/27,07:51:00,DSFFDE1H,12,93,3,0,132,0,0,0,135,4,0,162,...
2,2023/05/27,07:51:00,DSFFDE1I,7,112,3,0,144,0,0,0,147,7,0,170,...
2,2023/05/27,07:51:00,DSFFDE1J,9,115,3,0,147,0,0,0,150,4,0,185,...
2,2023/05/27,07:51:00,DSFFDE1K,4,115,3,0,146,0,0,0,149,4,0,189,...
2,2023/05/27,07:51:00,DSFFDE1L,13,130,3,0,161,0,0,0,164,5,0,203,...
:
2,2023/05/27,07:51:00,DSFFSC6M,18,48,7,0,78,0,0,0,85,26,0,107,...
2,2023/05/27,07:51:00,DSFFSC6N,20,48,14,0,71,0,0,0,86,82,0,100,...
2,2023/05/27,07:51:00,DSFFSC6O,17,50,6,0,71,0,0,0,77,25,0,99,...
2,2023/05/27,07:51:00,DSFFSC6P,14,49,3,0,73,0,0,0,76,4,0,89,...
2,2023/05/27,07:52:00,*TOTAL*,3878,23,2,0,163,0,0,0,166,6,0,254,...
2,2023/05/27,07:52:00,DSFFDE1A,13,92,2,0,130,0,0,0,133,4,0,156,...
2,2023/05/27,07:52:00,DSFFDE1B,8,132,2,0,141,0,0,0,143,3,0,150,...
2,2023/05/27,07:52:00,DSFFDE1C,7,111,1,0,137,0,0,0,139,3,0,160,...
2,2023/05/27,07:52:00,DSFFDE1D,9,105,3,0,133,0,0,0,137,4,0,153,...
2,2023/05/27,07:52:00,DSFFDE1E,7,128,3,0,148,0,0,0,152,4,0,164,...
2,2023/05/27,07:52:00,DSFFDE1F,14,123,3,0,144,0,0,0,147,4,0,169,...
:

```

Figure 17. Export file contents: Transit Extract by Interval

The field headings are optionally included as the first record in the export file. The headings are comma separated, in the same sequence but of different length to the data fields.

Each subsequent row represents a record of type 2 containing accumulated data for the given transaction code for the given time interval. The time shown is the start time of the interval and is included in the interval. If there is no transaction code shown, the row represents totals for the interval. The transaction data appears in alphabetical order by transaction code with *TOTAL* (the total for the interval) appearing first.

The data fields are fixed length, comma separated values. Character fields are left-justified and blank-filled to the right. Numeric fields are right-justified and blank-filled to the left.

The record format of the export file is shown in the following table.

Table 1. Export file record layout: Transit Extract by Interval

Field description	Column heading	Field length (bytes)
Record Type (= 2)	Type	1
Date (User-defined format)	Date	10
Sort yyyy/mm/dd		
U.S. mm/dd/yyyy		
European dd/mm/yyyy		
Julian yyyyddd		
Batch ddMMMyyyy where MMM = Jan, Feb,...		
Time (hh:mm:ss)	Time	8
Transaction Code or *TOTAL*	Trancode	8
Transaction count	Count	10

Table 1. Export file record layout: Transit Extract by Interval (continued)

Field description	Column heading	Field length (bytes)
Minimum Transit time (msec)	Min	8
Input Queue time (msec)	Avg Input	6
Program Switch time (msec)	Avg Switch	6
Program Execution time (msec)	Avg Pgm Exec	6
Output Queue time (msec)	Avg Output	6
Output CQS time (msec)	Avg Out CQS	6
Output Local Queue time (msec)	Avg Out Loc	6
Total Transit time (msec)	Avg Total	6
Input Queue time <i>User-defined percentage (msec)</i>	<i>nnn% Input</i>	6
Program Switch time <i>User-defined percentage (msec)</i>	<i>nnn% Switch</i>	6
Program Execution time <i>User-defined percentage (msec)</i>	<i>nnn% Pgm Exec</i>	6
Output Queue time <i>User-defined percentage (msec)</i>	<i>nnn% Output</i>	6
Output CQS time <i>User-defined percentage (msec)</i>	<i>nnn% Out CQS</i>	6
Output Local Queue time <i>User-defined percentage (msec)</i>	<i>nnn% Out Loc</i>	6
Total Transit time <i>User-defined percentage (msec)</i>	<i>nnn% Total</i>	6
Maximum Transit time (msec)	Max	8
CPU Time (msec)	CPU	8

The export file makes selected transaction transit time by time interval data available to external programs.

Content: Extract Export Report

The **Extract Export Report** panel provides a summary report of your requested export processing when executing in foreground. If executing in batch mode, a similar report is produced and is written to SYSPRINT. You can use the report to indicate whether the results of the export are as expected, prior to proceeding with further processing of the export data.

For example, if the number of records written to the Export Data Set is unreasonably large, you may choose to return to previous panels to change the filters and processing options to reduce the amount of data selected for export. The number of export records written does not include the record containing the headings.

Extract Start and **Extract End** show the period of the data in the Extract file. **Export Start** and **Export End** show the period of the data in the Export file specified using the **From** and **To** date and time option on the Extract Export panel. Compare these periods to verify that you are exporting the required portion of the extract data.

```

                                Extract Export Report
Command ==> _____

Extract DSN:   IMSPA.EXTRACT.DATA
Extract Start: 2023/05/27 07:51:00
Extract End:   2023/05/27 07:56:00
Extract Records read: 1250

Export DSN:    IMSPA.EXPORT.DATA
Export Start:  2023/05/27 07:51:00
Export End:    2023/05/27 07:53:00
Export Records written: 26

IPI0139I  Export request completed successfully, RC=0

```

Figure 18. Extract Export report

Graphing interval data using GDDM-PDF

This facility uses IBM GDDM-PGF to display or print graphs of selected transaction transit time by time interval data from an Extract Data Set, and the filtering and processing options specified on the Extract Graphing & Export panel. The Extract Data Set contains data extracted during Log Report Set processing using the **Extract by Interval** report facility.

This facility is invoked from option **G** on the Extract Graphing & Export panel.

You can produce up to eight line graphs, and select which data items are to appear on each graph; you may also select one or more data items to appear on all graphs. The data item values are plotted on the y-axis against the time interval on the x-axis. If you select a "Count" item to appear on the same graph as one or more "Transit Time" items, the graph contains two y-axes, with Transit Time (msecs) on the left and Count on the right.

If multiple graphs are requested, they are presented one per page in ascending graph-number order in the following sequence:

1. First, if requested **By Interval**, all requested graphs with summary level data for all transactions are presented in turn.
2. Then, if requested **By Transaction Within Interval**, all requested graphs per transaction code are presented in descending order of transaction code.

If displaying the graphs, press **Enter** to page forward and view them sequentially. Press **Exit (F3)** or **Cancel (F12)** at any stage if you wish to prematurely terminate the display.

Transaction Exception report and extract

The Transaction Exception report shows transaction performance information that affects response time. The report can be ordered by Transaction Code, User ID, Message Class, or Time of Input. The User ID, Message Class, and Time of Input reports optionally show a breakdown by transaction code.

Log records: The report is derived from the IMS log records 01, 03, 06, 07, 08, 31, 32, 33, 34, 35, 38, 40, 72.

Each of the Transaction Exception reports is designed to give a system analyst insight into a different facet of response tuning:

- The Transaction Code and Message Class reports show areas in application design and scheduling that may require attention.
- The User ID report shows whether the distribution of service among system users is adequate.
- The Time of Input report highlights performance problems caused by momentary surges of transaction input.

Optionally, two extract files may be produced, one containing detail records of all transaction activity, and one containing only exception transactions as determined by the values specified in an Expectation Set.

The Transaction Exception Recap report is always produced at the end to give a summary of the processing of the selected reports and requested extracts.

The content of the Transaction Exception report differs from the Transaction Transit Analysis report in the following ways:

- The Analysis report only reports transactions that are directly involved in end-to-end response. Therefore, only transactions and their program switches that respond back to the originating LTERM are reported.

The Transaction Exception report shows all transaction activity.

- The Analysis report tracks the life of the transaction, from the time of the input message, across program switches, to the time of the output message. Program to program message switches are attributed to the program under the originating transaction and reported as Switch Queue time.

The Transaction Exception report treats each transaction individually. Input messages are reported under Input Queue time and output messages under Output Queue time for the transaction, regardless of the source.

- The Transaction Exception report includes DB and DC call statistics, and optionally shared queue time.
- The Transaction Exception report can optionally produce two extract files, Total Traffic showing details of all transactions, and Exception Traffic showing details of transactions that exceed performance thresholds.

Options

To specify the report options, select the Transaction **Transit Exception** report in a Log Report Set.

Several reporting sequences are available for this report. It can be ordered by:

- Transaction Code
- User ID
- Message Class
- Time of input message

The User ID, Message Class, and Time of Input reports can be further broken down by Transaction Code.

The reports can be requested in either of two formats. Extended format **FORMAT2** gives a consistent breakdown of transactions (Exceptions + OK = Total) for all reports: Transaction Code, User ID, Class, and Time. Original format **FORMAT1** omits OK transactions (non-exceptions) from the User ID, Class, and Time reports.

In the **Log Global Options** panel, you can specify the name of a Transaction Substitution Exit to change the Transaction Code name that is reported. Where Transaction Code and Program (PSB) Name are reported together as the report ordering sequence, then IMS Performance Analyzer changes the Program name to ***USERXIT**. This ensures that transactions with substituted names are grouped and reported in a single report line.

Shared queue users can optionally select to report shared queue times.

A report interval can be specified. This applies to the reduced data file after the Global (or Run-time) report interval is effected.

The report output is written to the data set specified by the Report Output DDname.

MSC, BMP, APPC, and OTMA transactions can be included for reporting by selecting the desired options in the **Transaction Transit Options** panel.

Transaction exceptions are determined by the specification of an Expectation Set. If the Expectation Set is not specified, then all transactions are treated as exceptions. A transaction is defined as an exception if it is outside the range defined in the Expectation Set for any of the following criteria:

- Input queue time
- Processing time
- Output queue time
- Total transit time
- DB DL/I calls
- DC DL/I calls
- DB waits
- CPU time

Specify the Total Traffic data set to create a Total Traffic extract. All transactions have a detail record written to the Total Traffic data set.

Specify the Exception Traffic data set to create an Exception Traffic extract. Only exception transactions have an exception record written to the Exception Traffic data set.

Selection Criteria can be specified to filter on Transaction Code, User ID and Class. These are applied after the Transaction Code filter specified in the Selection Criteria on the **Transaction Transit Options** panel.

Report content (FORMAT1)

These examples show the Transaction Exception reports applicable to both local and shared queue transaction processing.

Several reporting options are available, ordered by Transaction Code, User ID, Message Class, or Time of Input.

IMS Performance Analyzer Transaction Exception by Trancode																
From 240ct2018 14:02:33:79 To 240ct2018 14:12:21:68 Elapsed= 0 Hrs 9 Mins 47.887.108 Secs Page 1																
Trancode	PSB	Transact Count	Min Tran Time	Average Input Queue	Transit Pgm Exec	Time Queue Total	90% Peak Input Queue	Transit Pgm Exec	Time Queue Total	0 Hrs 9 Mins	Max Tran Time	DB Calls	DC Calls	DB Waits	Average CPU	Tran/Min
ADDINQ	*OK*	10	8	3	116	0	12	3	16	0	18	25	1	2	0	3
ADDPART	*OK*	8	8	3	7	0	10	4	9	0	12	12	4	0	0	1
CEXSCONV	CEXSPGM	9	2	2	1116	0	1118	2	3945	0	3947	5011	2	4	0	2
	OK	6	14	7	13	0	20	10	19	0	27	27	5	5	0	5
CEXSCONV	*Total*	15	2	4	675	0	679	7	2931	0	2933	5011	3	4	0	2
CEXSNONC	CEXSPGM	2	2009	1005	1009	0	2015	2824	2818	0	2024	2020	3	3	0	4
	OK	8	6	6	8	0	14	8	13	0	21	23	3	3	0	3
CEXSNONC	*Total*	10	6	206	208	0	414	1018	1019	0	1496	2020	3	3	0	3
CEXTCONV	CEXTCPGM	3	5011	1	6680	0	6680	2	10379	0	10380	10012	5	4	0	3
	OK	17	5	3	12	3	18	7	27	17	43	75	4	4	0	4
CEXTCONV	*Total*	20	5	3	1012	2	1017	6	4365	15	4368	10012	4	4	0	4
CEXTNCON	CEXTCPGM	5	2007	407	6409	0	6816	1561	14239	0	14030	15011	4	2	0	3
	OK	11	4	5	9	1	15	8	16	5	27	39	4	2	0	4
CEXTNCON	*Total*	16	4	131	2009	1	2140	775	7646	4	7734	15011	4	2	0	4
DLEITNV	*OK*	8	9	3	9	0	12	5	13	0	16	17	2	2	0	3
DLETPART	*OK*	6	8	3	8	0	10	3	9	0	12	12	4	2	0	3
DSPALL1	*OK*	8	9	3	11	0	14	5	20	1	23	27	5	7	0	4
DSPINV	*OK*	16	7	2	8	0	11	4	10	0	13	14	4	9	0	4
DVPTFRAN2	DVPPGM01	19	18	20	7954	0	7975	107	15002	0	14996	15052	208	8	0	12
	OK	14	9	7	12	0	20	18	22	0	37	58	10	5	0	3
DVPTFRAN2	*Total*	33	9	15	4585	0	4600	81	11937	0	11944	15052	124	7	0	8
IVTCV	*OK*	24	6	3	9	0	12	8	12	0	17	8	5	8	0	1
IVTCX	DFSIVP35	2	165	6	181	0	187	13	213	0	226	208	1	4	0	18
	OK	10	11	2	11	0	13	3	13	0	15	17	1	4	0	4
IVTCX	*Total*	12	11	3	39	0	42	6	125	0	129	208	1	4	0	6
IVTNO	*OK*	28	4	5	6	0	10	11	11	0	19	33	1	2	0	1
IVTVN	*OK*	33	1	3	3	0	6	6	4	0	10	15	1	2	0	1
MQATREQ1	MQATPGM	4	294	6	309	0	315	9	335	0	342	344	9	2	0	13
PART	DFSSAM02	2	118	118	231	0	349	154	612	0	767	579	1	2	0	4
	OK	40	8	6	11	0	17	14	18	1	28	43	1	3	0	3
PART	*Total*	42	8	12	21	0	33	44	107	1	146	579	1	3	0	3
** Grand Total **		293	1	20	749	0	769	233	4221	4	4242	15052	16	4	0	3

IMS Performance Analyzer Transaction Exception by Userid																
From 240ct2018 14:02:33:79 To 240ct2018 14:12:21:68 Elapsed= 0 Hrs 9 Mins 47.887.108 Secs Page 2																
Userid	Trancode	Transact Count	Min Tran Time	Average Input Queue	Transit Pgm Exec	Time Queue Total	90% Peak Input Queue	Transit Pgm Exec	Time Queue Total	0 Hrs 9 Mins	Max Tran Time	DB Calls	DC Calls	DB Waits	Average CPU	Tran/Min
CEX001	CEXSCONV	9	2	2	1116	0	1118	2	3945	0	3947	5011	2	4	0	2
	CEXSNONC	2	2009	1005	1009	0	2015	2824	2818	0	2024	2020	3	3	0	4
	CEXTCONV	3	5011	1	6678	0	6680	2	10379	0	10380	10012	5	4	0	3
	CEXTNCON	5	2007	407	6409	0	6816	1561	14239	0	14030	15011	4	2	0	3
	DVPTFRAN2	19	18	20	7954	0	7975	107	15002	0	14996	15052	208	8	0	12
	IVTCX	2	165	6	181	0	187	13	213	0	226	208	1	4	0	18
	MQATREQ1	4	294	6	309	0	315	9	335	0	342	344	9	2	0	13
	PART	2	118	118	231	0	349	154	612	0	767	579	1	2	0	4
	Except	46	2	102	4725	2	4827	2	3945	0	3947	15052	88	5	0	8
	OK	168	3	5	9	0	14	11	17	5	27	75	3	3	0	3
CEX001	*Total*	214	2	26	1023	0	1049	2	3945	0	3947	15052	21	3	0	4
CEX002	*OK*	35	3	2	7	0	9	4	11	0	14	27	2	4	0	3
CEX003	*OK*	24	3	3	7	0	10	5	12	0	15	24	3	6	0	3
CEX004	*OK*	18	3	3	8	0	11	7	11	0	17	24	2	4	0	3
CEX005	*OK*	2	1	1	3	0	4	3	6	0	9	7	2	2	0	0
** Grand Total **		293	1	20	749	0	769	233	4221	4	4242	15052	16	4	0	3

IMS Performance Analyzer Transaction Exception by Class																
From 240ct2018 14:02:33:79 To 240ct2018 14:12:21:68 Elapsed= 0 Hrs 9 Mins 47.887.108 Secs Page 3																
Class	Trancode	Transact Count	Min Tran Time	Average Input Queue	Transit Pgm Exec	Time Queue Total	90% Peak Input Queue	Transit Pgm Exec	Time Queue Total	0 Hrs 9 Mins	Max Tran Time	DB Calls	DC Calls	DB Waits	Average CPU	Tran/Min
1	DVPTFRAN2	19	18	20	7954	0	7975	107	15002	0	14996	15052	208	8	0	12
	IVTCX	2	165	6	181	0	187	13	213	0	226	208	1	4	0	18
	PART	2	118	118	231	0	349	154	612	0	767	579	1	2	0	4
	Except	2	18	27	6607	0	6634	107	15002	0	14996	15052	172	7	0	12
	OK	144	6	4	9	0	14	10	16	0	23	58	3	4	0	3
1	*Total*	167	6	7	918	0	925	107	15002	0	14996	15052	26	5	0	4
2	*OK*	28	4	5	6	0	10	11	11	0	19	33	1	2	0	1
3	*OK*	33	1	3	3	0	6	6	4	0	10	15	1	2	0	1
5	CEXTCONV	3	5011	1	6678	0	6680	2	10379	0	10380	10012	5	4	0	3
	CEXTNCON	5	2007	407	6409	0	6816	1561	14239	0	14030	15011	4	2	0	3
	Except	8	2007	255	6510	0	6765	2	10379	0	10380	15011	4	3	0	3
	OK	28	4	4	11	2	17	7	23	13	37	75	4	4	0	4
5	*Total*	36	4	60	1455	2	1516	2	10379	0	10380	15011	4	3	0	4
6	MQATREQ1	4	294	6	309	0	315	9	335	0	342	344	9	2	0	13
15	CEXSCONV	9	2	2	1116	0	1118	2	3945	0	3947	5011	2	4	0	2
	CEXSNONC	2	2009	1005	1009	0	2015	2824	2818	0	2024	2020	3	3	0	4
	Except	11	2	184	1097	0	1281	2	3945	0	3947	5011	2	4	0	2
	OK	14	6	6	10	0	16	9	16	0	24	27	4	4	0	4
15	*Total*	25	2	84	488	0	573	598	2306	0	2426	5011	3	4	0	3
** Grand Total **		293	1	20	749	0	769	233	4221	4	4242	15052	16	4	0	3

IMS Performance Analyzer Transaction Exception by Time																
From 240ct2018 14:02:33:79 To 240ct2018 14:12:21:68 Elapsed= 0 Hrs 9 Mins 47.887.108 Secs Page 4																
Time	Trancode	Transact Count	Min Tran Time	Average Input Queue	Transit Pgm Exec	Time Queue Total	90% Peak Input Queue	Transit Pgm Exec	Time Queue Total	0 Hrs 9 Mins	Max Tran Time	DB Calls	DC Calls	DB Waits	Average CPU	Tran/Min
14:00:00	CEXSCONV	9	2	2	1116	0	1118	2	3945	0	3947	5011	2	4	0	2
	CEXSNONC	2	2009	1005	1009	0	2015	2824	2818	0	2024	2020	3	3	0	4
	CEXTCONV	3	5011	1	6678	0	6680	2	10379	0	10380	10012	5	4	0	3
	CEXTNCON	5	2007	407	6409	0	6816	1561	14239	0	14030	15011	4	2	0	3
	DVPTFRAN2	19	18	20	7954	0	7975	107	15002	0	14996	15052	208	8	0	12
	IVTCX	2	165	6	181	0	187	13	213	0	226	208	1	4	0	18
	MQATREQ1	4	294	6	309	0	315	9	335	0	342	344	9	2	0	13
	PART	2	118	118	231	0	349	154	612	0	767	579	1	2	0	4
	Except	46	2	102	4725	2	4827	2	3945	0	3947	15052	88	5	0	8
	OK	247	1	4	8	0	13	9	16	4	24	75	3	4	0	3
14:00:00	*Total*	293	1	20	749	0	769	233	4221	4	4242	15052	16	4	0	3
** Grand Total **		293	1	20	749	0	769	233	4221	4	4242	15052	16	4	0	3

IMS Performance Analyzer Transaction Exception Recap																
From 240ct2018 14:02:33:79 To 240ct2018 14:12:21:68 Elapsed= 0 Hrs 9 Mins 47.887.108 Secs Page 5																
Total number of transactions examined (Total Traffic) 293																
Number of exception transactions (Exception Traffic) 46																
Expectation Set used in the analysis . . . EXPECT01 in Library IPT000.QAAUTO.TESTCASE.IPIEXPQ																
Total Traffic Data Set N/A																
Exception Traffic Data Set N/A																

-Max-

Maximum threshold values specified in the Expectation Set. Only appears if Print Expectations (PRINTEXP) is specified and there are values.

Trancode/PSB

Exception statistics for each transaction code that ran in the time interval, reporting only those transactions that exceeded one or more thresholds in the Expectation Set.

OK

OK statistics for transactions that did not exceed any thresholds in the Expectation Set. When the exception count is zero, this is the only line printed.

Total

Total activity for the Trancode/PSB combination (Exceptions + OK).

**** Grand Total ****

All transaction activity in the report period.

Report lines: Transaction Exception by Userid, Class, or Time

The Transaction Exception by Userid, Class, or Time reports have the following rows:

-Min-

Minimum threshold values specified in the Expectation Set. Only appears if Print Expectations (PRINTEXP) is specified and there are values.

-Max-

Maximum threshold values specified in the Expectation Set. Only appears if Print Expectations (PRINTEXP) is specified and there are values.

Trancode

Exception statistics for each transaction code that ran in the time interval, reporting only those transactions that exceeded one or more thresholds in the Expectation Set.

Except

Roll-up of exception statistics for all transactions in the interval that exceeded one or more thresholds in the Expectation Set.

OK

Roll-up of OK statistics for all transactions in the time interval that did not exceed any thresholds in the Expectation Set.

Total

Total statistics for all transactions in the time interval (Exceptions + OK).

**** Grand Total ****

All transaction activity in the report period.

Report columns

The first two columns in the report are ordering columns according to your selection. For example:

- If you select Transaction Code as the ordering operand, the first two column headers are **Trancode** and **PSB**.
- If you select User ID as the ordering operand, the first two column headers are **Userid** and **Trancode**.
- If you select Class as the ordering operand, the first two column headers are **Class** and **Trancode**.
- If you select Time Interval, the first two column headers are **Time** and **Trancode**.

For each of User ID, Class, and Time of Input, multiple report lines are written for every transaction code processed. A ***Total*** report line signifies the accumulated totals at the end of each User ID, Class, or Time of Input. Optionally, only this total report line may be produced to provide a summary of transaction activity by User ID, Class, or Time of Input.

The second report column can also be one of the following:

Total

Accumulated totals of all transaction codes within each User ID, Class or Time of Input.

OK

Total of all transactions that performed within the thresholds of the Expectation Set.

Except

Total of all transactions that exceeded at least one criteria in the Expectation Set.

MSC

MSC transaction processed remotely.

The report heading contains the reporting period. **From** specifies the date and time of the first transaction to be processed, and **To** specifies the date and time of the last transaction to be processed. **Elapsed** is the reporting period elapsed time, the time between the first and last transactions that were processed.

The following fields appear in the report after the two ordering fields:

Transact Count

Number of transactions completed during the time period being examined.

Min Tran Time

The shortest total transit time, in milliseconds, for a single transaction.

Average Transit Time

The average (mean) transit time, in milliseconds, required to process each transaction. These transit times are broken down into their component parts:

Input Queue

Input queue time

Pgm Exec

Program execution time

Output Queue

Output queue time

Total

Total time

nnn% Peak Transit Time

A statistical estimate, based on a normal distribution, that *nnn%* (between 50% and 100% as specified in the Transaction (MSGQ) Transit Options) of all transactions had transit times less than the time shown. This estimate shows that *nnn%* of transactions completed within the total transit time shown. Times are in milliseconds. The estimated transit times are broken down into their component parts:

Input Queue

Input queue time

Pgm Exec

Program execution time

Output Queue

Output queue time

Total

Total time

The total time is a statistical estimate itself, rather than the sum of the component estimates.

The peak values are a statistical estimate only, so care should be taken when interpreting the values if the transaction volume is low.

Max Tran Time

The longest total transit time, in milliseconds, for a single transaction.

Average Approximate

The averages for the DB, DC, and CPU statistics are approximations derived from the IMS type 07 log record. The totals from the 07 record are distributed among the transactions within a scheduling in proportion to the elapsed time of each transaction.

DB Calls

The average number of database calls, irrespective of type, made by this transaction.

DC Calls

The average number of data communication calls made by this transaction.

DB Waits

The average number of database waits (wait for PI enqueue) made by this transaction.

CPU

The average CPU time in milliseconds used by this transaction.

Tran/Min

The transaction processing rate, calculated as the average number of transactions processed per minute during the report interval.

Recap report

A Recap report is produced at the end of processing to give transaction totals and data set names.

Shared Queues

The following fields are only shown when the shared queue report is requested. In this case, Min Tran Time, Max Tran Time, DC Calls, DB Waits, and Tran/Min fields are excluded from the report.

Global Count

Number of transactions that were processed globally on the shared queue during the time period being examined.

Average Shared EMHQ Time

The average (mean) elapsed time, in milliseconds, that the transaction's Input and Output message spent on the shared queue.

nnn% Peak Shared EMHQ Time

A statistical estimate, based on a normal distribution, that *nnn%* (between 50% and 100% as specified by you) of all transactions had shared queue Input and Output queue times less than the time shown. Times are in milliseconds.

The peak values are a statistical estimate only, so care should be taken when interpreting the values if the transaction volume is low.

Note: The User ID, Message Class, and Time of Input reports can also be produced when shared queue details are requested.

Report content (FORMAT2)

These examples show the extended format Transaction Exception reports applicable to both local and shared queue transaction processing.

Several reporting options are available, ordered by Transaction Code, User ID, Message Class, or Time of Input.

IMS Performance Analyzer Transaction Exception by Trancode																			
From 240ct2018 14:02:33:79										To 240ct2018 14:12:21:68									
		Min	Average		Transit Time		-- 90%		Peak	Transit Time		Elapsed=		0 Hrs	9 Mins	47.887.108 Secs		Page	1
Trancode	PSB	Transact Count	Tran Time	Input Queue	Pgm Exec	Output Queue	Total	Input Queue	Pgm Exec	Output Queue	Total	Tran Time	Max	DB	DC	DB	Approximate	CPU	Tran/Min
ADDINV	DFSSAM04	10	8	3	10	0	12	3	16	0	18	25	1	2	0	3	1		
ADDPART	DFSSAM04	8	8	3	7	0	10	4	13	12	19	12	2	2	0	3	1		
CEXSCONV	*Except*	15	2	4	675	0	679	7	2931	0	2933	5011	3	4	0	3	2		
	Except	9	2	2	1116	0	1118	2	3947	0	3947	5011	2	4	0	2	1		
	OK	6	14	7	13	0	20	10	19	0	27	27	5	5	0	5	1		
CEXSNONC	*Except*	10	6	206	1085	0	1291	414	1018	1019	0	1496	2020	3	3	0	3	1	
	OK	2	2009	1005	1009	0	2015	2824	2818	0	2824	2020	3	3	0	4	0		
	OK	8	6	6	18	0	14	8	13	0	21	23	3	3	0	3	1		
CEXTCONV	*Except*	20	5	3	1012	2	1017	6	4365	15	4368	10012	4	4	0	4	2		
	OK	3	5011	1	6678	0	6680	2	10379	0	10380	10012	5	4	0	3	0		
	OK	17	5	3	12	3	18	7	27	17	43	75	4	4	0	4	2		
CEXTNOC	*Except*	16	4	131	2089	1	2140	775	7646	4	7734	15011	4	2	0	4	2		
	OK	5	2007	407	6409	0	6816	1561	14239	0	14030	15011	4	2	0	4	1		
	OK	11	4	5	9	1	15	8	16	5	27	39	4	2	0	4	1		
DLETIINV	DFSSAM04	8	9	3	9	0	12	5	13	0	16	17	2	2	0	3	1		
DLETPART	DFSSAM04	6	8	3	7	0	10	3	9	0	12	12	4	2	0	3	1		
DSPALLI	DFSSAM07	8	9	3	11	0	14	5	20	1	23	27	5	7	0	4	1		
DSPINIV	DFSSAM03	16	7	2	8	0	11	4	10	0	13	14	4	9	0	4	2		
DVPTRAN2	*Except*	33	9	15	4585	0	4600	81	11937	0	11944	15052	124	7	0	8	3		
	OK	19	18	20	7954	0	7975	107	15002	0	14996	15052	208	8	0	12	2		
	OK	14	9	7	12	0	20	18	22	0	37	58	10	5	0	3	1		
IVTCV	DFSIVP3	12	6	3	6	0	9	5	8	0	12	17	1	9	0	1	1		
IVTCV	DFSIVP35	12	11	3	30	0	42	6	125	0	129	208	1	4	0	6	1		
	Except	2	165	6	181	0	187	13	213	0	226	208	1	4	0	18	0		
	OK	10	11	2	11	0	13	3	13	0	15	17	1	4	0	4	1		
IVTNO	DFSIVP1	28	4	5	10	0	11	3	12	0	13	11	1	2	0	1	3		
IVTNO	DFSIVP2	33	1	3	3	0	6	6	4	0	10	15	1	2	0	1	3		
MQATREQ1	MQATPM0	4	294	6	309	0	315	9	335	0	342	344	9	2	0	13	0		
	Except	4	294	6	309	0	315	9	335	0	342	344	9	2	0	13	0		
PART	DFSSAM02	42	8	12	21	0	33	44	107	1	146	579	1	3	0	3	4		
	Except	2	118	118	231	0	349	154	612	0	767	579	1	2	0	4	0		
	OK	40	8	6	11	0	17	14	18	4	28	43	1	3	0	3	4		
** Grand Total **		293	1	20	749	0	769	233	4221	4	4242	15052	16	4	0	3	30		

IMS Performance Analyzer Transaction Exception by Userid																			
From 240ct2018 14:02:33:79										To 240ct2018 14:12:21:68									
		Min	Average		Transit Time		-- 90%		Peak	Transit Time		Elapsed=		0 Hrs	9 Mins	47.887.108 Secs		Page	2
Userid	Trancode	Transact Count	Tran Time	Input Queue	Pgm Exec	Output Queue	Total	Input Queue	Pgm Exec	Output Queue	Total	Tran Time	Max	DB	DC	DB	Approximate	CPU	Tran/Min
CEX001	ADDINV	5	11	3	12	0	15	4	19	0	22	25	1	2	0	3	1		
CEX001	ADDPART	4	8	3	6	0	9	4	6	0	10	10	2	2	0	3	0		
CEX001	CEXSCONV	15	2	4	675	0	679	7	2931	0	2933	5011	3	4	0	3	2		
	Except	9	2	2	1116	0	1118	2	3945	0	3947	5011	2	4	0	2	1		
	OK	6	14	7	13	0	20	10	19	0	27	27	5	5	0	5	1		
CEX001	CEXSNONC	10	6	206	1085	0	1291	414	1018	1019	0	1496	2020	3	3	0	3	1	
	Except	2	2009	1005	1009	0	2015	2824	2818	0	2824	2020	3	3	0	4	0		
	OK	8	6	6	18	0	14	8	13	0	21	23	3	3	0	3	1		
CEX001	CEXTCONV	20	5	3	1012	2	1017	6	4365	15	4368	10012	4	4	0	4	2		
	Except	3	5011	1	6678	0	6680	2	10379	0	10380	10012	5	4	0	3	0		
	OK	17	5	3	12	3	18	7	27	17	43	75	4	4	0	4	2		
CEX001	CEXTNOC	16	4	131	2089	1	2140	775	7646	4	7734	15011	4	2	0	4	2		
	Except	5	2007	407	6409	0	6816	1561	14239	0	14030	15011	4	2	0	4	1		
	OK	11	4	5	9	1	15	8	16	5	27	39	4	2	0	4	1		
CEX001	DLETIINV	3	10	3	8	0	11	3	9	0	12	12	4	2	0	3	0		
CEX001	DLETPART	3	10	3	8	0	11	3	9	0	12	12	4	2	0	3	0		
CEX001	IVTCV	33	9	15	4585	0	4600	81	11937	0	11944	15052	124	7	0	8	3		
	Except	19	18	20	7954	0	7975	107	15002	0	14996	15052	208	8	0	12	2		
	OK	14	9	7	12	0	20	18	22	0	37	58	10	5	0	3	1		
CEX001	IVTCV	12	6	3	6	0	9	5	8	0	13	17	1	9	0	1	1		
	Except	12	11	3	30	0	42	6	125	0	129	208	1	4	0	6	1		
	OK	2	165	6	181	0	187	13	213	0	226	208	1	4	0	18	0		
	OK	10	11	2	11	0	13	3	13	0	15	17	1	4	0	4	1		
CEX001	IVTNO	22	4	5	10	0	11	3	12	0	13	11	1	2	0	1	2		
CEX001	IVTNO	25	3	4	3	0	7	7	4	0	11	15	1	2	0	1	3		
CEX001	MQATREQ1	4	294	6	309	0	315	9	335	0	342	344	9	2	0	13	0		
	Except	4	294	6	309	0	315	9	335	0	342	344	9	2	0	13	0		
CEX001	PART	29	10	15	28	0	43	53	130	1	178	579	1	2	0	3	3		
	Except	2	118	118	231	0	349	154	612	0	767	579	1	2	0	4	0		
	OK	27	10	8	12	0	28	16	28	1	31	43	1	3	0	3	3		
CEX001	*Total*	214	2	204	1023	0	1049	276	5031	4	5056	15052	21	3	0	4	22		
	Except	46	2	102	4725	0	4827	634	11560	0	11570	15052	88	5	0	8	5		
	OK	168	3	5	9	0	14	11	17	5	27	75	3	3	0	3	17		
CEX002	ADDINV	8	2	2	7	0	9	3	9	0	11	11	1	1	0	3	1		
CEX002	DLETPART	3	8	2	7	0	10	4	8	0	12	11	4	2	0	3	0		
CEX002	DSPALLI	4	10	3	11	0	15	5	20	1	25	27	5	7	0	4	0		
CEX002	DSPINIV	4	10	2	9	0	11	4	11	0	12	12	4	2	0	10	0		
CEX002	IVTCV	12	6	2	5	0	8	4	7	0	10	12	1	4	0	1	1		
CEX002	IVTNO	2	3	2	2	0	4	4	2	0	6	5	1	2	0	1	0		
CEX002	PART	5	8	3	7	0	10	5	9	0	13	12	1	1	0	3	1		
CEX002	*Total*	35	3	2	7	0	9	4	11	9	14	27	2	4	0	3	4		
CEX003	DSPALLI	4	9	3	11	0	13	4	20	0	23	24	5	7	0	4	0		
CEX003	DSPINIV	6	7	2	8	0	11	4	10	0	13	13	4	9	0	4	1		
CEX003	IVTNO	6	5	4	4	0	8	7	6	0	11	11	1	2	0	6	1		
CEX003	IVTNO	2	3	1	3	0	4	1	5	0	6	5	2	2	0	1	0		
CEX003	PART	4	10	3	8	0	12	6	9	1	15	16	2	5	0	3	0		
CEX005	*Total*	24	3	3	7	0	10	5	12	0	14	24	2	4	0	3	2		
CEX004	ADDPART	4	11	3	8	0	12	4	10	0	12	12	2	2	0	3	0		
CEX004	DLETIINV	4	10	3	9	0	12	4	13	0	16	17	2	2	0	3	0		
CEX004	DSPINIV	4	9	2	8	0	10	3	11	0	14	14	4	8	0	4	0		

IMS Performance Analyzer Transaction Exception by Class																			
From 240ct2018 14:02:33:79										To 240ct2018 14:12:21:68									
		Min	Average		Transit Time		-- 90%		Peak	Transit Time		Elapsed=		0 Hrs	9 Mins	47.887.108 Secs		Page	4
Class	Trancode	Transact Count	Tran Time	Input Queue	Pgm Exec	Output Queue	Total	Input Queue	Pgm Exec	Output Queue	Total	Tran Time	Max	DB	DC	DB	Approximate	CPU	Tran/Min
1	ADDINV	10	8	3	10	0	12	3	16	0	18	25	1	2	0	3	1		
1	ADDPART	8	8	3	7	0	10	4	9	0	12	12	2	2	0	3	1		
1	DLETIINV	8	9	3															

-Min-

Minimum threshold values specified in the Expectation Set. Only appears if Print Expectations (PRINTEXP) is specified and there are values.

-Max-

Maximum threshold values specified in the Expectation Set. Only appears if Print Expectations (PRINTEXP) is specified and there are values.

Trancode/PSB

Total activity for the Trancode/PSB combination (Exceptions + OK). When the exception count is zero, this is the only line printed.

Except

Exception statistics for transactions that exceeded one or more thresholds in the Expectation Set.

OK

OK statistics for transactions that did not exceed any thresholds in the Expectation Set. When the exception count is zero, this is the only line printed.

**** Grand Total ****

All transaction activity in the report period.

Report lines: Transaction Exception by Userid, Class, or Time

The Transaction Exception by Userid, Class, or Time reports have the following rows:

-Min-

Minimum threshold values specified in the Expectation Set. Only appears if Print Expectations (PRINTEXP) is specified and there are values.

-Max-

Maximum threshold values specified in the Expectation Set. Only appears if Print Expectations (PRINTEXP) is specified and there are values.

Trancode

Total activity for the Trancode combination (Exceptions + OK). When the exception count is zero, this is the only line printed.

Except

Exception statistics for transactions that exceeded one or more thresholds in the Expectation Set.

OK

OK statistics for transactions that did not exceed any thresholds in the Expectation Set. When the exception count is zero, this is the only line printed.

Total

All transaction activity for the Userid, Class, or Time.

**** Grand Total ****

All transaction activity in the report period.

Other report options

The SUMMARY, PRINTEXP and SHRQ (Shared queues) options are honored in the same way as the original FORMAT1, albeit in the extended format.

Extract file content

The following figure shows an example of the contents of the extract file.

Trancode,Program	T,Q	InLTERM	OutLTERM	Nodename	Userid	Org	Proc	PST	Cls	Pri	InQTime	ProcTime	OutQTime	TotalTime	...
CEXTCONV,CEXTPGM	M,G	IPI2	IPI2	VAPIPI2B,IPI2	IDDE,IDDE	3	5	8			7499	12185	0	19684	...
CEXTCONV,CEXTPGM	M,G	IPI2	IPI2	VAPIPI2B,IPI2	IDDE,IDDE	3	5	8			3221	9941	0	13162	...
CEXTCONV,CEXTPGM	M,G	IPI2	IPI2	VAPIPI2B,IPI2	IDDE,IDDE	3	5	8			7797	8694	0	16491	...
CEXTCONV,CEXTPGM	M,G	IPI2	IPI2	VAPIPI2B,IPI2	IDDE,IDDE	3	5	8			7055	9239	0	16294	...
CEXTCONV,CEXTPGM	M,G	IPI2	IPI2	VAPIPI2B,IPI2	IDDE,IDDE	3	5	8			2853	2648		5501	...
CEXTCONV,CEXTPGM	M,G	IPI2	IPI2	VAPIPI2B,IPI2	IDDE,IDDE	3	15	8			3460	7711	0	11171	...
CEXTCONV,CEXTPGM	M,G	IPI2	IPI2	VAPIPI2B,IPI2	IDDE,IDDE	3	15	8			6228	2785		9013	...
CEXTCONV,CEXTPGM	M,G	IPI2	IPI2	VAPIPI2B,IPI2	IDDE,IDDE	3	5	8			10876	13354	0	24230	...
CEXTCONV,CEXTPGM	M,G	IPI2	IPI2	VAPIPI2B,IPI2	IDDE,IDDE	3	5	8			5042	2362		7404	...
CEXTCONV,CEXTPGM	M,G	IPI2	IPI2	VAPIPI2B,IPI2	IDDE,IDDE	3	15	8			3801	9919	0	13720	...
CEXTCONV,CEXTPGM	M,G	IPI2	IPI2	VAPIPI2B,IPI2	IDDE,IDDE	3	15	8			7007	2230		9237	...
CEXTCONV,CEXTPGM	M,G	IPI2	IPI2	VAPIPI2B,IPI2	IDDE,IDDE	3	5	8			5814	8903	0	14717	...
CEXTCONV,CEXTPGM	M,G	IPI2	IPI2	VAPIPI2B,IPI2	IDDE,IDDE	3	5	8			8441	8707	0	17148	...
CEXTCONV,CEXTPGM	M,G	IPI2	IPI2	VAPIPI2B,IPI2	IDDE,IDDE	3	5	8			3817	31405		35222	...
CEXTCONV,CEXTPGM	M,G	IPI2	IPI2	VAPIPI2B,IPI2	IDDE,IDDE	3	15	8			4167	10738	0	14905	...
CEXTCONV,CEXTPGM	M,G	IPI2	IPI2	VAPIPI2B,IPI2	IDDE,IDDE	3	15	8			3171	24502	1108	28781	...
CEXTCONV,CEXTPGM	M,G	IPI2	IPI2	VAPIPI2B,IPI2	IDDE,IDDE	3	15	8			3293	9463	0	12756	...
CEXTCONV,CEXTPGM	M,G	IPI2	IPI2	VAPIPI2B,IPI2	IDDE,IDDE	3	15	8			5797	2016		7813	...
CEXTCONV,CEXTPGM	M,G	IPI2	IPI2	VAPIPI2B,IPI2	IDDE,IDDE	3	5	8			3505	12083	0	15588	...
CEXTCONV,CEXTPGM	M,G	IPI2	IPI2	VAPIPI2B,IPI2	IDDE,IDDE	3	5	8			3789	2721		6510	...
CEXTCONV,CEXTPGM	M,G	IPI2	IPI2	VAPIPI2B,IPI2	IDDE,IDDE	3	15	8			3686	10743	0	14429	...
CEXTCONV,CEXTPGM	M,G	IPI2	IPI2	VAPIPI2B,IPI2	IDDE,IDDE	3	15	8			6753	5587		12340	...
CEXTCONV,CEXTPGM	M,G	IPI2	IPI2	VAPIPI2B,IPI2	IDDE,IDDE	3	5	8			7415	10968	231	18614	...
CEXTCONV,CEXTPGM	M,G	IPI2	IPI2	VAPIPI2B,IPI2	IDDE,IDDE	3	5	8			3364	9930	1218	14512	...
CEXTCONV,CEXTPGM	M,G	IPI2	IPI2	VAPIPI2B,IPI2	IDDE,IDDE	3	5	8			4677	8118	0	12795	...
CEXTNONV,CEXTPGM	M,G	IPI2	IPI2	VAPIPI2B,IPI2	IDDE,IDDE	3	5	8			6837	8511	0	15348	...
CEXTNONV,CEXTPGM	M,G	IPI2	IPI2	VAPIPI2B,IPI2	IDDE,IDDE	3	5	8			5125	7322	0	12447	...

Figure 21. Extract file content: Transaction (MSGQ) Transit Traffic

The record formats are the same for both the Total Traffic and Exception Traffic extract data sets. The record layout is defined by the assembler macro IPITRDR in the SIPIMAC library.

Each record is 268 bytes long, and this is the default length if not specified. However, you can define your extract file with a smaller record length. For example, set the record length to 164 if shared queue elapsed times and the queue time stamps are not required.

The Traffic extract data sets can be used as input to other reporting and statistical analysis tools. Specify a delimiter character in the Log Global Options to ensure that the extract is suitable for use by these tools.

The field headings are optionally included as the first record in the extract file depending on the extract options set in Log Global Options. The headings line up with the column data fields that they describe. The data fields are fixed length, and can be separated by a blank or comma depending on the delimiter character set in Log Global Options.

The extract contains similar information to the Transaction Transit Log report, but includes additional information and is in a format suitable for import into Db2 or a PC reporting tool.

Each data row represents a single transaction, and details its execution statistics.

The following table shows the record format of the extract file.

Table 2. Extract file record layout: Transaction (MSGQ) Transit Traffic

Field description	Column heading	Field length (bytes)
Transaction Code or PSB Name	Trancode	8
PSB Name	Program	8
Transaction type	T	1
Queue type	Q	1
Input LTERM	InLTERM	8
Output LTERM	OutLTERM	8
Input VTAM Node name	Nodename	8

Table 2. Extract file record layout: Transaction (MSGQ) Transit Traffic (continued)

Field description	Column heading	Field length (bytes)
User ID	Userid	8
Originating IMS ID	Org	4
Processing IMS ID	Proc	4
Region PST ID	PST	3
Message Class	Cls	3
Priority	Pri	3
Input Queue Elapsed time (<i>microseconds</i>)	InQTime	11
Processing Elapsed time (<i>microseconds</i>)	ProcTime	11
Output Queue Elapsed time (<i>microseconds</i>)	OutQTime	11
Total Elapsed time (<i>microseconds</i>)	TotalTime	11
CPU time (<i>microseconds</i>)	CPU	11
DB calls	DBCall	7
DC calls	DCCall	7
DB waits	DBWait	7
Shared Queue Input time (<i>microseconds</i>)	ShrInQTime	11
Shared Queue Output time (<i>microseconds</i>)	ShrOutQTime	11
Input Message Arrival date (YYYY-MM-DD)	InQDate	10
Input Message Arrival time (HH.MM.SS.THMIJU)	InQTOD	15
Processing Start time	ProcStartTOD	15
Processing End time	ProcEndTOD	15
Output Sent time	OutSentTOD	15
Region PST ID	PST	4

Transaction History File

The IMS Transaction History File is used to collect historical performance data, useful for long-term trend analysis and capacity planning. Information is summarized for each transaction code over a short time interval, including transaction transit, response and CPU times, as well as DLI call statistics. Data is provided in a format suitable for loading directly into Db2, from where you can run queries or produce reports.

Log records: The history records are derived from the following log input records: 01, 03, 06, 07, 08, 31, 32, 33, 34, 35, 38, 40, and 72.

Options

To specify the history file options, select **Transaction History File** from the Transaction Transit Reports in a Log Report Set.

A report interval can be specified. This applies to the reduced data file after the Global (or Run-time) report interval is applied.

You can specify Selection Criteria to include or exclude data from the report based on Transaction Code.

The Recap report output is written to the data set specified by the Report Output DDname. The default is **TRANHIST**.

The time interval specifies the interval over which you want the transaction activity summarized. By default, the data is accumulated in 15 minute intervals.

New files take their default allocation details from the Reporting Allocation Settings in your Profile Options. By default, data is appended to the end of an existing file. The default DDname for the history file is **IPITHIST**.

Content: Transaction History File

The following figure shows the format of the Transaction History File records. The record layout is defined by the assembler macro IPITRHR in the SIPIMAC library.

TRHRSTRT DS	0D	.Start of Transaction History record
* TRHRDATE DS	CL10	.Date='yyyy-mm-dd' POSITION=01 DATE EXTERNAL(10)
DS	CL1'-'	.Hyphen
TRHRTIME DS	CL8	.Time='hh.mm.ss' =12 TIME EXTERNAL(8)
TRHRPRID DS	CL4	.Processing IMS Subsystem ID =20 CHAR(4)
TRHRTRAN DS	CL8	.Transaction Code =24 CHAR(8)
* *		.End of Key
* *		.Queue time Totals in microseconds:
TRHRTRA# DS	XL8	.Transaction count - POSITION=32 FLOAT
TRHRRSP# DS	XL8	.Response count- POSITION=40 FLOAT
TRHRTINQ DS	XL8	.Input queue elapsed time POSITION=48
TRHRTPRO DS	XL8	.Processing elapsed time =56
TRHRTOUT DS	XL8	.Output queue elapsed time =64
TRHRTTOT DS	XL8	.Total elapsed time - =72
* TRHRTRSP DS	XL8	.Total=Input+Processing+Output .End-User Response time - =80
* *		.Queue time Sums-of-Squares:
TRHR2INQ DS	XL8	.Input queue elapsed time POSITION=88
TRHR2PRO DS	XL8	.Processing elapsed time =96
TRHR2OUT DS	XL8	.Output queue elapsed time =104
TRHR2TOT DS	XL8	.Total elapsed time =112
TRHR2RSP DS	XL8	.End-User Response time =120
* *		.Start of 07 Application End statistics:
TRHRDLI# DS	XL8	.Transaction count with DLI stats - =128
TRHRCPUT DS	XL8	.CPU time in microseconds POSITION=136
* TRHRDBCL DS	XL8	.DLI call statistics totals .DB Calls POSITION=144
TRHRDCCL DS	XL8	.DC Calls =152
TRHRDBWT DS	XL8	.DB Waits =160

Figure 22. IMS Performance Analyzer Transaction History File record layout

All numerical fields are in Floating Point format.

The fields are:

Record Key

The 31 byte record key is made up of the following fields:

TRHRDATE

Date in the format yyyy-mm-dd. Character format, length 10.

-

Hyphen to delineate date and time.

TRHRTIME

Time in the format hh.mm.ss. Character format, length 8.

TRHRPRID

Processing IMS Subsystem ID. Character format, length 4.

TRHRTRAN

Transaction Code. Character format, length 8.

TRHRTRA#

Transaction count. The number of times this Transaction Code was processed by an IMS region.
FLOAT format, length 8.

TRHRRSP#

Response count. The number of times this Transaction Code was the originating Transaction in a UOW and a response was sent back to the originating LTERM, either by this Trancode or a Program Switch.

Use TRHRRSP# (not TRHRTRA#) when calculating End-User Response time averages.



Warning: TRHRRSP# may be zero.

Queue times

Queue time totals are in microseconds:

TRHRTINQ

Input queue elapsed time.

TRHRTPRO

Processing elapsed time.

TRHRTOUT

Output queue elapsed time.

TRHRTTOT

Total elapsed time. This is the sum of Input + Processing + Output.

TRHRRSP

End-user response time. This is the elapsed time from when the originating transaction input message was enqueued to when the transaction (or a program switch) responded back to the originating LTERM.

Applicable only if TRHRRSP# is greater than zero.

Queue time Sums-of-Squares

Used to calculate Peak Percentile estimates.

TRHR2INQ

Input queue elapsed time.

TRHR2PRO

Processing elapsed time.

TRHR2OUT

Output queue elapsed time.

TRHR2TOT

Total elapsed time.

TRHR2RSP

End-user response time.

Start of 07 Application End statistics

The 07 Application End Statistics are:

TRHRDLI#

Transaction count with DLI statistics.

Use TRHRDLI# (not TRHRTRA#) when calculating DLI statistics and CPU time averages. DLI statistics and CPU time are obtained from the Application End type 07 log record.

Sometimes the type 07 record is not cut until well after the transaction ends, especially for WFI and pseudo-WFI processing. If IMS Performance Analyzer flushes a completed transaction

without the associated 07 record being processed, then the DLI statistics and CPU time are not available.

When statistics are available, both TRHRDLI# and TRHRTRA# are incremented by 1. When statistics are not available, only TRHRTRA# is incremented by 1.



Warning: TRHRDLI# may be zero.

TRHRCPUT

CPU time in microseconds.

DLI call statistics totals

The DLI call statistics totals are:

TRHRDBCL

DB Calls.

TRHRDCCL

DC Calls.

TRHRDBWT

DB Waits.

Content: Recap report

The following figure shows an example of the Recap report produced at the end of Transaction History File processing.

The Transaction History File was requested by a command such as the following:

```
IMSPALOG      TRANHIST(  
              DDNAME(TRANHIST),  
              INTERVAL(00:15:00))  
IMSPALOG      EXECUTE
```

IMS Performance Analyzer		Page	1
<u>Transaction History</u>			
History Data Set:	JCH.TRANSACTION.HIST0001		
Record Count :	290		
Start :	2023-04-04-05.45.00		
End :	2023-04-05-00.00.00		
Interval :	00:15:00		

Figure 23. IMS Performance Analyzer Transaction History File: Recap report

Chapter 9. Resource Usage and Availability reports

IMS PA presents detailed and summary information for analysis of the usage and availability of various IMS resources.

The resources include:

- Regions
- Transactions
- Programs
- Lines
- VTAM nodes
- Message queues
- Databases
- Buffer pools

Dashboard report

The IMS Dashboard report provides a quick overview of critical system performance indicators, including transaction throughput and IMS system resources. Use this IMS Performance Analyzer report to highlight potential performance problems quickly, providing a springboard to other reports that provide more detailed information.

Log records: The report is derived from IMS log records 01, 03, 06, 07, 08, 0A, 11, 31, 32, 33, 34, 35, 38, 40, 45, 5901, 5903, 5911, 5916, 5936, 5937, 5938, and 72.

Options

To specify the report options, select the Resource Usage and Availability **Dashboard** report in a Log Report Set.

The report output is written to the data set specified by the Report Output DDname. The default is DASH.

There are no other report-specific options. A report interval can be specified only at run-time to override the Global. Selection Criteria are not applicable to this report.

Content

The Dashboard report provides a comprehensive health check of your IMS systems.

The Dashboard report consolidates summarized information from the following reports:

- Management Exception report, for MPP transaction response time information
- Fast Path Transit Analysis, for IFP transaction response time information
- Internal Resource Usage report, for Message Queue and OSAM/VSAM Buffer statistics

The Dashboard report contains four sub-reports:

1. Transaction Processing Analysis
2. Message Queue Pool Statistics
3. OSAM Buffer Pool Statistics
4. VSAM Buffer Pool Statistics

Transaction Processing Analysis report

The Transaction Processing Analysis report in the IMS Performance Analyzer Dashboard report provides summary statistics of transaction transit time by each type of region.

IMS Performance Analyzer Dashboard					
(HHMM.MM.SS)		Start : 02Jan2018 10:05:41:84		End : 08Feb2018 13:18:14:61	Interval : 891.12.32
-- Transaction Summary --	*****	Average	Elapsed	Time (msec)	*****
Type	Count	Input	Process	Output	Total
MPP	1288	9	240	0	249
STD	882	5	98	0	103
OTMA	264	25	835	0	861
MSC	142	1	17	0	17
MSC Send	142	0	18	0	18
BMP	6	0	16,037	0	16,037
STD	6	0	16,037	0	16,037
JBP	2	0	605	0	605
STD	2	0	605	0	605
IFP	105	0	6	0	7

Figure 24. Dashboard report: transaction transit time

The report fields are:

Type

The region types are:

MPP

All transactions processed by MPP regions.

JMP

All transactions processed by JMP regions.

BMP

All transactions processed by BMP regions.

JBP

All transactions processed by JBP regions.

MSC Send

MSC transactions sent to a remote system for processing.

IFP

All transactions processed by IFP regions.

DBCTL

All transactions processed by DBCTL regions.

ODBM

Transactions processed by Open Database regions.

Unknown

Transactions processed, but IMS Performance Analyzer was not able to determine the region type.

For region types MPP, JMP, BMP, and JBP, there are the following sub-types:

OTMA

Open Transaction Manager Access (OTMA) transactions.

APPC

Implicit Advanced Program-to-Program Communication (APPC) transactions.

MSC

Multiple Systems Coupling (MSC) transactions.

CPI-C

Explicit Common Programming Interface - Communications (CPI-C) APPC transactions.

STD

Transactions that do not fit into any of the previous categories, such as transactions whose input source is VTAM.

Count

Number of transactions processed by that type of region.

Average Elapsed Time (msec)

The values are elapsed time average per transaction with millisecond precision. The Transaction Transit Time data fields are:

Input

Input Queue time. If this is large, you could investigate the problem further by running the Transaction Exception report to look for any MPP transactions with very large input queue times that may skew the system-wide average. See [“Transaction Exception report and extract” on page 79.](#)

Process

Transaction Processing time.

Output

Output Queue time.

Total

Total Transit time.

Message Queue Pool Statistics report

The Message Queue Pool Statistics report in the IMS Performance Analyzer Dashboard report provides summary statistics of Message Queue Pool activity.

System IMS	Start : 27Aug2021 00.09.00.07	End : 27Aug2021 23.59.00.06	Interval : 23.50.00 (HHMM.MM.SS)
----- Message Queue Pool Statistics -----			
Locates:	1,229,640	Reads : 260	IWAITs : 200
In Pool:	1,229,380	Writes: 1,899	I/O Errors: 0

Figure 25. Dashboard report: Message Queue Pool statistics

The Message Queue Pool statistics are:

Locates

Number of locate requests to the Message Queue Pool, calculated as:

Locate requests (STQLOC) + Locate and Alter requests (STQLAC)

In Pool

Number of locate requests satisfied in the pool, calculated as:

Locate requests (STQLOC) + Locate and Alter requests (STQLAC) - Reads (STQREAD) - Write (Total) (STQWRIT) + Writes for Purge (STQBFP)

Reads

Number of Read requests to the Message Queue data sets, calculated as:

Reads (STQREAD)

Writes

Number of Write requests to the Message Queue data sets, calculated as:

Write (Total) (STQWRIT)

IWAITs

Number of IWAITs, calculated as:

Waits for Purge Complete (STQPRWT) + Waits for Buffer (STQBUFWT) + Other DECB to Read Buffer (STQWTIN) + Other DECB to Write Buffer (STQWTOUT) + Conflicting ENQ-DEQ (STQWTQ)

I/O Errors

Number of I/O errors, calculated as:

Temporary I/O errors not retried (STQIOER)

OSAM Buffer Pool Statistics report

The OSAM Buffer Pool Statistics report in the IMS Performance Analyzer Dashboard report provides summary statistics of OSAM Buffer Pool activity.

----- OSAM Buffer Pool Statistics -----							
-ID-	Size	Count	Locates	In Pool	Read IO	Write IO	Waits
A1DD	512	4	70,844	70,840	4	0	1
B1DD	1,024	64	1,071	1,059	94	0	2
C1DD	2,048	4	0	0	0	0	0
D1DP	4,096	4	0	0	0	0	0
E2G3	26,624	256	6,244	5,904	851	710	8
F1DD	32,768	4	93,029	93,018	156	149	10

Figure 26. Dashboard report: OSAM Buffer Pool statistics

The OSAM Buffer Pool statistics are:

-ID-

OSAM Buffer Pool ID (STDBPOID)

Size

Buffer size (STDBBSIZ)

Count

Number of Buffers (STDBNBUF)

Locates

Number of Locate calls, calculated as:

Locate calls (STDBLCTR)

In Pool

Number of Locate calls satisfied in the Pool, calculated as:

Locate calls-data in pool (STDBFIPL)

Read IO

Number of Read I/O requests, calculated as:

Read I/O requests (STDBRREQ)

Write IO

Number of Write I/O requests calculated as:

Writes for Buffer Steal (STDBBSTW) + Writes for Purge (STDBPRGW)

WAITS

Number of Waits for Buffers, calculated as:

Waits for Busy ID (STDBWBZI) + Waits for Busy Write (STDBWBZW) + Waits for Busy Read (STDBWBZR) + Waits for Buffer Steal/Purge Owner Release (STDBWRLO) + Waits for Buffer Steal no Buffers (STDBWNOB)

VSAM Buffer Pool Statistics report

The VSAM Buffer Pool Statistics report in the IMS Performance Analyzer Dashboard report provides summary statistics of VSAM Buffer Pool activity.

----- VSAM Buffer Pool Statistics -----								
-ID-	Size	Count	Retrieves	Updates	VSAM Calls	In Pool	Read IO	Write IO
DFLT/D	512	256	0	0	890	142	83	5
DFLT/D	1,024	450	412	20	1,338	560	30	26
DFLT/D	2,048	600	0	0	890	995	117	105
DFLT/D	4,096	800	6	1,315	2,211	4,171	3,978	7,630
DFLT/D	8,192	50	32	12	948	52	14	16
DFLT/D	32,768	8	0	0	890	0	0	0

Figure 27. Dashboard report: VSAM Buffer Pool statistics

The VSAM Buffer Pool statistics are:

-ID-

Shared resource pool ID (STVBPOID), followed by the pool type (STVBPTY)

Size

Buffer size (STVBBSIZ)

Count

Number of Buffers (STVBNBUF)

Retrieves

Number of Retrieve calls, calculated as:

Retrieve by RBA (STVBRRBA) + Retrieve by Key (STVBRKEY)

Updates

Number of Update calls, calculated as:

Logical records ISRTS/ESDS (STVBEIST) + Logical records ISRTS/KSDS (STVBKIST) + Logical records altered in subpool (STVBBALT)

VSAM Calls

Number of calls to VSAM, calculated as:

Background writes (STVBBGWR) + Sync calls (STVBSYNP) + VSAM GET calls (STVBVSMG) + VSAM search buffers calls (STVBSCHB)

In Pool

Number of VSAM calls satisfied in the Pool, calculated as:

Times VSAM found CI in pool (STVBVSMF)

Read IO

Number of Read I/O requests calculated as:

Reads from DASD (STVBVSMR)

Write IO

Number of Write I/O requests, calculated as:

Writes initiated by IMS (STVBUSRW) + Writes initiated by VSAM (STVBVSMW)

Management Exception report

The IMS Management Exception report shows whether critical values are within specified limits, and it gives summary values of indicative information. Use this IMS Performance Analyzer report to measure today's transaction performance against agreed benchmarks, such as service level agreements and benchmark averages. Then, when a problem occurs, you can go to other IMS Performance Analyzer reports for additional, more detailed information.

Service level agreements are determined by Expectation Sets, where you set the response time thresholds for individual transactions or groups of transactions.

Benchmark averages are calculated against an Averages data set, where you save the transaction performance information from an IMS log file where acceptable transaction performance was observed.

Log records: This report is derived from IMS log records 01, 03, 06, 07, 08, 0A, 10, 24, 31, 32, 33, 34, 35, 38, 39, 40, 67.

Uses

Management Exception reporting of an IMS log file produces a report showing transaction response time and resource usage information. The report also highlights any transaction response time higher or lower than the benchmark Expectation or Average thresholds.

Management Exception reporting also optionally produces an Averages data set containing transaction response time information. A new averages data set can be used to reflect benchmarks from this run only, whereas an existing Averages data set can accumulate a rolling average with previous runs to assist with historical trend analysis and capacity planning.

The Management Exception report alerts managers to those situations needing attention. The information in the report provides clues to other IMS Performance Analyzer reports that can supply additional information.

For example:

- If input queue time, processing time, or output queue time are outside typical boundaries, you may want to look at the group of transaction transit time reports for more detail.
- If the CPU time is outside typical boundaries, the CPU Usage report can provide more information.
- Excessive database calls or waits can be investigated in the Database Update Activity report, the Internal Resource Usage reports, and the Database Trace.
- Excessive data communication calls suggest that you should look at the Message Queue Utilization report, Internal Resource Usage reports, or DC Queue Manager Trace.

Other management-style reports include [“Transaction Exception report and extract” on page 79](#), [“Transaction History File” on page 89](#), and [“Transaction Transit Extract by Interval” on page 75](#).

Options

To specify the report options, select the Resource Usage and Availability **Management Exception** report in a Log Report Set.

The following options can be specified:

- A Transaction Code Object List can be used to name specific transaction codes to be included in or excluded from the report. For example, the sample report (see [Figure 28 on page 100](#)) was produced by specifying a Transaction Code Object List which contained the transaction codes DSFFHR2L DSFFHR2M DSFFHR2N DSFFHR2O DSFFHR2P DSFFIT2A DSFFIT2B DSFFIT2C DSFFIT2D DSFFIT2E DSFFIT2F. All excluded transactions, by default, are grouped into a category identified by *OTHERS* in the **Trancode** column. Averages are produced for each of the report's selected transaction codes.

Optionally, you can request to exclude *OTHERS* from the report. In this case, transaction codes that are excluded by the selection criteria are not reported, and not included in the report subtotals and totals.

- Print all transactions, or only those outside specified boundaries.
- Print the input Averages Data Set.
- The number of queues used in processing the Management Exception report. Varying the number of queues may improve performance when you are doing high-volume processing.

- Omit messages from the processing queue after a specified *nnn* minutes (deletion occurs at checkpoint record processing). This may improve performance when transactions are held on IMS message queues for a long time.
- A report interval can be specified. This applies to the reduced data file after the Global (or Run-time) report interval is effected.
- The data set to contain the report output is specified by the Report Output DDname option.

Two types of auxiliary data sets can be used with the Management Exception report:

- The Expectation Set contains user-supplied **expected values** for comparison with the values that are to be gathered.
- The input Averages Data Set contains the accumulated **totals** and **averages** for information gathered in previous Management Exception report runs. The output Averages Data Set contains the accumulated **totals** and **averages** resulting from this Management Exception report run.

Content

The Management Exception report can have two parts:

- Management Exception Summary, which contains system summary information on an exception basis.
- Error Conditions log, which is produced if certain types of errors are detected.

You can also obtain a print of the input Averages Data Set in the format of the Management Exception Summary report, showing only the **Average** line for each transaction code in the Averages Data Set. This print is produced independently of the input log data set; no log records are processed.

Management Exception Summary report

This is an example of the Management Exception Summary report.

The report is ordered alphabetically by transaction code. For each transaction code, the following information is reported:

- Total transaction count
- Averages (per transaction) of:
 - Total time
 - Input queue time
 - Processing time
 - Output queue time
 - Approximate number of database calls
 - Approximate number of data communication calls
 - Approximate number of database waits (wait for PI enqueue)
 - CPU time
- Transactions per minute

Times are reported in seconds and milliseconds (**Sc.mil**).

If an Expectation Set or an Input Averages Data Set or both are present, a test is made to see if each of the averages for each transaction in the current run is within the user-defined expectations for that transaction. If all current averages for a transaction are within both sets of limits, the transaction will not be listed on the report. If any of the averages for the transaction are outside either of the two corresponding sets of limits, the report will contain a line item for the transaction, and the out-of-bounds averages will be reported. An average or expectation of zero is considered a nonexistent value, and no boundary test is made in such cases.

If neither the input Averages Data Set nor Expectation Set is specified, all averages for all transactions are produced and the report is no longer an *exception* report. This would be the case on your first run of the Management Exception report.

Start 27May2023 15.51.04.65				IMS Performance Analyzer Management Exception Summary					End 27May2023 15.51.23.04				Page	1
Trancode	Source of Information	Transact Count	Total Sc.mil	Input Q Sc.mil	Process Sc.mil	Output Q Sc.mil	DB Calls	DC Calls	DB Waits	CPU Time Sc.mil	Transact Per Min			
OTHERS	This Run	913	202	13	188					52	2,980.2			
	Expectation		150	5	120					50	2.0			
DSFFHR2L	This Run	7	131		128						22.8			
	Average	7	109		106						.0			
	Expectation				120						2.0			
DSFFHR2M	This Run	3	146	13	131				.0		9.8			
	Average	3	121		109				1.0		.0			
	Expectation			5	120						2.0			
DSFFHR2N	This Run	3			140						9.8			
	Average	3									.0			
	Expectation				120						2.0			
...														
DSFFIT2E	This Run	3	223	29	193		34.0		.0		9.8			
	Average	3	185						10.0		.0			
	Expectation		150	5	120		30.0				2.0			
DSFFIT2F	This Run	6	109	3	105		34.0			44	19.6			
	Average	6	91	4	87					103	.0			
	Expectation		120				30.0				2.0			
SYSTEM	This Run	50	130	6	122	1	20.8	3.6	.0	33	163.2			
	Average	50	108								.0			
	Expectation			5	120						2.0			

Figure 28. Management Exception report: Summary

Two characteristics of the report should be noted:

- The total transaction count (**Transact Count**) on the **Average** line is the total number of occurrences in the Averages Data Set for that transaction and is used for computing the averages for previous runs; it does not include the transaction occurrences for the current run.
- The **Transact Count** on the **This Run** line is not the same as the **Number of Responses** in the Transaction Transit Analysis report. **Number of Responses** is the number of completed transit sets. **Transact Count** is the number of transactions processed. If there is a program switch, two transactions may have to be processed to complete one transit set.

The report provides the following information:

Trancode

Transaction Code.

Two entries in the Trancode column have special meaning:

OTHERS

The accumulated values for all transaction codes excluded from the report. When you filter on TRANCODE, one report line with a Trancode of *OTHERS* is reported, accumulating the transactions that did not match the TRANCODE filter.

SYSTEM

The accumulated values for all transaction codes reported.

If you want to exclude *OTHERS* from the report (and as a consequence, from the final *SYSTEM* total), specify the NOOTHERS operand. For example:

```
IMSPALOG MGREX(NOOTHERS, ...
```

Source of Information

The source of information that caused the report line to be printed:

This Run

The values reported are averages for the transactions that ran in the log input file.

Average

The values reported are the threshold values defined in the Expectation Set and Averages data set. Only exceptions to the thresholds are reported.

The Expectation Set defines thresholds for this Transaction Code based on a base Average. If any transaction statistical value exceeds the average value saved in the Averages data set by more than nn%, then an exception is reported. This is a useful method to verify that transaction response time is not exceeding a benchmark set of average values. For example, you can create an Averages data set for a log file where transaction response time is acceptable. Then each subsequent run against future log files can verify their results against the saved averages. For example, verify that they are not exceeded by more than 10%.

Expectation

The values reported are the threshold values defined in the Expectation Set. Only exceptions to the thresholds are reported.

The Expectation Set defines thresholds for this Transaction Code. If any transaction statistical value exceeds the value specified in the Expectation Set, then an exception is reported. This is a useful method to verify that transaction response time is not exceeding required service level goals.

Transact Count

The total number of transactions run.

The Transact Count on the This Run line is not the same as the Number of Responses in the Transaction Transit Analysis report. Transact Count is the number of transactions processed. Number of Responses is the number of completed transit sets. For example, if there is a program switch, two transactions (Transact) may have to be processed to complete one transit set (Response).

The transaction count on the Average line is the total number of occurrences in the Averages Data Set for that transaction and is used for computing the averages for previous runs; it does not include the transaction occurrences for the current run.

Total

The average total elapsed time (milliseconds).

Input Q

The average input queue elapsed time (milliseconds).

For shared queue transactions, this is the sum of input queue times on the front and back-end systems.

Process

The average processing elapsed time (milliseconds).

Output Q

The average output queue elapsed time (milliseconds).

For shared queue transactions, this is the sum of output queue times on the back and front-end systems.

DB Calls

The average number of DB calls per transaction.

DC Calls

The average number of DC calls per transaction.

DB Waits

The average number of DB waits per transaction.

CPU Time

The average CPU time (milliseconds) per transaction.

The averages for the DB, DC, and CPU statistics are approximations derived from the 07 (application schedule end) IMS log record. The totals from the 07 record are distributed *equally* among the transactions within a scheduling (regardless of their processing elapsed time).

Transact per Min

The transaction processing rate per minute.

Error Conditions Log

This is an example of the Error Conditions log.

Start 27May2023 10.00.00.00												IMS Performance Analyzer Error Conditions				Page 1	
Time	IMS	Error	Line/DBD	PTerm/DS	Volser	Cyl	Trk	Rec	RBA	Program	TC/UID	1st Log Rec	Last Log Rec				
10.19.27.40	IMM1		100	SGA10016							ETUU8501	925,185					
10.22.58.60	IMM3		100	R131015B							RGES	952,160					
Cod Error Text																	
100 User Exit Security Violation																	

Figure 29. Management Exception report: Error Conditions log

The report provides the following information:

Time

The time of the record logging the error.

IMS

The IMS subsystem ID.

Volser

Volume serial number. For Program Abend or Backout Failure exception events, this column can also be Userid. In this case, the column heading is changed to **VI/UID**.

1st Log Rec

The sequence number in decimal format of the first (or only) record logging the error. The log sequence number can be used as the value of the NEGOF option to print the record with IMS utility DFSERA10.

Five types of error conditions are optionally reported:

- Program Abends
- Security Violations
- Backout Failures
- Database I/O Errors (VSAM only)
- Snap Trace

Program Abends

Program abends are reported from the 07, 67FD, and 67FF type log records.

The first and last log sequence numbers of the type 67 records, containing the snap dump of the region having the error, are reported. The 67FD and 67FF records can be formatted using the DFSERA30 exit to DFSERA10 or IBM IMS Problem Investigator for z/OS. Certain pseudo-abends do not produce a 67 record. In this case, the time and log sequence number are from the 07 record and the number of the last sequence number is reported.

The **Program** and **Trancode** columns show the abending program and transaction code.

The **Error** column shows the type of abend and completion code.

- For an IMS user abend, the first four characters identify the type of abend, followed by the 4-digit completion code. The abend types are:

ABND

Region-Abend Condition

BACK

Backout Snap

DUMP

Exceptional Status Code - Dump Request

ESSD

ESAF (External Subsystem) Deadlock

PSAB

Pseudo-Abend Condition

SNAP

External/Internal Snap

- For an MVS system abend, the first five characters are SYSAB, followed by the 3-digit completion code.

Security Violations

Security violations are reported from the type 10 log records.

The problem code appears in the **Error** column and is described under **Code Error Text** at the bottom of the Error Conditions log. If a problem code is not in the following list, the following message appears in place of a description:

```
XXX All other codes unknown
```

and a snap of the type 10 log record is written to IPIDIAGS under the error message:

```
IPI0042E Unknown reason code in type 10 record
```

Unknown error codes are SCERROR codes not defined in the IMS DFSLOG10 macro. They can result from unsupported return codes or ABENDs from RACF® security exits.

The problem code can be one of the following:

```

0  User rejected by DFSCCMD0
4  User not defined to RACF
8  Password not defined to User
12 Password Expired
16 New Password invalid
20 Group not defined to User
24 RACF Exit rejected /SIGN ON
28 User's access revoked
32 RACF not active
36 Access to group revoked
40 OID Card not supplied
44 OID Card invalid
48 Not authorized to TERM by RACF
52 Not authorized to APPL by RACF
56 RACF Reason Code 56
60 RACF Reason Code 60
62 Req Password not present
64 RACF Reason Code 64
66 Invalid Password entered
67 Terminal Security Violation
68 Command Security Violation
72 RACF Reason Code 72
76 RACF Reason Code 76
80 Terminal in conversation
84 Terminal held in conversation
88 Terminal in Present Mode
92 Terminal in Response Mode
96 Term not authorized to Conv
100 User Exit Security Violation
104 RACF Reason Code 104
108 RACF Reason Code 108
112 RACF Reason Code 112
116 RACF Reason Code 116
120 RACF Reason Code 120
124 RACF Reason Code 124
128 Syntax error in SIGN command

```

```

132 RACF System error
136 ICMD Userid not defined to RACF
140 ICMD Userid not auth to command
144 ICMD rejected by DFSCCMD0
148 ICMD failed, DFSCCMD0 unavail
149 MCS Userid not defined to RACF
150 MCS Userid not auth to command
151 MCS Cmd rejected by DFSCCMD0
152 MCS Cmd failed, DFSCCMD0 unavail
160 CMD Userid not defined to RACF
161 CMD Userid not auth to command
162 CMD rejected by DFSCCMD0
163 CMD failed, DFSCCMD0 unavail
432 RACF ABEND suppressed
171 OM Userid not defined to RACF
172 OM Userid not auth to command
173 OM Cmd rejected by DFSCCMD0
174 OM Cmd failed, DFSCCMD0 unavail
65535 Rejected by default command

```

The time and sequence number of the type 10 log record appear in the **Time** and **1st Log Rec** columns respectively. Where applicable, the following also appear:

- Line number or VTAM node name in the **Line** column
- PTERM number in the **Pterm** column
- Transaction code or userid in the **TC/UID** column

Backout Failures

Backout failures are reported from the 07 record. The time and sequence number of the record and the program name and transaction code are reported.

Database I/O Errors (VSAM Only)

Database errors are reported from the 24 type record and apply only to VSAM.

The reason code appearing in the **Error** column can be one of the following:

READ

Read operation

WRITE

Write operation

UNKNOWN

Cannot be determined

If the reason cannot be determined, a snap of the 24 log record is written to IPIDIAGS under the error message:

```
IPI0043E Unknown error code in type 24 record
```

The following information also appears:

- Database name in the **DBD** column
- Volume serial number in the **Volser** column
- Disk address (cylinder, track, record) in the **Cyl Trk Rec** column
- RBA in the **RBA** column

Snap Trace

IMS internal errors are reported.

Transaction Resource Usage report

The IMS Transaction Resource Usage report provides a comprehensive overview of transaction resource usage. The resources reported on by IMS Performance Analyzer include scheduling statistics (including WFI), CPU usage, DL/I call statistics, enqueue statistics, and DBCTL DB and I/O usage.

Log records: The reports are derived from IMS log record 07 (Application Terminate Accounting).

Options

To specify the report options, select **Transaction Resource Usage** from the **Resource Usage & Availability Reports** category in a Log Report Set.

You can request any of the following reports:

- List report detailing individual transaction resource usage.
- Summary report providing totals of all transaction statistics for each region type and for each transaction by region type. This is the default.
- DL/I Calls Summary report providing transaction averages of DB Calls, DC Calls and CPU per transaction message.

For the first two reports (List and Summary), you can optionally include any combination of the following:

- DB Calls
- DC Calls
- Other DLI Calls
- ENQ/DEQ Counts

A report interval can be specified. This applies to the reduced data file after the Global (or Run-time) report interval is effected.

Note: Since the type 07 Application Terminate Accounting log record does not contain the schedule start time, the record time stamp is used for record selection. Therefore all time references in the report relate to the 07 record time stamp rather than transaction start and end times.

The report output is written to the data sets specified by the Report Output DDname for each report. The default is TRANRESU for all three reports.

You can specify Selection Criteria to include or exclude from the report particular values for the following:

- Region ID (PST Number or Region Jobname)
- Transaction Code
- Program (PSB)
- IMS Subsystem ID

The following region types are supported:

MPP

Message Processing Program.

Transactions may run in this region type without being rescheduled. These transactions are known as quick restart transactions. The Transaction Resource Usage report does not include quick restart statistics in MPP region reports, but reports on them separately under a region type of "Quick".

BMP

Batch Message Processing.

DBCTL

Database Control.

CPI-C

Common Programming Interface for Communications (APPC).

JMP

Java message processing region

JBP

Java batch processing region

Transaction Resource Usage List report

This is an example of the Transaction Resource Usage List report. The report lists statistics for each selected transaction using the IMS Transaction Terminate Accounting Log Record (type 07).

It is similar in format to the Long Summary report with the exclusion of averages. The report provides additional transaction information such as Program name and Completion Codes.

This report is used to review the performance of individual transactions.

IMS Performance Analyzer													
IMS Transaction Resource Usage - List													
Tran Code: VJMPNP		CPU :	40	Msg Count:	1	Time: 10/04/2023	23:02:03:18	CC: U0777		DLOCK			
Program : VJMPANP		Pty:	8	PST :	18	Jobname: M61CND03	Type: MPP	System: I61C					
* DB Call *	GU	GN	GNP	GHU	GHN	GHNP	ISRT	DLET	REPL	DEQ	Total		
	1	44	0	0	0	0	0	0	0	0	45		
* DC Call *	GU	GN	ISRT	PURG	Total								
	1	0	0	0	1								
Other DLI	CMD	GCMD	CHNG	AUTH	SET0	APSB	DPSB	GMSG	ICMD	RCMD			
	0	0	0	0	0	0	0	0	0	0			
	CHKP	XRST	ROLB	ROLS	SETS	SETU	INIT	INQY	LOG	Total			
	0	0	0	0	0	0	0	1	0	1			
* ENQ/DEQ *	*****	Test *****	*****	Queue Command *****	*****	*****	Update *****	*****	*****	Exclusive *****	*****		
	ENQ Cnt	ENQ Wts	DEQ Cnt	ENQ Cnt	ENQ Wts	DEQ Cnt	ENQ Cnt	ENQ Wts	DEQ Cnt	ENQ Cnt	ENQ Wts	DEQ Cnt	Total
	0	0	0	0	0	0	0	0	0	1	0	1	2
=====													

Figure 30. Transaction Resource Usage report: List (basic)

IMS Performance Analyzer IMS Transaction Resource Usage - List												
Tran Code: ACMA		CPU :	7122	Msg Count:	592	Time: 05/06/2023		01:02:20:86				
Program : ACMP010		Pty:	01	PST :	4	Jobname: IMW1MA1		Type: MPP		System: IMW1		
Wait For SUBQ6/Msg		SUBQ6 Accum										
Input 1165700		17629K										
* DB Call *	GU	GN	GNP	GHU	GHN	GHNP	ISRT	DLET	REPL	DEQ	Total	
	592	0	0	592	0	0	592	0	592	0	2368	
* DC Call *	GU	GN	ISRT	PURG	Total							
	593	0	592	0	1185							
Other DLI	CMD	GCMD	CHNG	AUTH	SET0	APSB	DPSB	GMSG	ICMD	RCMD		
	0	0	592	0	0	0	0	0	0	0		
	CHKP	XRST	ROLB	ROLS	SETS	SETU	INIT	INQY	LOG	Total		
	0	0	0	0	0	0	0	0	0	592		
* ENQ/DEQ *	*****	Test *****	*****	Queue Command *****	*****	*****	Update *****	*****	*****	Exclusive *****	*****	
	ENQ Cnt	ENQ Wts	DEQ Cnt	ENQ Cnt	ENQ Wts	DEQ Cnt	ENQ Cnt	ENQ Wts	DEQ Cnt	ENQ Cnt	ENQ Wts	DEQ Cnt
	0	0	0	0	0	0	0	0	0	592	0	0
	0	0	0	0	0	0	0	0	0	592	0	592

Figure 31. Transaction Resource Usage report: List (with WFI statistics)

IMS Performance Analyzer IMS Transaction Resource Usage - List													
Tran Code:		CPU :	11	Msg Count:	0	Time: 01/08/2023		12:17:50:93					
Program : XN010		PrtY:	40	PST	47	Jobname: CICST		Type: DBCTL	System: DD3ACIC1				
DBCTL	I/O Cnt		I/O Elp		Lock Elp								
	4		166		0								
* DB Call *	GU	GN	GNP	GHU	GHN	GHNP	ISRT	DLET	REPL	DEQ	Total		
	0	0	0	2	0	0	0	0	0	0	2		
* DC Call *	GU	GN	ISRT	PURG	Total								
	0	0	0	0	0								
Other DLI	CMD	GCMD	CHNG	AUTH	SET0	APSB	DPSB	GMSG	ICMD	RCMD			
	0	0	0	0	0	0	0	0	0	0			
	CHKP	XRST	ROLB	ROLS	SETS	SETU	INIT	INQY	LOG	Total			
	0	0	0	0	0	0	0	0	0	0			
* ENQ/DEQ *	*****	Test	*****	*****	Queue Command	*****	*****	Update	*****	*****	Exclusive	*****	
	ENQ Cnt	ENQ Wts	DEQ Cnt	ENQ Cnt	ENQ Wts	DEQ Cnt	ENQ Cnt	ENQ Wts	DEQ Cnt	ENQ Cnt	ENQ Wts	DEQ Cnt	Total
	0	0	0	0	0	0	0	0	0	0	0	0	0

Figure 32. Transaction Resource Usage report: List (with DBCTL statistics)

The Transaction Resource Usage List report is produced in log record sequence.

The report contains the following information:

Tran Code

Transaction Code.

CPU

Transaction CPU time in milliseconds.

Msg Count

Number of messages processed by this Schedule.

Time

Log record date and time.

CC

Transaction System or User completion code and description.

Program

Name of transaction program.

PrtY

Transaction priority in hexadecimal.

PST

Partition Specification Table number.

Jobname

Job Name.

Type

Processing region type: **MPP, Quick** (MPP Quick reschedule), **BMP, DBCTL, CPI-C, Java**.

System

IMS Subsystem ID.

Wait For Input

The WFI statistics are only displayed if they contain non-zero values.

SUBQ6/Msg

SUBQ 6 time in milliseconds for last message in the schedule.

SUBQ6 Accum

Accumulated SUBQ 6 time in milliseconds.

DBCTL

The DBCTL statistics are only displayed if the schedule was for a DBCTL thread.

I/O Cnt

DBCTL I/O count.

I/O Elp

DBCTL I/O elapsed time in milliseconds.

Lock Elp

DBCTL Lock elapsed time in milliseconds.

DB Call

This section is only included if you selected the report option **Include DB Calls**. It gives the count for each type of DB call (**GU, GN, GNP, GHU, GHN, GHNP, ISRT, DLET, REPL, DEQ**) and the **Total** DB calls.

DC Call

This section is only included if you selected the report option **Include DC Calls**. It gives the count for each type of DC call (**GU, GN, ISRT, PURG**) and the **Total** DC calls.

Other DLI

This section is only included if you selected the report option **Include Other DLI Calls**. It gives the count for each type of call and the total DLI calls.

CMD

Number of IMS commands issued.

GCMD

Get command response call count.

CHNG

Change alternate PCB call count.

AUTH

Authorization call count.

SETO

Set Options call count.

APSB

Allocate PSB call count.

DPSB

Deallocate PSB call count.

GMSG

Get message call count.

ICMD

Issue Command call count.

RCMD

Retrieve Command call count.

CHKP

Basic Checkpoint call count.

XRST

Extended Restart call count.

ROLB

Rollback call count.

ROLS

Rollback to SETS/SETU call count.

SETS

Set Backout Point call count.

SETU

Set Backout Point Unconditionally call count.

INIT

Initialize call count.

INQY

Inquiry call count.

LOG

Log call count.

Total

Total DLI calls.

ENQ/DEQ

This section is only included if you selected the report option **Include ENQ/DEQ Counts**.

TEST**ENQ Cnt**

Test Enqueue call count.

ENQ Wts

Number of waits on Test Enqueue calls.

DEQ Cnt

Test Dequeue call count.

Queue Command**ENQ Cnt**

Queue Command Enqueue call count.

ENQ Wts

Number of waits on Queue Command Enqueue calls.

DEQ Cnt

Queue Command Dequeue call count.

Update**ENQ Cnt**

Update Enqueue call count.

ENQ Wts

Number of waits on Update Enqueue calls.

DEQ Cnt

Update Dequeue call count.

Exclusive**ENQ Cnt**

Exclusive Enqueue call count.

ENQ Wts

Number of waits on Exclusive Enqueue calls.

DEQ Cnt

Exclusive Dequeue call count.

Total

Total Enqueue/Dequeue call count.

Transaction Resource Usage Summary report

This example shows the Transaction Resource Usage Summary report. It is a two-part report generated using the IMS transaction terminate accounting record (log code 07). Each part consists of two sections, totals and call group statistics.

IMS Performance Analyzer														
IMS Transaction Resource Usage - Summary														
Report From: 19Mar2023 08:36:48:21					To: 19Mar2023 08:36:57:21			Elapsed=		0 Hrs	0 Mins	9.000.328 Secs		
Tran : Total				*****	DLI	Calls	*****	***	Enqueues	***	* WFI *		***	Schedule
Type : MPP	CPU	Sched	Trans	DB	DC	Other	Count	Wait	Count	SUBQ6	Quick	=0	Distribution	****
Total	17790	1004	696	902	2264	1182	16	0	0	0	0	Sch	393	547 64
/Sched	17	1.0	0.7	0.9	2.3	1.2	0.0	0.0	0.0	0.0	0.0	Tra	0	547 149
/Tran	25	1.4	1.0	1.3	3.3	1.7	0.0	0.0	0.0	0	0	T/S	0	1 2
/Minute	17790	1004.0	696.0	902.0	2264.0	1182.0	16.0	0.0	0.0	0	0.0	S/M	393.0	547.0 64.0
% Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	0.00	0.00	0.00	0.00	%Sc	39.14	54.48 6.37
* DB Call *	GU	GN	GNP	GHU	GHN	GHNP	ISRT	DLET	REPL	DEQ				
Total	574	36	205	25	0	3	31	3	25	0				
/Tran	0.8	0.1	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
% DLI	13.20	0.83	4.71	0.57	0.00	0.07	0.71	0.07	0.57	0.00				
* DC Call *	GU	GN	ISRT	PURG										
Total	1287	182	731	64										
/Tran	1.8	0.3	1.1	0.1										
% DLI	29.60	4.19	16.81	1.47										
Other DLI	CMD	GCMD	CHNG	AUTH	SET0	APSB	DPSB	GMSG	ICMD	RCMD				
Total	0	0	74	0	0	0	0	0	0	0				
/Tran	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
% DLI	0.00	0.00	1.70	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
	CHKP	XRST	ROLB	ROLS	SETS	SETU	INIT	INQY	LOG					
Total	0	0	0	0	0	0	667	362	79					
/Tran	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.5	0.1					
% DLI	0.00	0.00	0.00	0.00	0.00	0.00	15.34	8.33	1.82					
* ENQ/DEQ *	*****	Test	*****	*****	Queue	Command	*****	*****	Update	*****	*****	Exclusive	*****	
	ENQ	ENQ	ENQ	ENQ	ENQ	DEQ	ENQ	ENQ	ENQ	DEQ	ENQ	ENQ	DEQ	
	Count	Waits	Count	Count	Count	Waits	Count	Count	Waits	Count	Count	Waits	Count	
Total	0	0	0	0	0	0	0	0	0	0	16	0	0	
/Tran	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
% DB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.77	0.00	0.00	

Figure 33. Transaction Resource Usage report: Long Summary (with WFI statistics)

IMS Performance Analyzer IMS Transaction Resource Usage - Summary												
Report From: 21Jan2023 11:49:21:67				To: 21Jan2023 13:05:39:18				Elapsed= 1 Hrs 16 Mins 17.503.664 Secs				
Tran : XN010				*****	DLI	Calls	*****	*** Enqueues ***		*****	DBCTL	*****
Type : DBCTL	CPU	Sched	Trans	DB	DC	Other	Count	Wait	I/O Cnt	I/O Elp	Lck Elp	
Total	146	96	0	256	0	0	1	0	15	422	0	
/Sched	1	1.0	0.0	2.7	0.0	0.0	0.0	0.0	0.2	4	0	
/Tran	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0	
/Minute	1	1.3	0.0	3.4	0.0	0.0	0.0	0.0	0.2	5	0	
% Total	100.00	100.00	0.00	100.00	0.00	0.00	100.00	0.00	100.00	100.00	0.00	
* DB Call *	GU	GN	GNP	GHU	GHN	GHNP	ISRT	DLET	REPL	DEQ		
Total	0	0	0	154	0	101	1	0	0	0		
/Tran	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
% DLI	0.00	0.00	0.00	60.16	0.00	39.45	0.39	0.00	0.00	0.00		
* DC Call *	GU	GN	ISRT	PURG								
Total	0	0	0	0								
/Tran	0.0	0.0	0.0	0.0								
% DLI	0.00	0.00	0.00	0.00								
Other DLI	CMD	GCMD	CHNG	AUTH	SETO	APSB	DPSB	GMSG	ICMD	RCMD		
Total	0	0	0	0	0	0	0	0	0	0		
/Tran	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
% DLI	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
	CHKP	XRST	ROLB	ROLS	SETS	SETU	INIT	INQY	LOG			
Total	0	0	0	0	0	0	0	0	0			
/Tran	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
% DLI	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
* ENQ/DEQ *	*****	Test *****	*****	***** Queue	Command *****	*****	*****	Update *****	*****	***** Exclusive	*****	
	ENQ	ENQ	DEQ	ENQ	ENQ	DEQ	ENQ	ENQ	DEQ	ENQ	ENQ	DEQ
	Count	Waits	Count	Count	Waits	Count	Count	Waits	Count	Count	Waits	Count
Total	0	0	0	0	0	0	0	0	0	1	0	0
/Tran	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
% DB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.39	0.00	0.00

Figure 34. Transaction Resource Usage report: Long Summary (with DBCTL statistics)

The first part is a summary of statistics by region type (**MPP, JMP, BMP, JBP, DBCTL, CPI-C**) giving an overall view of region performance.

The second part is identical to the first, but gives a breakdown of the region summary statistics by transaction. For each region type, a summary report is generated for each transaction providing an overall view of transaction performance. The first section of the report provides totals for each call group and overall counts. It gives a total for each statistics field in the 07 records and includes averages per transaction, schedule and minute, as well as percentage of totals. The second section of the report provides detailed statistics for each call group. Each call group statistics are averaged by transaction and as a percentage of DLI or DB calls.

The Long Summary report prints summaries in transaction and region key order. That is, the reports are sorted by transaction code and region type in ascending order. Region summary reports have a transaction code of **Total** and are printed before the individual transaction summary reports.

The report contains the following information:

Report From

Time stamp of the first transaction record.

To

Time stamp of the last transaction record.

Elapsed

The difference between the Report From and To.

Tran

Transaction code, or PSB if the transaction code is blank, or "Total" for the region total report.

Type

Transaction type: **MPP, JMP, BMP, JBP, DBCTL, CPI-C**.

The Summary section columns are:

CPU

CPU time in milliseconds.

Sched

Scheduled transaction count. Note that for an MPP (or JMP) region, this count is MPP (or JMP) schedules only. Quick Reschedules are not included, but are counted separately in the **Quick** column.

Trans

Transaction (messages processed) count.

DLI Calls

DB

Total number of database GU, GN, GNP, GHU, GHN, GHNP, ISRT, DLET, REPL and DEQ calls.

DC

Total number of message queue GU, GN, ISTR, and PURG calls.

Other

Total number of CMD, GCMD, message CHNG, message AUTH, message SETO, APSB, DPSB, GMSG, ICMD, RCMD, CHKP, XRST, ROLB, ROLS, SETS, SETU, INIT, INQY and LOG calls.

Enqueues

Count

Number of Test Enqueues, Queue Commands, Update and Exclusive Enqueues made by each transaction.

Waits

Number of waits on Test Enqueues, Queue Commands, Update and Exclusive Enqueues.

WFI SUBQ6

Wait For Input, accumulated SUBQ 6 time in milliseconds. SUBQ 6 statistics are always printed for MPP and BMP type transactions, whether zero or non-zero.

DBCTL

This section is only displayed if the transactions used a DBCTL thread.

I/O Cnt

DBCTL I/O count.

I/O Elp

DBCTL I/O elapsed time in milliseconds.

Lock Elp

DBCTL Lock elapsed time in milliseconds.

Quick

Quick Reschedule transaction count. Only printed for MPP or JMP regions.

Schedule Distribution

This section is only for MPP/JMP and BMP/JBP regions. These statistics provide a summary schedule transaction distribution for all MPP/JMP and BMP/JBP schedules. MPP/JMP schedules do not include Quick Reschedules belonging to them. Each schedule contains from 0 to n transactions (messages). The number of messages in each schedule determines the distribution category it is added to:

=0

Schedules containing no transactions ("false schedules").

=1

Schedules containing a single transaction.

>1

Schedules containing more than one transaction.

The rows of statistics are:

Sch

Number of schedules for each of the distribution categories.

Tra

Number of transactions for each of the distribution categories. As a result, the value in column =0 will always be zero, and in column =1 will be equal to the number of schedules in the same column.

T/S

Number of Transactions per Schedule for each distribution category. As a result, the value in column =0 will always be zero, and in column =1 will always be 1.

S/M

Average number of schedules per minute for each of the distribution categories.

%Sc

Percentage of each distribution category based on the total number of schedules.

The rows of statistics for the Summary section are:

Total

Total amount of resource used.

/Sched

Amount of resource used per schedule.

/Tran

Amount of resource used per transaction. Omitted for **Quick** as this statistic is not meaningful for Quick Reschedules.

/Minute

Amount of resource used per minute.

%Total

The values in the column above as a percentage of total region values. The percentage of resource used across all regions.

Note:

1. JMP (Java™ message processing region) is similar to MPP (message processing program), and JBP (Java batch processing region) is similar to BMP (batch message processing program). Hence, what is described in this report for MPP can equally be said for JMP, and what is described for BMP can equally be said for JBP.
2. An MPP schedule is defined as the MPP schedule and all its associated Quick Reschedules. For example, an MPP schedule may be a single MPP schedule containing zero or messages, or include a number of Quick Reschedules. A schedule is deemed complete when the Application Terminate Accounting X'07' type DLRMESR (MPP) log record is received.
3. The MPP transaction count is the total number of MPP messages and Quick Reschedule messages, including incomplete schedules. However, when calculating **T/S** values, only transactions for completed MPP schedules are included. That is, if a group of Quick Reschedules does not have a completing MPP schedule, their message count is included in the **Tran** counts, but not in the **T/S** calculation. This is because IMS PA may receive an incomplete set of log records for the schedule that if included in the **T/S** calculation would distort the results.

The following sections are shown only if requested.

DB Section

This section is only included if you selected the report option **Include DB Calls**. It gives the count for each type of DB call (GU, GN, GNP, GHU, GHN, GHNP, ISRT, DLET, REPL, DEQ). For each of these, the report shows:

Totals

Total for each call type.

/Tran

Calls per transaction.

%DLI

Percentage of DB calls across all regions.

DC Section

This section is only included if you selected the report option **Include DC Calls**. It gives the count for each type of DC call (GU, GN, ISRT, PURG) and the total DC calls. For each of these, the report shows:

Totals

Total for each call type.

/Tran

Calls per transaction.

%DLI

Percentage of DB calls across all regions.

Other DLI Section

This section is only included if you selected the report option **Include Other DLI Calls**. It gives the count for each type of call: CMD, GCMD, CHNG, AUTH, SETO, APSB, DPSB, GMSG, ICMD, RCMD, CHKP, XRST, ROLB, ROLS, SETS, SETU, INIT, INQY, LOG. For a description of these counts, see [“Other DLI” on page 108](#). For each of these, the report shows:

Totals

Total for each call type.

/Tran

Calls per transaction.

%DLI

Percentage of DB calls across all regions.

ENQ/DEQ

This section is only included if you selected the report option **Include ENQ/DEQ Counts**. It shows the Test, Queue Command, Update and Exclusive Counts (ENQ Count, ENQ Wait and DEQ Count). Refer to [“Transaction Resource Usage List report” on page 106](#) for the description of these data fields. For each, we have:

Totals

Total for each call type.

/Tran

Calls per transaction.

%DLI

Percentage of DB calls across all regions.

Transaction Resource Usage DL/I Calls Summary report

This is an example of the Transaction Resource Usage DL/I Calls Summary report.

It lists the transaction code, the total number of messages for each transaction, CPU, DB and DC call averages per message for each transaction using the IMS Transaction Terminate Accounting Log Record (type 07). The report also provides a total line that includes the total number of messages for all selected transactions and the average CPU, DB & DC calls per message.

IMS Performance Analyzer IMS Transaction Resource Usage - DL/I Calls															
Report From: 08Dec2023 15:06:29:10				To: 08Dec2023 15:33:45:52				Elapsed= 0 Hrs 27 Mins 16.425.071 Secs							
Trancode	Msg Cnt	CPU	GU	GN	GNP	GHU	GHN	GHNP	ISRT	DLET	REPL	GU	GN	ISRT	PURG
MGM9JHM	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VGGDCIP	25	54	6.2	0.0	0.0	6.0	0.0	0.0	2.0	2.0	1.0	2.0	0.0	1.0	0.0
VGGDCMC	23	118	8.3	0.0	0.0	11.0	0.0	0.0	4.0	3.0	3.0	2.0	0.0	5.0	4.0
VGGDTS1	290	32	4.2	0.0	0.0	2.0	0.0	0.0	1.5	1.5	0.5	2.0	0.0	1.0	0.0
VGGDMLX	26	42	1.0	0.0	0.0	2.0	3.4	0.0	4.4	3.4	0.0	2.0	0.0	0.0	0.0
VGGDPIER	297	8	0.1	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.1	0.0	0.0	0.0
VGGDPSTR	3	14	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0
VGGDRMC	74	43	10.6	0.0	0.0	3.7	0.0	0.0	1.0	1.0	1.7	2.0	0.0	1.0	0.0
VGGDTLOG	56	16	3.7	0.0	0.0	1.5	0.0	0.0	1.5	1.5	0.0	1.5	0.0	1.0	0.0
VGGDTRAK	73	54	5.8	0.1	0.0	5.2	0.0	0.0	1.9	1.0	2.0	2.0	0.0	1.4	0.4
VGG022T1	319	1189	96.0	277.4	1.4	93.4	0.0	0.0	90.6	92.4	1.0	1.1	0.0	1.0	0.0
VGG023T1	156	23	5.6	0.0	0.2	3.6	0.0	0.0	1.4	1.0	1.4	1.0	0.0	1.2	0.2
VGMPNP	9	107	4.3	149.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	3.0
VG0IC01A	18	42	4.1	0.0	0.0	1.0	0.0	0.0	0.0	0.0	1.0	2.0	0.0	1.0	0.0
VG0IT07	3	14	2.0	9.0	0.0	9.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0
VG001WR2	10	1368	11.7	149.7	11.0	3.0	0.0	0.0	0.0	0.0	3.0	2.0	0.0	6.9	3.0
VG002WR2	16	13320	10.6	4013.4	8438.4	3.0	0.0	0.0	0.0	0.0	3.0	1.6	0.0	3.0	3.0
YXCALARM	6	26	5.2	0.0	0.0	2.0	0.0	0.0	1.0	0.0	2.0	1.7	0.0	1.0	1.0
YXCANLD	1	12	1.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0	2.0	0.0	1.0	0.0
YXCANL2	3	75	35.0	34.7	0.0	34.3	0.0	0.0	0.3	0.0	34.3	1.7	0.0	0.3	0.7
YXCAPER	186	19	8.1	0.0	0.0	2.0	0.0	0.0	1.0	1.0	0.4	1.7	0.0	1.0	0.0
YXMPCC1B	4	31	2.7	0.0	1.0	1.0	0.0	0.0	2.2	0.0	1.0	2.0	2.0	0.5	0.2
YXMPNP	13	70	1.7	80.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0
YX0IC01A	5	44	6.8	0.0	0.0	1.0	0.0	0.0	0.0	0.0	1.0	1.6	0.0	1.0	0.0
YX0QCAW2	15	626	34.5	168.9	0.0	3.0	0.0	0.0	0.0	0.0	3.0	1.3	0.0	7.2	1.0
Total	1631	384	22.8	97.6	83.1	20.1	0.1	0.0	18.8	18.8	0.8	1.5	0.0	1.0	0.2

Figure 35. Transaction Resource Usage report: DL/I Calls Summary

The DL/I Calls Summary report is sorted on Trancode in ascending sequence. The report fields are:

Trancode

Transaction code.

Msg Count

Total number of messages (transactions) processed.

CPU

Average CPU time in milliseconds.

DB Calls

The average number of calls for each type of DB call: GU, GN, GNP, GHU, GHN, GHNP, ISRT, DLET, REPL.

DC Calls

The average number of calls for each type of DC call: GU, GN, ISRT, PURG.

Resource Availability report

The IMS Resource Availability report indicates the relative amount of time a specific resource is active, idle, or unavailable. Use this report to get general availability information, a summary of how frequently each resource is used, to plan more efficient scheduling, and to identify when remedial action is required. Resource Availability reports can be generated in IMS Performance Analyzer for any combination of regions, programs (PSBs), transaction codes, databases, or lines or VTAM nodes.

Log records: This report is derived from IMS log records 01, 02, 07, 08, 20, 21, 24, 31, 34, 35, 36, 40, and 67.

Options

To specify the report options, select **Resource Availability** from the Resource Usage and Availability Reports in a Log Report Set.

The report can be requested for any or all of the following resources:

- Region
- Program (PSB)
- Transaction Code

- Database
- Line

By using Object Lists, you can specify that only certain values be included in or excluded from the report for:

- Region IDs (PST number or Message Region Job name)
- Programs (PSBs)
- Transaction Codes
- Databases
- Lines
- VTAM Nodes
- IMS Subsystem IDs

The results for excluded items are dropped completely. There is no "OTHERS" category.

A report interval can be specified. This applies to the reduced data file after the Global (or Run-time) report interval is effected.

The output data set for the report is controlled by specifying the Report Output DDname.

Content

The Resource Availability report shows the relative amount of time each resource is in use (active), idle, or unavailable. The resources are reported by category: regions, programs (PSB), transaction codes, databases, lines (or VTAM nodes).

The IMS Subsystem ID is shown in the heading of all but the Line report as Line availability is only meaningful on a system (sysplex) wide basis.

In the upper left-hand corner of each report is the **Total IMS Up Time**. This is the time from the first time stamp or the first type 40 log record (checkpoint) to the last time stamp or the last IMS checkpoint within the reporting period. The percentages on all reports are obtained by dividing the time for the resource by the Total IMS Up Time.

The meaning of the **In Use** (active), **Idle**, and **Unavailable** columns in the report is based on the resource; the meaning of these times depends on which resource is being examined. The columns are therefore described separately for each resource.

Reason codes can appear in the **Unavailable** column. The format of the reason codes is *reason code (count)*, where count is the number of times that reason code has occurred in the reporting period.

Some resources in a specific resource category may not appear in the report. For example, if a region is started before the start time of the report and is not stopped until after the stop time of the report (or after end-of-file), the region will not appear in the report. This should be acceptable because it is the problem areas within the time span of the report that are of primary interest, and these are reported.

The **Waiting for Input** column contains that part of the In Use time that a program scheduled in a region spends waiting for input, rather than processing a transaction. This appears on the Resource Availability reports for regions, programs, or transaction codes; it is not applicable to databases or lines.

When a Resource Availability report is requested by Line, VTAM node names are reported (instead of line number) for VTAM terminals. The VTAM Node Object List, if specified, is used in this case. If the Line and PTERM numbers are unavailable, question marks will appear instead.

A > symbol to the left of a resource name indicates the resource was still in use at the end of the report period.

Special meanings for transaction codes and program names are as follows:

BLANK

Batch program

UNDEFND*

Not defined in checkpoint records

Note: MSC links are reported in the Resource Availability report as Line/PTERMs. This is because MSC assigns line numbers to each MSC link after the real lines are defined. MSC messages are sent/received against their associated line/PTERM, which is really an MSC Link.

Start 14Jun2023 15.51.04.65			IMS Performance Analyzer						End 14Jun2023 15.51.23.04		
Resource Availability-IMS2											
Total IMS Up Time			18 (hh.mm.ss)								
Region			<-----In Use----->		<-----Idle----->		<--Unavailable-->		<--Waiting for Input-->		
			hh.mm.ss	Pct	hh.mm.ss	Pct	hh.mm.ss	Pct	hh.mm.ss.t	Pct	
>	2	IMP11A1	14	76.8	4	23.3	0	.0	8.8	47.9	
>	3	IMP11B1	15	81.1	3	18.9	0	.0	8.6	46.8	
>	4	IMP11C1	15	79.9	3	20.1	0	.0	8.8	47.9	
>	5	IMP11D1	15	80.9	3	19.1	0	.0	9.0	49.0	
>	6	IMP11E1	15	80.9	3	19.1	0	.0	9.0	49.0	
>	7	IMP11F1	15	81.2	3	18.8	0	.0	9.6	52.2	
>	8	IMP11G1	15	80.2	3	19.8	0	.0	9.1	49.5	
>	9	IMP11H1	15	79.9	3	20.1	0	.0	9.4	51.1	
>	10	IMP11I1	15	81.2	3	18.9	0	.0	10.5	57.1	
>	11	IMP11J1	15	81.1	3	18.9	0	.0	9.9	53.9	
>	12	IMP11K1	15	81.2	3	18.8	0	.0	9.6	52.2	
>	13	IMP11L1	15	80.8	3	19.3	0	.0	9.4	51.1	
>	14	IMP11M1	15	80.8	3	19.2	0	.0	8.5	46.2	
>	15	IMP11N1	15	81.1	3	19.0	0	.0	8.9	48.4	
>	16	IMP11O1	15	80.2	3	19.8	0	.0	9.3	50.6	
>	17	IMP11P1	15	80.9	3	19.2	0	.0	9.7	52.8	
Program			<-----In Use----->		<-----Idle----->		<--Unavailable-->		<--Waiting for Input-->		
			hh.mm.ss	Pct	hh.mm.ss	Pct	hh.mm.ss	Pct	hh.mm.ss.t		
		DFSFE1A	3	17.1	15	82.9	0	.0	1.3		
		DFSFE1B	3	17.0	15	83.0	0	.0	2.4		
		DFSFE1C	3	15.0	16	85.0	0	.0	1.2		
		DFSFE1D	1	5.9	17	94.1	0	.0	0.9		
		DFSFE1E	3	18.9	15	81.1	0	.0	3.1		
		DFSFE1F	3	17.8	15	82.2	0	.0	2.5		
		DFSFE1H	2	11.5	16	88.5	0	.0	1.7		
		DFSFE1I	2	9.9	17	90.1	0	.0	1.4		
		DFSFE1J	2	10.5	16	89.5	0	.0	1.9		
>		DFSFE1K	1	3.1	18	96.9	0	.0			
		DFSFE1L	6	30.5	13	69.5	0	.0	4.0		
		DFSFE1M	0	.8	18	99.2	0	.0			
		DFSFE1N	4	20.9	15	79.1	0	.0	2.0		
		DFSFE1O	2	10.8	16	89.2	0	.0	1.3		
		DFSFE1P	1	6.7	17	93.3	0	.0	0.6		
		DFSFHR1A	4	19.9	15	80.1	0	.0	2.8		
		DFSFHR1B	3	16.5	15	83.5	0	.0	2.8		
>		DFSFHR1C	4	21.2	14	78.8	0	.0	2.8		
Transact			<-----In Use----->		<-----Idle----->		<--Unavailable-->		<--Waiting for Input-->		
			hh.mm.ss	Pct	hh.mm.ss	Pct	hh.mm.ss	Pct	hh.mm.ss.t		
		DSFFE1A	3	17.1	15	82.9	0	.0	1.3		
		DSFFE1B	3	17.0	15	83.0	0	.0	2.4		
		DSFFE1C	3	15.0	16	85.0	0	.0	1.2		
		DSFFE1D	1	5.9	17	94.1	0	.0	0.9		
		DSFFE1E	3	18.9	15	81.1	0	.0	3.1		
		DSFFE1F	3	17.8	15	82.2	0	.0	2.5		
		DSFFE1H	2	11.5	16	88.5	0	.0	1.7		
		DSFFE1I	2	9.9	17	90.1	0	.0	1.4		
		DSFFE1J	2	10.5	16	89.5	0	.0	1.9		
>		DSFFE1K	1	3.1	18	96.9	0	.0			
		DSFFE1L	6	30.5	13	69.5	0	.0	4.0		
		DSFFE1M	0	.8	18	99.2	0	.0			
		DSFFE1N	4	20.9	15	79.1	0	.0	2.0		
		DSFFE1O	2	10.8	16	89.2	0	.0	1.3		
		DSFFE1P	1	6.7	17	93.3	0	.0	0.6		
		DSFFHR1A	4	19.9	15	80.1	0	.0	2.8		
		DSFFHR1B	3	16.5	15	83.5	0	.0	2.8		
>		DSFFHR1C	4	21.2	14	78.8	0	.0	2.8		

Figure 36. Resource Availability report: regions, programs, transactions

Start 14Jun2023 12.25.26.10		IMS Performance Analyzer Resource Availability-IMS2						End 14Jun2023 17.03.36.30	
Total IMS Up Time		4.38.10 (HH.MM.SS)		<-----In Use----->		<-----Idle----->		<--Unavailable-->	
	Database	Data Set	hh.mm.ss	Pct	hh.mm.ss	Pct	hh.mm.ss	Pct	
>	DQIMSA	DQIMSA1	4.37.57	99.9	13	.1	0	.0	
>	DQS01A	DQS01A1	4.38.06	100.0	5	.0	0	.0	
>	DZIMSA	DZIMSA1	4.37.56	99.9	14	.1	0	.0	
Line	PTERM	<-----In Use----->		<-----Idle----->		<--Unavailable-->			
		hh.mm.ss	Pct	hh.mm.ss	Pct	hh.mm.ss	Pct		
	DSW00003	5	28.4	13	71.6	0	.0		
	DSW00004	0	.5	18	99.5	0	.0		
	DSW00005	6	33.6	12	66.4	0	.0		
	DSW00006	8	43.4	10	56.6	0	.0		
	DSW00007	0	.0	18	100.0	0	.0		
	DSW00008	0	.3	18	99.7	0	.0		
	DSW00009	0	.2	18	99.8	0	.0		
	DSW00010	0	.1	18	99.9	0	.0		
	DSW00011	0	.1	18	99.9	0	.0		
	DSW00012	0	.3	18	99.7	0	.0		
	DSW00013	0	.3	18	99.7	0	.0		
	DSW00014	0	.2	18	99.8	0	.0		
>	DSW00015	15	81.2	3	18.8	0	.0		
>	DSW00016	9	51.6	9	48.4	0	.0		
	DSW00017	0	.2	18	99.8	0	.0		
	DSW00018	0	.2	18	99.8	0	.0		
	DSW00019	7	39.5	11	60.5	0	.0		
	DSW00020	3	16.9	15	83.1	0	.0		

Figure 37. Resource Availability report: databases, lines (or VTAM nodes)

Use the following information to interpret these reports:

Region times

The In Use, Idle, and Unavailable times have the following meanings for the Region report.

In Use

The time during which a program is scheduled into a region (region occupancy time). This is the sum of the times between the type 08 log record (program scheduled) and the type 07 log record (region freed due to program termination) for each program using the region.

Idle

The time during which a region has been started but no programs are using it. This is the sum of the times between the type 07 log record for one program and the type 08 log record for the next program.

Unavailable

The time during which the region is not yet started or when the region has been stopped by a command or because of an error. For each down-time entry, a reason code is printed to the right of the time. The reason codes are as follows:

NOST

Region not started

STOP

Region stopped by a command

BMP

Region stopped because a BMP terminated

ABND

Region stopped because an abend occurred

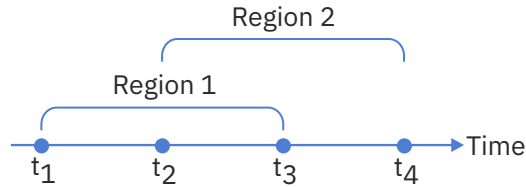
Program times

The In Use, Idle, and Unavailable times have the following meanings for the Program report.

In Use

The time during which a program is processing transactions. For each program, this is the time between its type 08 log record and its corresponding type 07 log record. If the program is running in two or more regions such that its running times overlap, the active time is the logical sum of the two running times. The following example shows four time intervals t1, t2, t3, t4. A program is

running from t1 to t4 but concurrently in two regions from t2 to t3. In this example, the active time is the time from t1 to t4.



Idle

The time during which the program is available but is not scheduled. This is the sum of the times from the type 07 log record (program termination) to the next type 08 log record for that program (program started).

Unavailable

The time during which the program is unavailable for scheduling. The program has been stopped by a command or by an abend. For each downtime entry, a reason code is printed to the right of the time. The reason codes are as follows:

STOP

Program stopped by a command

sss

System completion code for the abend

uuuu

User completion code for the abend

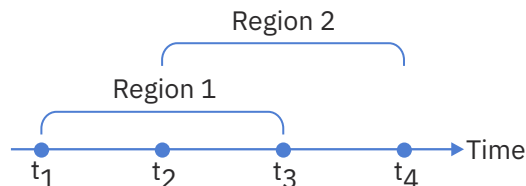
Note: If a backout occurs, backout times are also reported.

Transaction times

The In Use, Idle, and Unavailable times have the following meanings for the Transaction report.

In Use

The time during which a transaction is being processed. For each transaction, this is the time between its type 08 log record and its corresponding type 07 log record. If the transaction is running in two or more regions such that its running times overlap, the active time is the logical sum of the two running times. The following example shows four time intervals t1, t2, t3, t4. A transaction is running from t1 to t4 but concurrently in two regions from t2 to t3. In this example, the active time is the time from t1 to t4.



Idle

The time during which the transaction is available but is not scheduled. This is the sum of the times from the type 07 log record (transaction termination) to the next type 08 log record for that transaction (transaction started).

Unavailable

The time during which the transaction cannot be scheduled. The transaction has been stopped by a command or by an abend. For each downtime entry, a reason code is printed to the right of the time. The reason codes are as follows:

STOP

Transaction stopped by a command

sss

System completion code for the abend

uuuu

User completion code for the abend

Note: If a backout occurs, backout times are also reported.

Database times

This resource is subdivided into data sets within each database. The data sets are identified by DDname under each database name. The In Use, Idle, and Unavailable times have the following meanings for the Database report.

In Use

The data sets are open. This is the time, for each database, from the type 20 log record (database open) to the type 21 log record (database close).

Idle

The time during which the data sets are closed (before the type 20 or after the type 21 log record) but the database is not stopped.

Unavailable

The time during which the database is stopped by a command or by a read/write error. For each downtime entry, a reason code is printed to the right of the time. The reason codes are as follows:

STOP

Database stopped by a command

READ

Read error occurred (VSAM only)

WRITE

Write error occurred (VSAM only)

OERR

Open error occurred

Line times

The In Use, Idle, and Unavailable times have the following meanings for the Line report.

In Use

For response transactions, In Use is the time between the type 01 log record (first message segment received) and the type 36 log record (output transmission complete). This time includes queue times and processing times. For nonresponse transactions, In Use is the time from the type 01 log record to the type 35 log record (input transmission complete) and from the type 31 log record (output transmission started) to the type 36 log record. In this case, processing times and non-transmission queue times are not included. The line can be available even though a terminal is busy.

Idle

The time during which the line is available but nothing is being transmitted. The line has not been stopped by a command or by an error.

Unavailable

The time during which an error stopped the line. The START and STOP commands are not supported; if the line is stopped by a command, this is not recorded in the log and so does not appear in the report. For each downtime entry, a reason code is printed to the right of the time. The reason codes are as follows:

READ

Read error occurred

WRITE

Write error occurred

Note: Unavailable time includes only those line read or write errors reported in the type 67 log record.

CPU Usage report and extract

The IMS CPU Usage report gives statistics for CPU time and elapsed time during a specified period for regions, transactions, and programs. It can help you determine who is using too much CPU time or, conversely, what programs or transactions in which regions are in a wait state too long. The report can optionally be written by IMS Performance Analyzer to an extract data set as a CSV file.

With a single request, you can get up to five flavors of this report, with each one ordered by any combination of region, transaction, and program. In addition, an extract file can be produced ordered by region-transaction-program.

For log data from multiple IMS subsystems running in a sysplex, the region is shown by IMS subsystem ID. APPC (standard, modified, CPI-C) and OTMA transactions are reported.

Log records: This report is derived from IMS log records 07, 08, 0A, 31, 33, and 40.

Uses

The two columns of primary interest are the **Mean CPU Time** and the **Elapse/CPU Ratio**:

- From the mean CPU times, you can monitor the actual time required for each transaction. For a given program, the mean CPU times should be approximately the same across regions and from day to day; however, these mean times should be interpreted based on the number of transactions per scheduling, which is also reported. If the mean time begins to increase, the most likely reason is increased database activity. This could be a sign that databases need to be reorganized.
- The Elapse/CPU Ratio can indicate whether a program is spending more time in the wait state in one region than in another. This could be caused by a low priority or excessive page faults in one region. Your use of certain options (for example, the STIMER option) can bias these ratios.

The other columns in the report are useful to help indicate if an observed timing problem is common every time a program is scheduled or if it happens only occasionally.

The extract file is suitable for analysis by graphing tools.

Options

To specify the report options, select **CPU Usage** from the Resource Usage and Availability Reports in a Log Report Set.

Several reporting sequences are available for the CPU Usage report. These reporting sequences are controlled using any combination of the ordering operands REGN (region), TRAN (transaction code), and PROG (program).

For example:

- Specify only TRAN to produce a report ordered by transaction code.
- Specify a nested ordering of PROG–REGN–TRAN to produce a report ordered by transaction code within region within program.

Up to five nested orderings can be specified. Each one will produce a separate report sorted in the specified sequence. The extract file is produced in the order region-transaction-program.

Specify Selection Criteria to include or exclude particular regions, transactions codes, programs (PSBs) and IMS subsystems from the report. Region ID can be specified by PST number or by Message Region Job name. When programs or transaction codes are excluded, by default they are grouped into a category called *OTHERS* and included in the report subtotals and totals. When regions are excluded, their results are grouped into a category called XXXX. For example, if you specify a report ordered by transaction code within region, and include the transaction code TRAN12, the report will have for each region, two detail lines: one for TRAN12 transactions and one for all other transactions.

You can request to exclude "OTHERS" from the report. In this case, transaction codes and programs that are excluded by the selection criteria are not reported, and not included in the report subtotals and totals.

The attributes of the Processing Time (CPU) and Elapsed Time graphs are controlled by specifying Distributions. The sample Distributions \$IPDIST1 (CPU) and \$IPDIST2 (Elapsed) are provided and are the default if Distributions are not specified.

A report interval can be specified. This applies to the reduced data file after the Global (or Run-time) report interval is effected.

The report output data set is controlled by specifying the Report Output DDname.

To request the extract, specify an extract data set name. DDname CPURXTRO identifies the extract output file.

The extract file contains field headings as the first record in the file provided that option is selected on the Log Global Options panel.

The data fields are fixed length and separated by a blank or a comma depending on the delimiter specified on the Log Global Options panel.

Content: CPU Usage report

The CPU Usage report gives statistics for CPU time and elapsed time during a specified period for regions, transactions, and programs.

The CPU times in the report are derived from the times recorded in the log records, which in turn depend on the value of the STIMER option. If STIMER=0, no times are recorded; hence none can be reported. If STIMER=1, only application processing time is recorded and reported. If STIMER=2, application processing time and DL/I time are recorded and reported. The time units are in milliseconds.

Start 04Jun2021 16.10.15.96			IMS Performance Analyzer CPU Usage Report					End 04Jun2021 16.14.59.19					
Region	Jobname	Observ Count	*****CPU Time (msecs)*****				Elapse	*****Elapse Time (msecs)*****				Trans	
			Total	Mean	SDev	/CPU Ratio	Total	Mean	SDev		/Obs		
IM02	2 IM02ASU1	166	2,530	15	.37	9.82	24,846	150	3.59		.69		
IM02	5 IM02OLPB	3	213	71	.27	15.13	3,227	1,076	.59		.67		
IM02	7 IM02OLPA	6	189	32	.70	5.05	956	159	.99		.83		
IM02	8	3	20	7	.71	158.21	3,172	1,057	1.33		.33		
IM02	9 IM02OLPE	3	46	15	.39	3.84	176	59	.30		1.00		
IM02	10 IM02OLPF	24	992	41	.92	61.58	61,078	2,545	1.86		.67		
IM02	11	4	291	73	.60	170.05	49,553	12,388	.89		1.00		
IM02	12 IM02OLPJ	19	927	49	1.22	21.22	19,679	1,036	2.59		.53		
:													
IM03	43 IM03OLP6	3	130	43	1.09	49.20	6,398	2,133	1.40		.33		
IM03	44	6	312	52	1.59	30.70	9,571	1,595	1.34		.67		
IM03	46	14	641	46	.80	27.49	17,628	1,259	1.67		.71		
IM03	47 IM03OLP4	4	210	52	.98	59.22	12,435	3,109	1.66		.50		
IM03	48 IM03OLP5	3	30	10	.00	.83	25	8	.32		.00		
Total		991	44,803	45	3.56	31.94	1,431,099	1,444	4.02		.72		
Grand Total		991	44,803	45		31.94	1,431,099	1,444			718		
1) Avg. No. of Transactions processed per checkpoint is N/A 2) Total No. of Transactions processed in report period is 718													
Region	Program	Trancode	Observ Count	*****CPU Time (msecs)*****				Elapse	*****Elapse Time (msecs)*****				Trans
				Total	Mean	SDev	/CPU Ratio	Total	Mean	SDev		/Obs	
IM02ASU1	PIMMIDBP	TIMIDB	32	692	22	.36	5.85	4,044	126	1.02		.72	
IM02ASU1	PIMMIDBP	TIMASM	36	483	13	.11	4.88	2,358	66	.50		.92	
IM02ASU1	PIMMSELP	TIMASM	23	250	11	.21	3.80	950	41	.73		.70	
IM02ASU1	PIMULUDP	TIMASU	75	1,104	15	.29	15.85	17,494	233	3.37		.56	
Subtotal			166	2,530	15	.37	9.82	24,846	150	3.59		.69	
:													
IM03	46 PIM3UPD3	TIMOP3	4	315	79	.52	42.65	13,446	3,361	.89		.75	
IM03	46 PIM3UPD3	TIMOP3	1	10			.64	6				.00	
IM03	46 PIM3UPD3	TIMOP3	4	208	52	.38	8.08	1,683	421	.48		1.00	
IM03	46 PIMCMENU	TIMOQC	4	68	17	1.08	6.00	409	102	1.00		.50	
IM03	46 PIMCMENU	TIMOQC	1	39			18.30	721				1.00	
Subtotal			14	641	46	.80	25.37	16,266	1,162	1.83		.71	
:													
IM03OLP4	PIM3MPAP	TIMOP3	1	54			7.13	387				1.00	
IM03OLP4	PIM3UPDA	TIMOP3	3	156	52	1.14	77.39	12,048	4,016	1.41		.33	
Subtotal			4	210	52	.98	59.22	12,435	3,109	1.66		.50	
:													
IM03OLP5	PIMEINQA	TIMQUE	3	30	10	.00	.83	25	8	.32		.00	
Total			1,034	44,803	43	3.34	29.95	1,342,040	1,298	3.28		.69	
Grand Total			1,034	44,803	43		29.95	1,342,040	1,298			718	
1) Avg. No. of Transactions processed per checkpoint is N/A 2) Total No. of Transactions processed in report period is 718													

Figure 38. CPU Usage report

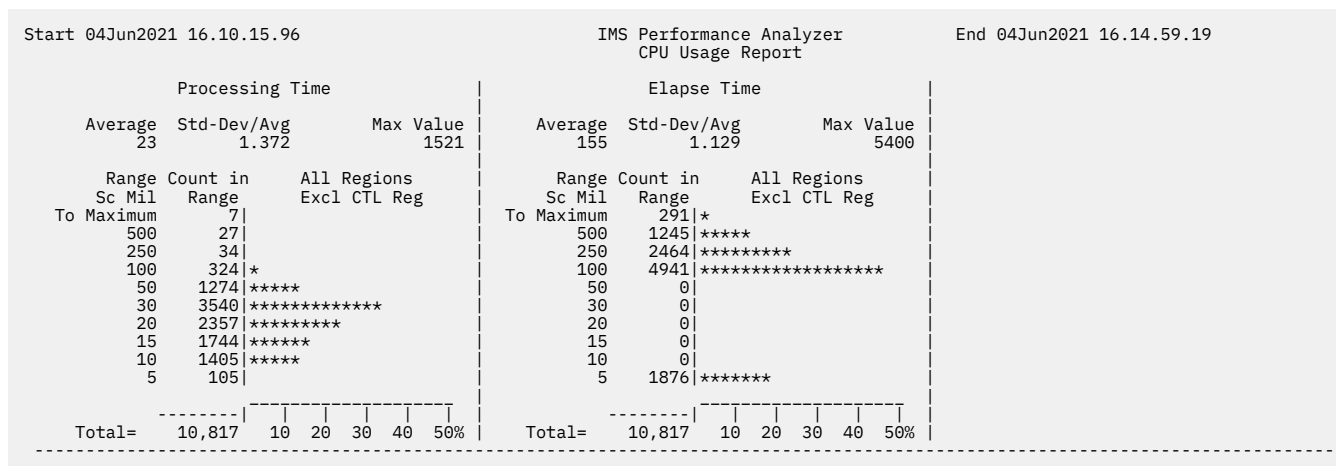


Figure 39. CPU Usage report: Distributions

The report and extract contain the following information:

Region - Jobname

The first section of the report provides a summary by region. Each region is identified by the IMS Subsystem ID and PST number. If the job name is available and is the same for all jobs for the region, the job name for the region is also shown.

Region - Program - Trancode

The leftmost one, two, or three columns contain the values of the ordering operands. The sample report is ordered on transaction code, within program, within region. The report shows subtotals by region then the total for all regions. The region job name is shown if it is available, otherwise the IMS Subsystem ID and PST number are shown. Regardless, if the report is ordered by region, it is always ordered by IMS Subsystem ID and PST number, not job name.

The Region PST ID is reported as XXX to identify the accumulation of dependent regions that were excluded from reporting. When you specify **Selection Criteria** to filter the regions to be reported, for example `INCLUDE (REGION (. . .))`, then each selected region is reported and all other regions are accumulated and reported as XXX.

A > symbol to the left of one of the ordering operands indicates that a transaction in that group was being processed either:

- At the time the report ended (defined by end-of-file, or by the Stop or To date and time)
- At the time of a prescan reset signal (defined by a jump backward in log sequence numbers)

As a result, the statistics for the group are not complete. This also means the transaction may have to be backed out if there is a system failure within the reporting period.

APPC transactions, known by their transaction code and program (PSB) name, are reported. All APPC transactions (Standard, Modified, CPI-C) are supported.

If the transaction code is not available in the log record, then the region type is substituted in the Trancode column. This will be one of *BMP*, *JBP*, or *DBCTL*.

Other special meanings for transaction codes and program names are as follows:

BLANK

Batch program

UNDEFND*

Not defined in checkpoint records

Observ Count

Contains a count of the number of observations in each ordering group. If the transaction code was one of the ordering operands, this column is a count of the number of messages (transactions) processed as recorded in the type 07 log record.

Note that there is a minimum increment of one for each type 07 log record encountered, even though the type 07 record can reflect zero messages (transactions) processed for abnormal terminations. If the transaction code was not one of the ordering operands, **Observ Count** is a count of the type 07 log records encountered.

CPU Time

Processing time in milliseconds.

Total

Total processing (CPU) time.

Mean

Average processing (CPU) time. If the **Observ Count** is 1, the value of this field is the same as the **Total**.

SDev

The standard deviation CPU time. If the **Observ Count** is 1, the value of this field is zero (0). IMS PA calculates a normalized standard deviation equal to the true standard deviation divided by the mean.

Elapse/CPU Ratio

The ratio of the total elapsed time to the total CPU time.

Elapse Time

Elapsed time in milliseconds.

Total

Total elapsed time.

Mean

Average elapsed time. If the **Observ Count** is 1, the value of this field is the same as the **Total**.

SDev

The standard deviation elapsed time. If the **Observ Count** is 1, the value of this field is zero (0).

Trans/Obs

Ratio of transactions processed to observation counts (**Observ Count**). In the sample report, the number of messages (transactions) processed is the exact count from the type 07 log record. A zero count is not forced to a one count, as in the **Observ Count** column. Because of this, a ratio of less than one can occur. This indicates that at least one program was scheduled whose attempt to process a message was abnormally terminated.

Total, CTL Task, and Grand Total

At the bottom of the report are:

- Totals or summaries (**Total**) of the regions
- Control region statistics (**CTL Task**)
- Grand totals or summaries (**Grand Total**)

The grand total shown at the bottom of the **Trans/Obs** column is the total number of transactions processed by the system in the report period. This includes transactions active at report start and end.

Processing Time and Elapse Time

Distribution graphs of the CPU time and elapsed time are shown on the second page of the sample report. These distributions are always based on the number of PSBs processed and not on transactions. Therefore, if transaction code is one of the ordering operands, the graphic distributions may not agree exactly with the tabular results in the main body of the report.

Content: Extract file

This is an example of the contents of the CPU Usage extract file.

Region	Trancode	Program	Obs_Count	CPU_Total	CPU_Mean	CPU_Dev	Elp/CPU	Elp_Total	Elp_Mean	Elp_Dev	Trans/Obs
IX23	1		3	30	10	.00	152.22	215125	71708	.97	.00
IX23	2		18	2290	127	.61	20.94	47946	2664	1.65	.89
MP230LPA			14	780	56	1.73	13.51	10539	753	2.84	1.07
MP230LPC			3	338	113	.12	148.04	50093	16698	1.14	1.67
IX23	1	*BLANK*	2	20	10	.00	342.08	167276	83638	.99	.00
IX23	1	TECA0B03	1	10	10	0	772.49	47849	47849	0	.00
MP23ASU1	IDB	PASMIIDBP	65	1728	27	.13	9.29	16042	247	1.08	1.00
MP23ASU1	IDB2	PASMIIDBP	2	44	22	.02	6.22	276	138	.09	1.00
MP23ASU1	TASBTREU	PASBTREP	2	38	19	.24	71.14	2686	1343	.88	1.00
		PAC3UTLP	11	409	37	.33	119.64	48965	4451	2.92	1.00
		PASBTREP	2	38	19	.24	71.14	2686	1343	.88	1.00
		PASMAS2P	1	122	122	0	5.52	674	674	0	1.00
		PASMIIDBP	144	2863	20	.34	7.83	22428	156	1.29	1.00
		TTB0003I	25	1116	45	.34	10.57	11793	472	1.25	1.00
		TTB0004I	14	355	25	.18	9.43	3349	239	.63	1.00
		TTB0005I	7	177	25	.05	10.93	1936	277	.21	1.00
		TTB0007I	14	483	35	.13	11.71	5658	404	.83	1.00
		TTUMTUCP	1	26	26	0	22.61	586	586	0	1.00
IX23	1	*BLANK*	2	20	10	.00	342.08	167276	83638	.99	.00
IX23	2	CL	2	252	126	.04	14.97	3774	1887	.47	1.00
MP23ASU1	IDB		65	1728	27	.13	9.29	16042	247	1.08	1.00
MP23ASU1	IDB2		2	44	22	.02	6.22	276	138	.09	1.00

Figure 40. Extract file content: CPU Usage

The attributes of the extract data set are RECFM=FB, LRECL=132.

The information in the record is the same as the CPU Usage report ordered by Region, Transaction Code, and Program. However, if only Region is specified, then the transaction and program columns will be blank.

The field headings are optionally included as the first record in the extract file depending on the extract options set in Log Global Options. The headings line up with the column data fields that they describe. The data fields are fixed length, and are separated by a blank or comma depending on the delimiter character specified in Log Global Options.

The extract data set can be used as input to other reporting and statistical analysis tools. Ensure that the delimiter character you specify is suitable for use by these tools.

Internal Resource Usage reports

The IMS Internal Resource Usage reports provide statistics on the use of various IMS pools and resources. From the statistics produced by IMS Performance Analyzer, you can determine how they are being used and where inefficiencies exist.

Log records: The reports are derived from IMS log records 06, 07, 11, 31, 38, 40, 45.

The reports provide operating statistics for the following pools and resources:

Pools

- Message queue pool
- Message format buffer pool
- OSAM buffer pool
- VSAM buffer pool
- Variable pools:
 - DMB pool (DLDP)
 - PSB pool (DLMP)
 - PSB (DLI/SAS local) pool (DPSB)
 - PSB work pool (PSBW)
 - DMB work pool (DBWP)
 - EPCB pool (EPCB)

- Fixed pools
- Storage pool

Resources

- Program Isolation
- DL/I call
- Scheduler
- Latch manager
- Logger
- Dispatcher / Dynamic SAP
- Miscellaneous, which includes:
 - IMS version
 - Transaction counts
 - Receive Any buffer counts
- IRLM system
- IRLM subsystem
- RACF
- Virtual Storage usage
- IMODULE statistics
- EWLM statistics
- 64-bit Storage Manager statistics
- Fast Path 64-bit Buffer Manager statistics
- User Exit statistics
- Individual TCB statistics
- 64-bit Storage statistics
- Global OTMA TPIPE Statistics
- Member OTMA TPIPE Statistics

Options

To specify the report options, select **Internal Resource Usage** from the Resource Usage and Availability Reports in a Log Report Set. You can select specific pools and resources (and their associated sets of statistics) to be included in or excluded from the report. If none are selected, all reports are produced by default. Reports may also be produced in CSV-format for third-analytics applications.

At least two checkpoints are required to obtain reports. The minimum checkpoint time interval (**Minimum CHKP Interval**) option controls the printing intervals for this report. The default interval is zero. If no interval is specified, or it has a value of zero, one set of selected Internal Resource Usage reports is printed for the entire time range. But if an interval greater than zero is specified, several sets of reports may be printed; these reports correspond to selected checkpoints. For example, assume an interval n was specified and that a set of reports was printed corresponding to a checkpoint at time t . The next set of reports would be printed corresponding to the first checkpoint encountered that has a time greater than $t+n$. On the other hand, no reports would be printed for checkpoints encountered between times t and $t+n$.

Alternatively, you can select to print the set of reports after each completed checkpoint.

Optionally, Fast Path transaction counts can be included in the Miscellaneous Statistics report.

You can report on particular IMS subsystems by specifying an IMS Subsystem ID Object List to include or exclude.

A report interval can be specified. This applies to the reduced data file after the Global (or Run-time) report interval is effected.

The report output data set is controlled by specifying the Report Output DDname.

Message Queue Pool Statistics

The IMS Internal Resource Usage Message Queue Pool Statistics report provides information related to the activity and I/O associated with IMS message queues. This activity is a key indicator as to the performance of your IMS system. The report is produced by IMS Subsystem ID. This IMS Performance Analyzer report is similar to the Message Queue Pool report produced by the IMS Monitor.

Start 16Jan2018 14:18:19:85	IMS Performance Analyzer	End 16Jan2018 14:31:54:66
Page 1	Internal Resource Usage - IFDE	
Message Queue Pool Statistics	-----	Interval : 13.35 (HHHH.MM.SS)
	Count /Transact /Second	
Locate calls from QMGR	3,267 16.01 4.01	
Record Release calls from QMGR	1,380 6.76 1.69	
Locate and Alter calls from QMGR	6,160 30.20 7.56	
Requests to Purge the Q pool	2 .01 .00	
Address to DRRN translation requests	0 .00 .00	
Total requests to QMGR not incl Translates	10,809 52.99 13.27	
Read requests	349 1.71 .43	42.35% of I/O's
Write requests (Total)	475 2.33 .58	
Writes done by Purge	0 .00 .00	0.00% of I/O's
Writes done for Space	475 2.33 .58	57.65% of I/O's
Total I/O requests	824 4.04 1.01	
Locate calls satisfied in Pool	8,603	91.26% of all Locate calls
Waits for Purge to complete	3 .01 .00	
Waits because no Buffer available	0 .00 .00	
Waits for other DECB to Read this Buffer	0 .00 .00	
Waits for other DECB to Write this Bfr	0 .00 .00	
Waits for conflicting Enq/Deq Buffer req	0 .00 .00	
Total IWAITS	3 .01 .00	
Temporary I/O Errors	0	
Buffer locked	0	
Buffers unlocked	0	
PCBs unchained from Buffers	0 .00 .00	
ID of highest Dummy Record assigned	72	
Calls to Queue Manager (Total)	5,642 27.66 6.92	
Calls to Reposition a Lost Buffer	73 .36 .09	
Calls to Enqueue a Message	735 3.60 .90	
Calls to Dequeue one or more Messages	320 1.57 .39	
Calls to Cancel Input or Output	138 .68 .17	
Highest QBLKS Block Number ever used	4	
Highest SHMSG Block Number ever used	0	
Highest LGMSG Block Number ever used	59	
QBLKS upper threshold exceeded ?	N	
SHMSG upper threshold exceeded ?	N	
LGMSG upper threshold exceeded ?	N	
Size of Short Message record	352	
Size of Long Message record	3,320	
Initial count of Buffers	200	
Start 16Jan2018 14:18:19:85	IMS Performance Analyzer	End 16Jan2018 14:31:54:66
Page 2	Internal Resource Usage - IFDE	
Message Queue Pool Statistics	-----	Interval : 13.35 (HHHH.MM.SS)
	Count /Transact /Second	
Shared Queue Buffer Statistics:		
Total count of Buffers	600	
High Threshold for Buffers	480	
Low Threshold for Buffers	300	
Number of Buffer in use count	464	
HWM - Buf In Use Count since Chkpt	465	
# of times Buffers have Expanded	10	
Count of First Available Buffer	463	
HWM - Buf In Use Count since Restart	465	

Figure 41. IMS Performance Analyzer Message Queue Pool Statistics report

A key performance indicator for the Message Queue Pool is the percentage of Locate calls satisfied in the pool. A high percentage indicates that the Message Queue Pool is satisfying most requests without the need for I/O.

For more information on using this report, see "Monitoring Message Queue Handling" in *IMS Utilities Reference: System*.

Shared queues

The following statistics have no meaning for shared queues and can be ignored:

- Writes done by purge (always 0)
- Writes done for space

Message Queue Pool Statistics report has additional data at the end of the report for shared queues. You can use this information to help you to tune the following DFSPBxxx parameters:

QBUF

Initial number of message queue buffers allocated to the queue pool.

QBUFHITH

High threshold percentage for the message queue buffer.

QBUFLWTH

Low threshold percentage for the message queue buffer.

QBUFMAX

Maximum number of message queue buffers for the queue pool.

Message Format Buffer Pool Statistics

The IMS Internal Resource Usage Message Format Buffer Pool Statistics report provides information related to the activity associated with message formatting. This IMS Performance Analyzer report is similar to the Message Format Buffer Pool report produced by the IMS Monitor.

Message Format Buffer Pool Statistics				Interval :	13.35 (HHMM.MM.SS)
	Count	/Transact	/Second		
Prefetch requests	470	2.30	.58		
Times Prefetch was ignored	157	.77	.19		
Prefetches and Block on Immediate Fetch Queue	0			0.00% of P/Fetches	
Prefetches and Block on Free Block Queue	464			98.72% of P/Fetches	
Immediate Fetch requests	1,259	6.17	1.55		
I/O operations caused by Immediate Fetch	59	.29	.07	I/O's	
I/Fetches and Block on Free Block Queue	1,071			100.00% of I/Fetches	
I/Fetches and Block on I/Fetch Queue	0			0.00% of I/Fetches	
Free Block requests	995				
Times free block requests were ignored	0	.00	.00		
Free Block reqs and Block on I/Fetch Queue	995				
Requests to Compress Pool	0				
Times there was no Dir Entry for Block	12				
I/O operations to Directory	53	.26	.07	I/O's	
I/O Errors on Read or Point	0				
Blocks Freed for lack of Fetch Req Elements	37	.18	.05		
Immediate I/O requests waited due to maximum I/O	0				
Requests satisfied by Index/Dynamic Directory	18				

Figure 42. IMS Performance Analyzer Message Format Buffer Pool Statistics report

For more information on using this report, see "Monitoring MFS Activity" in *IMS Utilities Reference: System*.

When message formatting occurs, the appropriate message blocks must reside in the message format buffer pool. If the blocks are not already in the buffer, I/O to the active IMS.FORMATA/B library must occur. Block retrieval can involve a prior directory lookup, or be direct, using an index kept in the pool.

Prefetch and Immediate Fetch

An MFS block pair often includes the names of the next expected block pair. IMS attempts to prefetch anticipated blocks. The prefetch routine checks to see if the anticipated block is in the pool but not currently in use (is on the free blocks queue). If it is there, IMS moves it to the bottom of the queue and marks it most recently used. If prefetch does not find the necessary block in the pool, nothing else happens at that time. When a message requires a block that is not in the pool, IMS does an immediate fetch of the block. Many of the counts reveal details of internal event management. When there is no directory entry for a block this implies extra directory lookup I/O. Delays caused by unavailable FRE entries are recorded as request-ignored counts.

A key performance indicator for FRE allocation are the Times free block requests were ignored and Blocks freed for lack of FREs counts. Ideally, these should be low.

Another key performance indicator is the percentage of Prefetch and Immediate fetch requests satisfied on the Free Block Queue. Ideally, these percentages should be high.

OSAM Buffer Pool Statistics

The IMS Internal Resource Usage OSAM Buffer Pool Statistics report provides information related to the activity in each OSAM subpool. Subpools with no activity in the reporting period are not reported on. The final report contains cumulative statistics for all of the OSAM buffer pools. This IMS Performance Analyzer report is similar to the Database Buffer Pool report produced by the IMS DB Monitor.

Enhanced OSAM Buffer Pool Statistics				Interval :	13.35 (HHMM.MM.SS)
	Count	/Transact	/Second		
Subpool ID:	None				
Fix options: Prefix/Buffers	Y/Y				
Buffer Size	2,048				
Buffer count	5				
Locate-type calls	99	.49	.12		
Requests to create new Blocks	0	.00	.00		
Buffer Alter calls	31	.15	.04		
Purge calls	9	.04	.01		
Locate-type calls, Data already in Pool	97	.48	.12	97.98% of Locate calls	
Buffers searched by all Locate-type calls	97	.48	.12		
Read I/O requests	2	.01	.00	18.18% of OSAM I/O operations	
Single Block Writes by Buffer Steal routine	0	.00	.00	0.00% of OSAM I/O operations	
Blocks Written by Purge	9	.04	.01	81.82% of OSAM I/O operations	
Total count of OSAM I/O operations	11	.05	.01		
Locate calls waited due to busy ID	0	.00	.00		
Locate calls waited due to busy Write	0	.00	.00		
Locate calls waited due to busy Read	0	.00	.00		
Buffer Steal/Purge waited for Ownership Releas	0	.00	.00		
Buffer Steal requests waited for Buffers	0	.00	.00		
Total I/O errors for this Subpool	0	.00	.00		
Buffers locked due to Write Errors	0	.00	.00		
Blocks Read from CF	0	.00	.00		
Blocks expected but not Read	0	.00	.00		
Blocks written to CF (Prime)	0	.00	.00		
Blocks written to CF (Changed)	0	.00	.00		
Blocks not written; Storage Class full	0	.00	.00		
Blocks invalidated with XI	0	.00	.00		
XI Calls issued	0	.00	.00		
SB Immediate (Sync) Sequential Reads	0	.00	.00		
SB Anticipatory Reads	0	.00	.00		
:					

Figure 43. IMS Performance Analyzer OSAM Buffer Pool Statistics report

A key performance indicator for an OSAM Buffer Pool is the percentage of locate calls where the data was already in the buffer. A high percentage indicates that the OSAM Buffer Pool is satisfying most requests without the need for database I/O. When data sharing in IMS sysplex database environments, there needs to be a balance between maximizing the requests satisfied in the pool and minimizing the occurrence of buffer invalidation.

For more information on using this report, see *IMS Utilities Reference: Database Manager*.

VSAM Buffer Pool Statistics

The IMS Internal Resource Usage VSAM Buffer Pool Statistics report provides information related to the activity in each VSAM subpool. Subpools with no activity in the reporting period are not reported on. The final report contains cumulative statistics for all of the VSAM buffer pools. This IMS Performance Analyzer report is similar to the VSAM Buffer Pool report produced by the IMS DB Monitor.

Enhanced VSAM Buffer Pool Statistics				Interval :	13.35 (HHMM.MM.SS)
		Count	/Transact	/Second	
Shared Resource Pool ID/Type	XXXX/D				
Fix Option: Index/Block/Data	N/Y/Y				
Buffer Size		512			
Buffers in Subpool		5			
HS Buffers in Subpool		0			
Write Errors		0			
Largest number of Write Errors		0	.00	.00	
Retrieve by RBA calls		0	.00	.00	0.00% of Retrieve calls
Retrieve by Key calls		0	.00	.00	0.00% of Retrieve calls
Total Retrieve calls		0	.00	.00	
Logical records Inserted into ESDS		0	.00	.00	0.00% of Update requests
Logical records Inserted into KSDS		0	.00	.00	0.00% of Update requests
Logical records Altered in this Subpool		0	.00	.00	0.00% of Update requests
Total number of Updates		0	.00	.00	
Nbr of Background Write requests		0	.00	.00	0.00% of calls to VSAM
Nbr of Synch calls		113	.55	.14	100.00% of calls to VSAM
Nbr of VSAM Get calls		0	.00	.00	0.00% of calls to VSAM
Nbr of VSAM Search Buffer calls		0	.00	.00	0.00% of calls to VSAM
Total Nbr of VSAM calls		113	.55	.14	
Nbr of times VSAM found CI in Pool		0	.00	.00	0.00% of VSAM buffer requests
Nbr of times VSAM Read CI from DASD		0	.00	.00	0.00% of VSAM I/O operation
Nbr of Writes initiated by IMS		0	.00	.00	0.00% of VSAM I/O operation
Nbr of Writes initiated by VSAM		0	.00	.00	0.00% of VSAM I/O operation
Total VSAM I/O operations		0	.00	.00	
Nbr of successful VSAM Reads frm HS		0	.00	.00	
Nbr of successful VSAM Writes to HS		0	.00	.00	
Nbr of failed VSAM Reads from HS		0	.00	.00	
Nbr of failed VSAM Writes to HS		0	.00	.00	
Nbr of PLH waits		0	.00	.00	
:					

Figure 44. IMS Performance Analyzer VSAM Buffer Pool Statistics report

A key performance indicator for an VSAM Buffer Pool is the number of times VSAM found the CI in the pool, rather than reading the CI from DASD.

Note that when data sharing in IMS sysplex database environments, there needs to be a balance between maximizing the requests satisfied in the pool and minimizing the occurrence of buffer invalidation.

For more information on using this report, see *IMS Utilities Reference: Database Manager*.

Variable Pool Statistics

The IMS Internal Resource Usage Variable Pool Statistics report provides information as to the size and utilization of the various DMB and PSB pools. Shortages in these pools, particularly the DMB pool, can

cause scheduling delays. Use this IMS Performance Analyzer report to detect over or under specification of the pool sizes.

Variable Pool Statistics			Interval : 13.35 (HHHH.MM.SS)	
	Count	/Transact	/Second	

DMB Pool Statistics (DLDP)				
Bytes in DMB Pool	49,152			
Bytes allocated at End of Report	2,560			
Maximum Bytes ever used	2,560			
PSB pool Statistics (DLMP)				
Bytes in PSB Pool	12,288			
Bytes allocated at End of Report	11,088			
Maximum Bytes ever used	11,408			
PSB pool (DLI/SAS Local) Statistics (DPSB)				
Bytes in PSB Pool	40,960			
Bytes allocated at End of Report	27,872			
Maximum Bytes ever used	27,872			
PSB Work Pool Statistics (PSBW)				
Number of Bytes in Pool	49,152			
Number of Bytes allocated at End of Report	10,312			
Maximum Bytes ever used	19,744			
DMB Work Pool Statistics (DBWP)				
Number of Bytes in Pool	24,576			
Number of Bytes allocated at End of Report	0			
Maximum Bytes ever used	584			
EPCB Pool Statistics (EPCB)				
Bytes in EPCB Pool	12,288			
Bytes allocated at End of Report	576			
Maximum Bytes ever used	576			
MAIN Pool Statistics (WKAP)				
Bytes in MAIN Pool	49,152			
Bytes allocated at End of Report	0			
Maximum Bytes ever used	480			

Figure 45. IMS Performance Analyzer Variable Pool Statistics report

If you suspect that there is a problem with pool space shortages, then run the IMS Monitor for a short period of time. The [Figure 164 on page 350](#) will show which storage pools failed, how many times they failed, and how much storage they required.

Program Isolation Statistics

The IMS Internal Resource Usage Program Isolation Statistics report provides information about the size and usage of the PI Enqueue pool by the IMS Lock Manager.

Program Isolation Enqueue/Dequeue Statistics			Interval : 13.35 (HHHH.MM.SS)	
	Count	/Transact	/Second	

Maximum Bytes Available	1,048,576			
Current Bytes used	65,536			
Calls to Search for Resource ID	99	.49	.12	
Synonyms Searched	2	.01	.00	
Maximum Synonyms Searched for a call	1			

Figure 46. IMS Performance Analyzer Program Isolation Statistics report

If you suspect that there is a problem with PI enqueues waiting (queued), then run the IMS Monitor for a short period of time. The [“Enqueue/Dequeue Trace report” on page 351](#) lists all enqueue waits, the program waiting for the enqueue, and the program holding it.

A key performance indicator is the maximum bytes ever used. This can be compared against the PIMAX parameter setting to ensure that the PI Enqueue pool is never exhausted, thus avoiding U0775 ABENDs. The number and length of synonym searches cannot be controlled, as the hash table only has 256 entries. When PI decides that an RBA needs to be enqueued, it hashes the DMB number, DCB number, and RBA to produce a value in the range 0 to 255, which is then used to identify the hash table entry to address a QCB (Enqueued PI resource).

When using IRLM for lock management, this pool is not used for database locking. But you must still specify a minimal amount of enqueue/dequeue storage (a maximum of two isolated locks for each partition specification table, or PST). IMS uses this storage internally.

DL/I Call Statistics

The IMS Internal Resource Usage DL/I Call Statistics report provides a count of all programs scheduled, transactions processed, and DL/I calls issued by call type.

Start 16Jan2018 14:18:19:85	IMS Performance Analyzer Internal Resource Usage - IFDE	End 16Jan2018 14:31:54:66	Page 14
DL/I Call Statistics	Count /Transact /Second	Interval : 13.35 (HHHH.MM.SS)	
Programs that reached Termination	268 1.31 .33		
Transactions process by above Programs	204 1.00 .25		
DB GU calls	55 .27 .07	4.24% of DL/I calls	
DB GN calls	15 .07 .02	1.16% of DL/I calls	
DB GNP calls	33 .16 .04	2.54% of DL/I calls	
DB GHU calls	139 .68 .17	10.71% of DL/I calls	
DB GHN calls	0 .00 .00	0.00% of DL/I calls	
DB GHNP calls	0 .00 .00	0.00% of DL/I calls	
DB ISRT calls	82 .40 .10	6.32% of DL/I calls	
DB DLET calls	76 .37 .09	5.86% of DL/I calls	
DB REPL calls	55 .27 .07	4.24% of DL/I calls	
DB DEQ calls	0 .00 .00	0.00% of DL/I calls	
DB Total calls	455 2.23 .56	35.05% of DL/I calls	
DC GU calls	213 1.04 .26	16.41% of DL/I calls	
DC GN calls	127 .62 .16	9.78% of DL/I calls	
DC ISRT calls	415 2.03 .51	31.97% of DL/I calls	
DC PURG calls	0 .00 .00	0.00% of DL/I calls	
DC Total calls	755 3.70 .93	58.17% of DL/I calls	
Test Enqueue requests	0 .00 .00	0.00% of DB calls	
Waits on Test Enqueues	0 .00 .00	0.00% of DB calls	
Test Dequeue requests	0 .00 .00	0.00% of DB calls	
User *Q Enqueue calls	0 .00 .00	0.00% of DB calls	
Waits on User *Q calls	0 .00 .00	0.00% of DB calls	
User *Q Dequeue requests	0 .00 .00	0.00% of DB calls	
Update Enqueue requests	0 .00 .00	0.00% of DB calls	
Waits on Update Enqueue requests	0 .00 .00	0.00% of DB calls	
Update Dequeue requests	0 .00 .00	0.00% of DB calls	
Exclusive Enqueue requests	46 .23 .06	10.11% of DB calls	
Waits on Exclusive Enqueue requests	0 .00 .00	0.00% of DB calls	
Exclusive Dequeue requests	2 .01 .00	0.44% of DB calls	
DL/I CHNG calls	15 .07 .02	1.16% of DL/I calls	
DL/I AUTH calls	0 .00 .00	0.00% of DL/I calls	
DL/I SETO calls	0 .00 .00	0.00% of DL/I calls	
DL/I APSB calls	0 .00 .00	0.00% of DL/I calls	
DL/I DPSB calls	0 .00 .00	0.00% of DL/I calls	
DL/I GMSG calls	0 .00 .00	0.00% of DL/I calls	
DL/I CHKP calls	0 .00 .00	0.00% of DL/I calls	
DL/I XRST calls	0 .00 .00	0.00% of DL/I calls	
DL/I ROLB calls	0 .00 .00	0.00% of DL/I calls	
Start 16Jan2018 14:18:19:85	IMS Performance Analyzer Internal Resource Usage - IFDE	End 16Jan2018 14:31:54:66	Page 15
DL/I Call Statistics	Count /Transact /Second	Interval : 13.35 (HHHH.MM.SS)	
DL/I ROLS calls	0 .00 .00	0.00% of DL/I calls	
DL/I SETS calls	0 .00 .00	0.00% of DL/I calls	
DL/I SETU calls	0 .00 .00	0.00% of DL/I calls	
DL/I INIT calls	0 .00 .00	0.00% of DL/I calls	
DL/I INQY calls	73 .36 .09	5.62% of DL/I calls	
DL/I LOG calls	0 .00 .00	0.00% of DL/I calls	
Total number of DL/I System Service calls	88 .43 .11	6.78% of DL/I calls	
DL/I CMD calls	0 .00 .00		
DL/I GCMD calls	0 .00 .00		
Internal Command calls	0 .00 .00		
Retrieve Command calls	0 .00 .00		

Figure 47. IMS Performance Analyzer DL/I Call Statistics report

Application Scheduling Statistics

The IMS Internal Resource Usage Application Scheduling Statistics report provides information relating to the various types of scheduling failures and scheduling activity during the IMS Performance Analyzer report period.

Scheduling Statistics			Interval :	13.35 (HHMM.MS.SS)
	Count	/Transact	/Second	
Program Conflicts	43	.21	.05	100.00% of all Conflicts
Database Intent Conflicts	0	.00	.00	0.00% of all Conflicts
Conflicts for Miscellaneous Reasons	0	.00	.00	0.00% of all Conflicts
SMBs tried for Scheduling	312	1.53	.38	
Programs Scheduled	271	1.33	.33	
Total Conflicts	43	.21	.05	13.78% of SMBS tried
Number of active BMPs	2			
Number of active MPPs	1			
PSB Pool Get Statistics				
Requests	13	.06	.02	
CSA PSB pool				
Space not immediately available	2	.01	.00	15.38% of PSB pool Get
PSBs cast out to make room for new PSB	2	.01	.00	15.38% of PSB pool Get
Failed	0	.00	.00	0.00% of PSB pool Get
DLI PSB pool				
Space not immediately available	0	.00	.00	0.00% of PSB pool Get
PSBs cast out to make room for new PSB	0	.00	.00	0.00% of PSB pool Get
Failed	0	.00	.00	0.00% of PSB pool Get
Space not immediately available in CSA and DLI	0	.00	.00	0.00% of PSB pool Get
Time getting PSB pool space with no PSB cast out	0.000	.00	.00	
Time getting PSB pool space with PSB cast out	0.000	.00	.00	
PSB Pool Free Statistics				
Requests	268	1.31	.33	
Time Freeing PSB pool space	0.002	.00	.00	
PSB Work Area Get Statistics				
Requests	271	1.33	.33	
Failed requests	0	.00	.00	0.00% of PSB Work Area pool Get
Time getting PSB work area pool space	0.001	.00	.00	
CQS Notify Statistics				
Notifies for local transactions	158	.77	.19	
Notifies for remote transactions	0	.00	.00	
Time between transition exit dispatch and schedule of inform exit	0.535	.00	.00	
Time between schedule of inform exit and dispatch of inform exit	0.007	.00	.00	
Time between inform exit and enqueue of SMB onto TCT (Local) or call of router (Remote)	0.015	.00	.00	

Figure 48. IMS Performance Analyzer Application Scheduling Statistics report

The following information is available in this report.

Program Conflicts

Number of SMBs not scheduled due to program conflicts. In addition to the count, this field shows the count per transaction and second. It is also expressed as a percentage of total all conflicts.

Database Intent Conflict

Number of SMBs not scheduled due to intent conflict. In addition to the count, this field shows the count per transaction and second. It is also expressed as a percentage of total all conflicts.

Conflicts for Miscellaneous Reasons

Number of SMBs not scheduled due to miscellaneous reasons. In addition to the count, this field shows the count per transaction and second. It is also expressed as a percentage of total conflicts.

The count is the value of SCDNMISC (macro ISCD) at system checkpoint time. Module DFSSMSC0 (the MPP REGION SCHEDULER) updates SCDNMISC when it tries to schedule a transaction, but fails. The reasons for a miscellaneous schedule failure are varied, but the most common is when the TRANSACT PARLIM (PARALLEL SCHEDULING THRESHOLD) limit has been reached. This counter is a "bucket" for all schedule failures other than Program and Database Intent conflicts.

SMBs tried for Scheduling

Number of SMBs examined for Schedule. This number represents the total number of SMBs examined for schedule, including those not scheduled due to conflicts. In addition to the count, this field shows the count per transaction and second.

Programs Scheduled

Number of SMBs successfully scheduled. In addition to the count, this field shows the count per transaction and second. It also expressed as a percentage of total all conflicts.

Total Conflicts

Total number of conflicts. In addition to the count, this field shows the count per transaction and second. It also expressed as a percentage of total SMBs tried for scheduling.

Number of active BMPs

Number of active BMPs.

Number of active MPPs

Number of active MPPs.

PSB Pool Get Statistics

The PSB pool manager (DFSDLMP0) collects detailed statistics on PSB pool and PSBW pool usage. Statistics include information on cast out processing (when an unused PSB is deleted from the pool to make room for a new PSB) and elapsed time values, so that performance problems caused by elongated PSB pool processing time can be analyzed. These values are reported after the basic scheduling statistics.

Get Requests

Total number of requests to get PSB pool space.

CSA PSB Pool

The CSA PSB Pool statistics are broken down into:

Space not immediately available

Number of times space was not immediately available in CSA PSB pool to satisfy the request. In addition to the count, this field shows the count per transaction and second. It is also expressed as a percentage of total Get Requests above.

PSBs cast out to make room for new PSB

Number of PSBs cast out (freed) to make room for new PSB in the CSA PSB pool. In addition to the count, this field shows the count per transaction and second. It is also expressed as a percentage of total Get Requests above.

Failed

Number of times get for PSB pool space failed for CSA PSB pool. In addition to the count, this field shows the count per transaction and second. It is also expressed as a percentage of total Get Requests above.

DLI PSB Pool

The DLI PSB Pool statistics are broken down into:

Space not immediately available

Number of times space was not immediately available in DLI PSB pool to satisfy the request. In addition to the count, this field shows the count per transaction and second. It is also expressed as a percentage of total Get Requests above.

PSBs cast out to make room for new PSB

Number of PSBs cast out (freed) to make room for new PSB in the DLI PSB pool. In addition to the count, this field shows the count per transaction and second. It is also expressed as a percentage of total Get Requests above.

Failed

Number of times get for PSB pool space failed for DLI PSB pool. In addition to the count, this field shows the count per transaction and second. It is also expressed as a percentage of total Get Requests above.

Space not immediately available in CSA and DLI

Number of times space was not immediately available in both CSA and DLI PSB pools. In addition to the count, this field shows the count per transaction and second. It is also expressed as a percentage of total Requests above.

Time getting PSB pool space with no PSB cast out

Cumulative time spent getting PSB pool space for calls when no PSB cast outs were needed.

Time getting PSB pool space with PSB cast out

Cumulative time spent getting PSB pool space for calls when PSB cast outs were needed to find the requested space.

PSB Pool Free Statistics

The PSB Pool Free Statistics are broken down into:

Free Requests

Number of requests to free PSB pool space.

Time freeing PSB pool space

Cumulative time spent freeing PSB pool space.

PSB Work Area Pool Get Statistics**Get Requests**

Total number of requests to get PSB work area pool space.

Failed Get Requests

Number of times get for PSB work area pool space failed. In addition to the count, this field shows the count per transaction and second. It is also expressed as a percentage of total Get Requests above.

Time getting PSB work area pool space

Cumulative time spent getting PSB work area pool space.

CQS Notify Statistics**Notifies for local transactions**

Number of CQS notifies for local transactions.

Notifies for remote transactions

Number of CQS notifies for remote transactions.

Time between transition exit dispatch and schedule of inform exit

Cumulative time between CQS structure list transition exit dispatch and CQS schedule of inform exit, in STCK units.

Time between schedule of inform exit and dispatch of inform exit

Cumulative time between CQS schedule of IMS inform exit and call of IMS inform exit (under SRB), in STCK units.

Time between inform exit and enqueue of SMB onto TCT (Local) or call of router (Remote)

Cumulative time between IMS inform exit and enqueue of SMB onto TCT (local) or call of router (remote), in STCK units.

Latch Statistics

The IMS Internal Resource Usage Latch Statistics report provides information regarding each IMS latch and the activity associated with that latch. The latch names are abbreviations for the different types of resources.

Latch	Conflict Statistics										Interval :		13.35 (HHMM.MM.SS)				
	Excl	Grant	Shr	Grant	Excl	IWAIT	Shr	IWAIT	Excl	OWAIT	Shr	OWAIT	Excl	Busy	Shr	Busy	Wait Time
DCSL		0		1537		0		0		0		0		0	2817823	Tot	0
/Tran	.00			7.53	.00		.00		.00		.00		.00		13,812.86	Ave	0
/Sec	.00			1.88	.00		.00		.00		.00		.00		3,458		
CONV	31		0		0		0		0		0		233		0	Tot	0
/Tran	.15		.00		.00		.00		.00		.00		1.14		.00	Ave	0
/Sec	.03		.00		.00		.00		.00		.00		.28		.00		
TERM	13		0		0		0		0		0		1501		0	Tot	0
/Tran	.06		.00		.00		.00		.00		.00		7.36		.00	Ave	0
/Sec	.01		.00		.00		.00		.00		.00		1.84		.00		
USER	13		0		0		0		0		0		376		0	Tot	0
/Tran	.06		.00		.00		.00		.00		.00		1.84		.00	Ave	0
/Sec	.01		.00		.00		.00		.00		.00		.46		.00		
SCHD	9		1017		0		0		0		0		24		2090022	Tot	0
/Tran	.04		4.99		.00		.00		.00		.00		.12		10,245.21	Ave	0
/Sec	.01		1.24		.00		.00		.00		.00		.02		2,565		
TCTB	1551		0		43		0		0		0		2047205		0	Tot	134308
/Tran	7.60		.00		.21		.00		.00		.00		10,035.32		.00	Ave	3123
/Sec	1.90		.00		.05		.00		.00		.00		2,512		.00		
APSB	0		313		0		0		0		0		0		1523886	Tot	0
/Tran	.00		1.53		.00		.00		.00		.00		.00		7,470.03	Ave	0
/Sec	.00		.38		.00		.00		.00		.00		.00		1,870		
PDRB	581		0		0		0		0		0		1523979		0	Tot	0
/Tran	2.85		.00		.00		.00		.00		.00		7,470.49		.00	Ave	0
/Sec	.71		.00		.00		.00		.00		.00		1,870		.00		
PSBP	12		538		0		0		0		0		298		2251	Tot	0
/Tran	.06		2.64		.00		.00		.00		.00		1.46		11.03	Ave	0
/Sec	.01		.66		.00		.00		.00		.00		.36		2.76		
DMBP	5		270		0		0		0		0		5373		9149	Tot	0
/Tran	.02		1.32		.00		.00		.00		.00		26.34		44.85	Ave	0
/Sec	.00		.33		.00		.00		.00		.00		6.59		11.22		
DMBB	211		33		0		0		0		0		84		0	Tot	0
/Tran	1.03		.16		.00		.00		.00		.00		.41		.00	Ave	0
/Sec	.25		.04		.00		.00		.00		.00		.10		.00		
PDRP	63		0		0		0		0		0		217		0	Tot	0
/Tran	.31		.00		.00		.00		.00		.00		1.06		.00	Ave	0
/Sec	.07		.00		.00		.00		.00		.00		.26		.00		
:																	

Figure 49. IMS Performance Analyzer Latch Statistics report

For a description of each latch name, see *IMS internal resource usage* in the *IMS System Administration* user documentation.

The following statistics are reported for each IMS latch:

Excl Grant

Exclusive latches granted

Shr Grant

Share latches granted

Excl IWAIT

Exclusive latch IWAIT count

Shr IWAIT

Share latch IWAIT count

Excl OWAIT

Exclusive latch OS wait count

Shr OWAIT

Share latch OS wait count

Excl Busy

Exclusive latch busy time

Shr Busy

Share latch busy time

Wait Time

Accumulated latch wait time (exclusive + shared)

Tip: A key performance indicator is the number of LOGR contentions. If it is high, then this may indicate a problem with the allocation or I/O rate of the OLDS.

Logger Statistics

The IMS Internal Resource Usage Logger Statistics report provides an analysis of the type x'4507' IMS logger statistics records. This IMS Performance Analyzer report provides various statistics describing the performance of the IMS log and WADS. I/O counts and buffer wait counts can be used to see if any system performance problems are being caused by bad logger or WADS I/O times.

Start 24Nov2017 11:34:39:49	IMS Performance Analyzer		End 24Nov2017 11:41:55:88
Page 1	Internal Resource Usage - IMS		
Logger Statistics	Count	/Transact	/Second
Interval :	7.16 (HHMM.MM.SS)		
Logical Logger:	Records Written	326	81.50
	Check Write requests	18	4.50
	Waits for Writes	0	.00
	Buffer Waits: CHKPT Invokers	0	.00
	Buffer Waits: Non-CHKPT Invokers	0	.00
	Buffer Waits: Transient	0	.00
	AWE submitted on Wrt	0	.00
	WTWT to CHKW conversions	0	.00
Physical Logger:	WADS EXCPVRs	18	4.50
	4K Segment Writes initiated	45	11.25
	OLDS Writes initiated	8	2.00
	OLDS Reads initiated	0	.00
	Internal Check Write requests	0	.00
	Cumulative WTWT Wait Time	01.44.34.026	
	OLDS Block Size	22,528	
	Log Buffers	5	
	CIs on the WADS	180	
	Cumulative primary WADS write I/O time	0.006	0.000348 Average per write
	Cumulative secondary WADS write I/O time	0.000	0.000000 Average per write
	Cumulative primary OLDS write I/O time	0.005	0.000624 Average per write
	Cumulative secondary OLDS write I/O time	0.005	0.000664 Average per write
	Primary WADS maximum I/O time	0.001	
	Secondary WADS maximum I/O time	0.000	
	Primary OLDS maximum I/O time	0.001	
	Secondary OLDS maximum I/O time	0.001	
	Primary WADS maximum I/O timestamp	11:41:53.84	
	Secondary WADS maximum I/O timestamp	N/A	
	Primary OLDS maximum I/O timestamp	11:34:39.49	
	Secondary OLDS maximum I/O timestamp	11:34:39.49	
	Buffer waiters needing posting at checkpoint	0	
	Buffer waiters needing posting not at checkpoint	0	
	WADS encryption matrix	NNNNNNNNNN	
	Checkpoint at: 11:41:55.88		
	OLDS dual logging in effect	YES	
	WADS dual logging in effect	NO	
	Log buffers in 64-bit real	NO	
	Log buffers in 64-bit virtual	NO	
	Log buffers using 1m real pages	NO	
	OLDS zhyperwrite	NO	
	WADS zhyperwrite	NO	
	WTWT converted to CHKW	NO	

Figure 50. IMS Performance Analyzer Logger Statistics report

A key performance indicator is the number of Logical Logger Buffer waits for non-checkpoint invokers. A high value may indicate that the Log Buffer allocation may be too low.

The report contains the following information:

Logical Logger

The Logical Logger writes IMS log records to the Log buffers, in preparation for DASD I/O to the WADS and OLDS data sets.

Records Written

The number of IMS log records written to the log (ILOG FUNC=WRT). Refer to the [Chapter 14, “Log Information report,”](#) on page 257 to understand the type and frequency of the records written by this IMS subsystem.

Check Write requests

The number of check write (ILOG FUNC=CHKW) requests issued by IMS. A physical write to the WADS is forced for a previously written log record (ILOG FUNC=WRT). If the specified log record is not yet written, this request will write the buffer(s) then return to the caller.

Waits for Writes

The number of wait for write (ILOG FUNC=WTWT) requests issued by IMS. The current task or transaction waits until a previously written log record (ILOG FUNC=WRT) is physically written to the WADS. If the specified log record is not yet written, the requesting ITASK is put in IWAIT status until the record is written to the WADS.

Buffer Waits: CHKPT Invokers

The number of times the IMS system checkpoint process waited for a Log Buffer to become available before it could write its checkpoint (type x'40') log records. Delays in checkpoint processing can cause delays in transaction processing and scheduling.

Buffer Waits: Non-CHKPT Invokers

The number of times that normal IMS and transaction processing waited for a Log Buffer to become available.

Note: A high rate of buffer waits may indicate a shortage of Log buffers, and you may need to increase their allocation. Log buffers can be located in 64 bit storage. Therefore previous ECSA constraints are no longer an inhibitor to increasing the allocation. To increase the number of Log buffers, update the BUFNO= value in the OLDSDEF statement in the DFSVSMxx member of the IMS PROCLIB data set.

Buffer Waits: Transient

The number of times that IMS processing waited for a Log buffer to become available; for conditions other than "all buffers are in use".

Note: Transient buffer waits are typically short in duration and are due to buffers being returned to the buffer free queue, or being scanned to find records in the buffers for reads. Transient buffer waits are not by themselves an indication of a log buffer shortage.

AWE submitted on WRT

The number of asynchronous work elements that were submitted as a result of all write log record requests (ILOG FUNC=WRT).

WTWT to CHKW conversions

The number of times a wait for write request was converted to a check write request.

Physical Logger

The Physical Logger performs the physical I/O of the Log buffers to the DASD WADS and OLDS.

WADS EXCPVRs

The number of EXCPVR I/O operations to the WADS data set in order to write the log buffers.

4K Segment Writes initiated

The number of 4096 byte log buffer segments written to the WADS data set.

OLDS Writes initiated

The number of write I/O operations issued against the OLDS data sets.

OLDS Reads initiated

The number of read I/O operations issued against the OLDS data sets.

Internal Check Write requests

The number of internal check write (ILOG FUNC=CHKW) requests issued by IMS.

Cumulative WTWT Wait Time

The cumulative elapsed time that IMS system and transaction processing waited for wait-for-write requests (ILOG FUNC=WTWT) to complete.

OLDS Block Size

The physical block size of the OLDS data sets.

Log Buffers

The number of log buffers allocated, as specified in the BUFNO= value in the OLDSDEF statement in the DFSVSMxx member of the IMS PROCLIB data set.

CIs on the WADS

The number of control intervals in the WADS. Given that the size of each control interval is 4KB, the size of the WADS data set in kilobytes is CIs on the WADS × 4.

Cumulative primary WADS write I/O time

The total elapsed time for all write I/O operations to the primary WADS data set. The average elapsed time per WADS write request is also reported.

Cumulative secondary WADS write I/O time

The total elapsed time for all write I/O operations to the secondary WADS data set, if used.

Cumulative primary OLDS write I/O time

The total elapsed time for all write I/O operations to the primary OLDS data sets. The average elapsed time per OLDS write request is also reported.

Cumulative secondary OLDS write I/O time

The total elapsed time for all write I/O operations to the secondary OLDS data sets, if used.

Primary WADS maximum I/O time

The maximum elapsed time of any write I/O operation to the primary WADS data set.

Secondary WADS maximum I/O time

The maximum elapsed time of any write I/O operation to the secondary WADS data set.

Primary OLDS maximum I/O time

The maximum elapsed time of any write I/O operation to the primary OLDS data set.

Secondary OLDS maximum I/O time

The maximum elapsed time of any write I/O operation to the secondary OLDS data set.

Primary WADS maximum I/O timestamp

The timestamp of the write I/O operation whose time is shown in Primary WADS maximum I/O time.

Secondary WADS maximum I/O timestamp

The timestamp of the write I/O operation whose time is shown in Secondary WADS maximum I/O time.

Primary OLDS maximum I/O timestamp

The timestamp of the write I/O operation whose time is shown in Primary OLDS maximum I/O time.

Secondary OLDS maximum I/O timestamp

The timestamp of the write I/O operation whose time is shown in Secondary OLDS maximum I/O time.

Buffer waiters needing posting at checkpoint

The number of times the physical logger found one or more programs waiting to POST at the completion of buffer I/O during checkpoint processing.

Note that the test for 'during checkpoint processing' is made at the time the buffer I/O completes, not at the time the ITASKs waited, so there can be some slight inconsistencies between the 'buffer waiter' fields and the logical logger buffer wait fields.

Buffer waiters needing posting not at checkpoint

The number of times the physical logger found one or more programs waiting to POST at the completion of buffer I/O not during checkpoint processing.

WADS encryption matrix

This field indicates whether the WADS data sets are encrypted. The matrix is a series of 10 values, where each value is either Y (encrypted) or N (not encrypted). The first character indicates whether the first WADS is encrypted. The second character indicates whether the second WADS, if it exists, is encrypted, and so on. Regardless of how many WADS data sets are in use, the matrix is always 10 characters in length; that is, the matrix is not an indicator of how many WADS data sets are in use. For example, YYNNNNNNNN shows that the first WADS is encrypted; it shows that the second WADS, if it exists, is encrypted, and it shows that the other WADS, if they exist, are not encrypted.

Checkpoint at HH:MM:SS.mm

The checkpoint time derived from the 0x4507 record.

OLDS dual logging in effect

Indicates if OLDS dual logging is in effect

WADS dual logging in effect

Indicates if WADS dual logging is in effect

Log buffers in 64-bit real

Indicates if log buffers are in 64-bit real storage

Log buffers in 64-bit virtual

Indicates if log buffers are in 64-bit virtual storage

Log buffers using 1m real pages

Indicates if log buffers are using 1M real pages

OLDS zhyperwrite

Status of OLDS zhyperwrite

WADS zhyperwrite

Status of WADS zhyperwrite

WTWT converted to CHKW

Indicates if WTWTs are currently being converted to CHKW

Dispatcher Statistics

The IMS Internal Resource Usage Dispatcher Statistics report provides performance related information for the various IMS TCBs. A report is produced for each TCB. The information reported includes ITASK and dispatcher statistics, as well as real time, IMS busy time and CPU time.

Note: The TCBs from which these Statistics are gathered may be running concurrently with the module that builds the 450F record. Thus the various counts and times may be "fuzzy" with respect to one another, and should be used as general indicators only.

Start 16Jan2018 14:18:19:85	IMS Performance Analyzer		End 16Jan2018 14:31:54:66
Page 21	Internal Resource Usage - IFDE		
Global Dispatcher Statistics	-----		Interval : 13.35 (HHHH.MM.SS)
	Count	/Transact	/Second
TCB Types	53		
Assigned dependent regions	5		
Total IMS ITASK Creates	5,995	29.39	7.36
Total IMS ITASK Dispatches	28,580	140.10	35.08
z/OS Processing statistics			
Online CPs	3		
Online zAAPs	0		
Online zIIPs	1		
Total online CPs	4		
CTL region TCB time (hh.mm.ss.ms)	0.896		
CTL region SRB time (hh.mm.ss.ms)	0.101		
DLI region TCB time (hh.mm.ss.ms)	0.165		
DLI region SRB time (hh.mm.ss.ms)	0.005		
CTL region enclave zIIP time	0.020		
CTL region non-enclave zIIP time	0.000		
CTL region zIIP time on CP	0.000		
DLI region enclave zIIP time	0.000		
DLI region non-enclave zIIP time	0.000		
DLI region zIIP time on CP	0.000		
Start 16Jan2018 14:18:19:85	IMS Performance Analyzer		End 16Jan2018 14:31:54:66
Page 22	Internal Resource Usage - IFDE		
Dispatcher Statistics	-----		Interval : 13.35 (HHHH.MM.SS)
	Count	/Transact	/Second
TCB Name	LOG		
# TCBs this type	1		
Total ITASK Creates	1,100	5.39	1.35
Total ITASK Dispatches	2,337	11.46	2.87
Total Dispatcher Suspend	2,144	10.51	2.63
Total Real Time for this TCB (hh.mm.ss.ms)	13.35.186		
IMS Busy Time/TCB (Non-Susp) (hh.mm.ss.ms)	0.189		.02% of IMS Real Time
CPU Time/TCB (hh.mm.ss.ms)	0.087		.01% of IMS Real Time
Total # wrong TCB ITASK terminations	0	.00	.00
Total suspend backouts	0	.00	.00
Cumulative count of ECBs on queues	140		
Maximum ECBs on queues since chkpt	4		
Time between RESUME and MVS disp of TCB	0.148		.01% of IMS Real Time
Maximum TCB resume time since chkpt	0.006		.00% of IMS Real Time
DBFSLEEP suspends	0	.00	.00
TCB Name	CTL		
# TCBs this type	1		
Total ITASK Creates	3,109	15.24	3.82
Total ITASK Dispatches	8,282	40.60	10.16
Total Dispatcher Suspend	7,441	36.48	9.13
Total Real Time for this TCB (hh.mm.ss.ms)	13.34.779		
IMS Busy Time/TCB (Non-Susp) (hh.mm.ss.ms)	0.424		.05% of IMS Real Time
CPU Time/TCB (hh.mm.ss.ms)	0.306		.03% of IMS Real Time
Total # wrong TCB ITASK terminations	0	.00	.00
Total suspend backouts	1	.00	.00
Cumulative count of ECBs on queues	747		
Maximum ECBs on queues since chkpt	3		
Time between RESUME and MVS disp of TCB	0.688		.08% of IMS Real Time
Maximum TCB resume time since chkpt	0.024		.00% of IMS Real Time
DBFSLEEP suspends	0	.00	.00
Note: The TCBs from which these Stats are gathered may be running concurrently with the module that builds the 450F record. Thus the various counts and times may be "fuzzy" with respect to one another, and should be used for general indicators only.			
:			

Figure 51. IMS Performance Analyzer Dispatcher Statistics report

Dynamic SAP Statistics

The IMS Internal Resource Usage Dynamic SAP Statistics report provides information on Dynamic SAPs (save area prefixes) that are used by communications ITASKs.

Dynamic SAP statistics		Interval : 13.35 (HHHH.MM.SS)		
TCB Name	ALM	Average	Minimum	Maximum
Total # avail Non-Priv SAPs		18	18	18
Total # avail Privileg SAPs		0	0	0
# SAPs on Stage Queue		0	0	0
Hi # SAPs asgn cur Contraction Interval		0	0	0
Current SAP Generation		0	0	0
Minimum # SAPs		18	18	18
Generation Size		36	36	36
	Count			
# Expands done		0		
# Contractions done		0		
# moves Stage to Free		0		
# times Upper Limit on SAPs		0		
# times in SD for SAPs		0		
# times Expansion failed		0		
	Average	Minimum	Maximum	
Total Non-Priv SD Waits		0	0	0
High Non-Priv SD Waiters		0	0	0
Total Priv SD Waits		0	0	0
High Priv SD Waiters		0	0	0
# Priv Disps during SD		0	0	0
Hi # SAPs asgn cur Checkpoint Interval		0	0	0
Hi # Priv asgn cur Checkpoint Interval		0	0	0
Number of Statistics Intervals	2			
Start 16Jan2018 14:18:19:85	IMS Performance Analyzer			End 16Jan2018 14:31:54:66
Page 37	Internal Resource Usage - IFDE			
Dynamic SAP statistics		Interval : 13.35 (HHHH.MM.SS)		
TCB Name	CTL	Average	Minimum	Maximum
Total # avail Non-Priv SAPs		41	41	41
Total # avail Privileg SAPs		15	15	15
# SAPs on Stage Queue		36	36	36
Hi # SAPs asgn cur Contraction Interval		2	2	3
Current SAP Generation		0	0	0
Minimum # SAPs		5	5	5
Generation Size		36	36	36
	Count			
# Expands done		0		
# Contractions done		0		
# moves Stage to Free		0		
# times Upper Limit on SAPs		0		
# times in SD for SAPs		0		
# times Expansion failed		0		
	Average	Minimum	Maximum	
Total Non-Priv SD Waits		0	0	0
High Non-Priv SD Waiters		0	0	0
Total Priv SD Waits		0	0	0
High Priv SD Waiters		0	0	0
# Priv Disps during SD		0	0	0
Hi # SAPs asgn cur Checkpoint Interval		2	2	3
Hi # Priv asgn cur Checkpoint Interval		0	0	0
Number of Statistics Intervals	2			

Figure 52. IMS Performance Analyzer Dynamic SAP Statistics report

Ideally, the number of waits for SAPs should be zero or close to zero. If not, it is recommended that you specify additional SAPs using the SAV= parameter. Dynamic SAPs are acquired when needed and the pool of dynamic SAPs may need to be expanded at times. If this occurs, IMS checks to see if it can contract them again, if certain conditions are met. DFSKDS20 does this monitoring. It is a timer driven module that examines the dynamic SAP activity every 10 minutes (the contraction interval).

Every time IMS goes through TASK CREATE in the IMS dispatcher and assigns a dynamic sap, IMS ups the count DSPDS_SAPS_ASGN, which represents the current number of dynamic SAPs. If this new value exceeds DSPDS_SAPS_HIGH (essentially the high water mark during this contraction interval), IMS updates the HIGH value to reflect the new high water mark.

When these tasks go through TASK TERMINATION in the IMS dispatcher, IMS places the freed SAPs on the SAP free queue to be re-used by subsequent TASK CREATES. If DFSKDS20 determines that the SAPs in use are excessive, IMS places these terminated SAPs on the STAGing queue, where they will be released back to the system rather than being available for re-use by IMS (SAP contraction).

There may be cases where IMS, again, exhausts the SAP free queue and needs to dig into the staging queue to re-acquire more SAPs, which plays into the calculations of DFSKDS20.

When DFSKDS20 runs, it takes a look at three conditions to determine if dynamic SAP contraction can take place:

- No expansion requests occurred during the interval.
- No moves from the stage queue to the free queue occurred during the interval.
- The SAP high water mark (high # of SAPs in use at the same time) for the interval is less than the number of SAPs that would have to be in use in order to cause SAP expansion if the current generation of SAPs were released. That is, IMS won't initiate SAP contraction if, by releasing the current generation of SAPs, IMS would reduce the SAP pool to the point where IMS would have to expand it again.

If these are all true, a bit (DSPDS_REET_HIGH) is set to indicate that on the next pass through TASK CREATE, the high water mark should be reset to DSPDS_SAPS_ASGN (the current SAP dispatch count). DFSKDS10 actually does the releasing of the SAPs on the staging queue by request from DFSKDS20.

ST450F_CKHSAP will probably be higher than ST450_SAPSHIGH since the checkpoints reset CKHSAP. Unless these are occurring every 10 minutes or less, it seems logical to expect them to be higher.

Fixed Pool Usage Statistics

The IMS Internal Resource Usage Miscellaneous Statistic report provides information about the fixed pools used by IMS. A number of statistics are provided for each buffer size in the pool; these include size, high water marks, and a number of other performance related statistics associated with each buffer.

Fixed Pool Usage Statistics				Interval :							13.35 (HHMM.MM.SS)
Pool Name	AOIP										
Pool Size at End of Period	39,928										
Maximum Pool Size	39,928										
Current # Bytes in Oversize Blocks	0										
Maximum Pool Size since IMS Restart	39,928										
Buffer Size	56	144	264	584	1,056	2,104	4,200	32,776	OVERSIZE		
Buffer count per Primary Block	50	500	100	32	16	8	4	4	0		
Buffer count per Secondary Block	50	1,500	100	32	8	4	2	2	0		
Max Buffer count since Init	0	0	0	2	0	3	0	0	0		
Max # Blocks since Init	1	0	0	1	0	1	0	0	0		
Initial Alloc (Yes/No)	YES	NO	NO	NO	NO	NO	NO	NO	NO		
Average Size requested	0	0	0	0	0	1,619	0	0	0		
Get reqs for this Buffer Size	0	0	0	0	0	155	0	0	0		
Get reqs this BuFSIZE per Second	0	0	0	0	0	>0.5	0	0	0		
# of times Upper Limit reached	0	0	0	0	0	0	0	0	0		
# times larger Buffer Size used	0	0	0	0	0	0	0	0	0		
Average Block count	0	0	0	0	0	1	0	0	0		
High Block count	1	0	0	1	0	1	0	0	0		
Low Block count	1	0	0	1	0	0	0	0	0		
Blocks Allocated (Expansion)	0	0	0	0	0	3	0	0	0		
Blocks Released (Compression)	0	0	0	0	0	3	0	0	0		
Average Buffer count	0	0	0	0	0	1	0	0	0		
High Buffer count	0	0	0	2	0	3	0	0	0		
Low Buffer count	0	0	0	2	0	0	0	0	0		
Page Load invoked, no IWAIT	0	0	0	0	0	0	0	0	0		
Page Load caused IWAIT	0	0	0	0	0	0	0	0	0		
:											

Figure 53. IMS Performance Analyzer Fixed Pool Usage Statistics report

Miscellaneous Statistics

The IMS Internal Resource Usage Miscellaneous Statistic report provides information on the highest PST used, the highest and current number of conversations in use, transaction counts by transaction type

(conversational, WFI, non-recoverable and response mode), RECANY buffer usage, IMS and statistics record versions, and the IMSPLEX name.

Miscellaneous Statistics		Interval : 13.35 (HHMM.MS.SS)	
	Count /Transact	/Second	
Highest PST used	5		
Highest CCB ID used	3		
Maximum # of CCBs in use	0		
Number of Conversations started	10	.01	
Number of Conversational Transactions	127	.16	62.25% of all Transactions
Number of Wait-For-Input Transactions	0	.00	0.00% of all Transactions
Number of NonRecoverable Transactions	0	.00	0.00% of all Transactions
Number of Response-Mode Transactions	61	.07	29.90% of all Transactions
Total number of Transactions	204	.25	
	Average	Minimum	Maximum
Number of RECANY Buffers used	0	0	0
Maximum number of RECANY Buffers used	0	0	1
Number of Statistics Intervals	2		
IMS Release Level	15.1.0		
Statistic records Version Level	0		
IMSPLEX name	CSLPLXDE		

Figure 54. IMS Performance Analyzer Miscellaneous Statistics report

The following information is reported.

Number of Conversations started

The number of Conversations started, calculated as the total number of type 11 records.

Transaction counts

The Transaction counts are for the number of transactions of each type that ran, calculated as the number of type 31 records for a GU to the SMB message queue.

Number of Conversational Transactions

Transactions defined with TRANSACT SPA

Number of Wait-For-Input Transactions

Transactions defined with TRANSACT WFI

Number of NonRecoverable Transactions

Transactions defined with TRANSACT INQUIRY=NONRECOV

Number of Response-Mode Transactions

Transactions defined with TRANSACT MSGTYPE=RESPONSE

Total number of Transactions

This total is used to calculate the percentage of all Transactions.

Number of RECANY Buffers used

The number of RECANY (Receive Any) buffers in use at the end of the checkpoint interval. Average, Minimum and Maximum values across all checkpoint intervals are reported.

Maximum number of RECANY Buffers used

The maximum number of RECANY (Receive Any) buffers used during the checkpoint interval. Average, Minimum and Maximum values across all checkpoint intervals are reported.

Tip: A key performance indicator is the number of RECANY buffers used by IMS to receive VTAM input messages. If the Number or Maximum number of RECANY buffers used is regularly high (equal to the RECA parameter in DFSPBxxx member of IMS.PROCLIB), then this may indicate a shortage. The Storage Pool statistics for the RECA pool provides additional information on its storage usage.

Storage Pool Statistics

The IMS Internal Resource Usage Storage Pool Statistics report provides information about the various storage pools used by IMS. Pools not used in the reporting period are not reported on.

For each pool, the following information is reported:

- Pool Identifier

- Description of the pool
- Average and maximum pool size
- Number of GETMAINS/FREEMAINS and GETs for the pool

Storage Pool Statistics		Count	/Transact	/Second	Interval :	13.35 (HHMM.MM.SS)
		-----	-----	-----		
IOSB	I/O Supervisor Block					
	Subpool Number	228				
	Average # Bytes allocated	17,749				
	Maximum # Bytes allocated	20,480				
	Number of GETMAINS	1	.00	.00		
	Number of FREEMAINS	0	.00	.00		
	Number of Gets for this Pool	9	.04	.01		
OSWA	OSAM Work Area					
	Subpool Number	228				
	Average # Bytes allocated	8,192				
	Maximum # Bytes allocated	8,192				
	Number of GETMAINS	0	.00	.00		
	Number of FREEMAINS	0	.00	.00		
	Number of Gets for this Pool	18	.09	.02		
PST	Partition Specification Table					
	Subpool Number	231				
	Average # Bytes allocated	15,018				
	Maximum # Bytes allocated	20,480				
	Number of GETMAINS	0	.00	.00		
	Number of FREEMAINS	2	.01	.00		
	Number of Gets for this Pool	0	.00	.00		
DPST	Dependent Region PST					
	Subpool Number	231				
	Average # Bytes allocated	24,576				
	Maximum # Bytes allocated	24,576				
	Number of GETMAINS	0	.00	.00		
	Number of FREEMAINS	0	.00	.00		
	Number of Gets for this Pool	5	.02	.01		
SAP	Savearea Set Prefix					
	Subpool Number	231				
	Average # Bytes allocated	53,248				
	Maximum # Bytes allocated	53,248				
	Number of GETMAINS	0	.00	.00		
	Number of FREEMAINS	0	.00	.00		
	Number of Gets for this Pool	14	.07	.02		
:						

Figure 55. IMS Performance Analyzer Storage Pool Statistics report

IRLM System Statistics

The IMS Internal Resource Usage IRLM System Statistics report provides information on the performance of the IRLM system. Counts of the various IRLM activities, as well as buffer and CSA usage, deadlock frequency and VTAM sends are reported.

IRLM System Statistics			Interval :	13.35 (HHMM.MS.SS)
	Count	/Transact	/Second	
Total Global Lock requests	819	4.01	1.01	
Child Locks Propagated	0	.00	.00	
RH to RH Notify requests	0	.00	.00	
Lock requests	826	4.05	1.01	
Unlock requests	381	1.87	.47	
Change requests	7	.03	.01	
Synchronous Notify requests	2	.01	.00	
Asynchronous Notify requests	127	.62	.16	
Verify requests	0	.00	.00	
Purge requests	1	.00	.00	
Query requests	0	.00	.00	
Takeover requests	0	.00	.00	
Suspend Exit counter	1	.00	.00	
Resume Exit counter	1	.00	.00	
Status Exit counter	0	.00	.00	
Notify Exit counter	0	.00	.00	
Deadlock Exit counter	0	.00	.00	
Timeout Exit counter	0	.00	.00	
Synchronously Propagated Locks	0	.00	.00	
Synchronously Propagated Changes	0	.00	.00	
Synchronously Propagated Unlocks	0	.00	.00	
Asynchronously Propagated Locks	0	.00	.00	
Local Resource Contentions	0	.00	.00	
Global Resource Contentions	0	.00	.00	
Contentions granted OK by IRLM	0	.00	.00	
False Contentions	0	.00	.00	
Identify requests	0			
Quit requests	0			
Total Local Deadlock Detection Cycles	0	.00	.00	
Total Global Deadlock Detection Cycles	0	.00	.00	
Timeout RLBs Purged	0			
CSA Highwater Mark	445,479			
Re-tryable ABENDs	0			
Non Re-Tryable ABENDs	0			

Figure 56. IMS Performance Analyzer IRLM System Statistics report

The 4522 IRLM System statistics contain information pertaining to this IRLM including total counts for all subsystems using this IRLM.

A key performance indicator is the ratio of Local and Global resource contentions to Lock requests. Ideally, this ratio should be low.

Another key performance indicator is the False Contentions count. A high value may indicate that the lock structure is too small.

Note: Starting with z/OS V1.4, XES changed the ASYNC processing rules. XES can now force requests to go ASYNC for many reasons that have no relationship to Resource Contention on the HASH class. IRLM can no longer assume that if the request went ASYNC but didn't get to the contention exit, that it was a false contention. Therefore, ASYNC conversions can cause some report fields to be invalid, for example:

1. The False Contention count can be drastically inflated.
2. The Suspend/Resume counts can be inflated if the suspend would not have occurred normally.

IRLM Subsystem Statistics

The IMS Internal Resource Usage IRLM Subsystem Statistics report provides information on the performance of the IRLM that relates to a particular IMS subsystem. Counts of the various IRLM activities are reported as well as per transaction (/Transact) and per second (/Second) values.

Start 16Jan2018 14:18:19:85 14:31:54:66 Page 69		IMS Performance Analyzer Internal Resource Usage - IFDE		End 16Jan2018	
IRLM SubSystem Statistics 13.35 (HHHH.MM.SS)		Interval :			
		Count	/Transact	/Second	
Total Global Lock requests		819	4.01	1.01	
Child Locks Propagated		0	.00	.00	
RH to RH Notify requests		0	.00	.00	
Lock requests		826	4.05	1.01	
Unlock requests		381	1.87	.47	
Change requests		7	.03	.01	
Synchronous Notify requests		2	.01	.00	
Asynchronous Notify requests		127	.62	.16	
Verify requests		0	.00	.00	
Purge requests		1	.00	.00	
Query requests		0	.00	.00	
Takeover requests		0	.00	.00	
Suspend Exit counter		0	.00	.00	
Resume Exit counter		0	.00	.00	
Status Exit counter		0	.00	.00	
Notify Exit counter		0	.00	.00	
Deadlock Exit counter		0	.00	.00	
Timeout Exit counter		0	.00	.00	
Synchronously Propagated Locks		0	.00	.00	
Synchronously Propagated Changes		0	.00	.00	
Synchronously Propagated Unlocks		0	.00	.00	
Asynchronously Propagated Locks		0	.00	.00	
Local Resource Contentions		0	.00	.00	
Global Resource Contentions		0	.00	.00	
Contentions granted OK by IRLM		0	.00	.00	
False Contentions		0	.00	.00	
:					

Figure 57. IMS Performance Analyzer IRLM Subsystem Statistics report

The 4521 IRLM Subsystem statistics contain counters attributable to the IMS subsystem only.

The Exit and Contention counters, while recorded in the 4521 IRLM subsystem record and reported here, are not applicable for the Subsystem report.

RACF Statistics

The IMS Internal Resource Usage RACF Statistics report provides information related to the performance of the RACF TCBs, such as counts of the various RACF activities, and the CPU and elapsed time used by these RACF activities.

RACF Statistics										Interval :		13.35 (HHHH.MM.SS)	
Time	TCB	Verify	Extract	AWEs	IWAITs	Count	IWAITs	Signons	ITASK	Elapsed Time	IMS Busy Time	CPU	
Sec.Mil	#	Failed	Failed	Proc.	GETRDYQ	GETRDYQ	Nowork	Proc.	Disp.	Sec.Mil	Sec.Mil		
.000	1	0	0	0	0	0	0	0	0	.000	.000		

Figure 58. IMS Performance Analyzer RACF Statistics report

Virtual Storage Usage

The IMS Internal Resource Usage Virtual Storage Usage report provides information related to general storage use.

General Storage Statistics		Interval :	13.35 (HHMM.MM.SS)
Virtual Storage Stats (Entire System)			
Size of 24-bit CSA	3,461,120		
Maximum allocated in 24-bit CSA	862,424		
Size of 31-bit CSA	314,851,328		
Maximum allocated in 31-bit CSA	95,585,712		
Size of 24-bit SQA	1,642,496		
Maximum allocated in 24-bit SQA	624,944		
Size of 31-bit SQA	175,837,184		
Maximum allocated in 31-bit SQA	32,283,432		
Maximum virtual shared memory pages alloc	537,091,840		
Maximum shared memory objects allocated	26		
Maximum 64-bit common memory objects alloc	242		
Size of 64-bit common area (bytes)	7.0866960E+10		
Maximum bytes allocated in 64-bit common	2.2841131E+10		
Real Storage Stats (Entire System)			
Real Frames			
System	7,692,480		
System < 16M real	4,094		
System 16M - 2G	515,618		
All available frame queues	3,045,212		
Preferred below available frame queue	1,540		
Non-preferred below available frame queue	0		
Preferred above available frame queue	455,415		
Non-preferred above available frame queue	0		
Preferred high available frame queue	2,588,257		
Non-preferred high available frame queue	0		
Available quad frame groups	641,265		
Pages			
Currently fixed	186,513		
Fixed < 16M	244		
Fixed 16M - 2G	30,819		
Paged in	9,650		
Paged out	21,575		
Common pages paged in	9,650		
Common pages paged out	21,567		
64-bit common pages backed in Real	98,948		
64-bit common pages backed in Aux	0		
64-bit common pages fixed in Real	17,434		
Start 16Jan2018 14:18:19:85		IMS Performance Analyzer	End 16Jan2018 14:31:54:66
Page 73	Internal Resource Usage - IFDE		
General Storage Statistics			

Virtual Storage Stats (IMS Ctl Region)			
Size of 24-bit private	9,412,608		
Limit of 24-bit private	9,412,608		
Maximum allocated in 24-bit User private	2,277,376		
Maximum allocated in 24-bit Auth private	589,824		
Size of 31-bit private	1,539,309,568		
Limit of 31-bit private	67,108,864		
Maximum allocated in 31-bit User private	9,641,984		
Maximum allocated in 31-bit Auth private	20,443,136		
Address space memory limit (MB)	16,384		
Allocated from high VM for memory objects	2,509,242,368		
Allocated from high VM for shared objects	0		
Memory objects allocated	20		
Shared memory objects allocated	0		
64-bit common objects allocated	5		
Bytes allocated in 64-bit common	2,151,677,952		
Source of MEMLIMIT (RAXLVMEMLIMS)	RAXLVAUTH		
Real Storage Stats (IMS Ctl Region)			
Frames in use by this address space	4,780		
Pages fixed in this address space	911		
Pages explicitly fixed < 16M	87		
Pages explicitly fixed 16M - 2G	375		
Virtual Storage Stats (DLI/SAS Region)			
Size of 24-bit private	9,412,608		
Limit of 24-bit private	9,412,608		
Maximum allocated in 24-bit User private	708,608		
Maximum allocated in 24-bit Auth private	225,280		
Size of 31-bit private	1,539,309,568		
Limit of 31-bit private	67,108,864		
Maximum allocated in 31-bit User private	2,424,832		
Maximum allocated in 31-bit Auth private	10,678,272		
Address space memory limit (MB)	16,384		
Allocated from high VM for memory objects	4.6714060E+09		
Allocated from high VM for shared objects	0		
Memory objects allocated	22		
Shared memory objects allocated	0		
64-bit common objects allocated	0		
Bytes allocated in 64-bit common	0		
Source of MEMLIMIT (RAXLVMEMLIMS)	RAXLVAUTH		
Real Storage Stats (DLI/SAS Region)			
Frames in use by this address space	1,644		
Pages fixed in this address space	440		
Pages explicitly fixed < 16M	1		
Pages explicitly fixed 16M - 2G	19		

Figure 59. IMS Performance Analyzer Virtual Storage Usage report

IMODULE Statistics

The IMS Internal Resource Usage IMODULE Statistics report provides information related to IMODULE services. Statistics are provided for IMODULE requests that obtained or deleted common storage. Statistics are also provided for IMODULE requests by call type.

IMODULE Summary Statistics			Interval : 13.35 (HHMM.MM.SS)	
	Count	/Transact	/Second	

Common Storage				
Common SP GETMAIN+GETSTOR requests	479	2.35	.59	
Cumulative common GETMAIN+GETSTOR size	1,085,824	5,322.67	1,332.60	
Common SP LOAD requests	0	.00	.00	
Cumulative common LOAD size	0			
Common SP DELETE requests	425	2.08	.52	
Cumulative common DELETE size	412,264			
DELETE SP=ALL requests	0	.00	.00	
Common DELETE SP=ALL entities	0			
Cumulative common DELETE SP=ALL size	0			
Requests				
GETMAIN				
Total requests	2,556	12.53	3.14	
Cumulative size	12,508,896	61,318.12	15,352	
Errors	0	.00	.00	
LOAD				
Total requests	55	.27	.07	
Cumulative size	145,168	711.61	178.16	
Errors	5	.02	.01	
Count of times module found in CDE chain	0	.00	.00	
LOCATE				
Total requests	18	.09	.02	
Cumulative size	0	.00	.00	
Errors	9	.04	.01	
DELETE				
Total requests	2,408	11.80	2.96	
Cumulative size	2,806,968	13,759.65	3,444.91	
Errors	0	.00	.00	
Directed LOAD				
Total requests	4	.02	.00	
Cumulative size	544	2.67	.67	
Errors	0	.00	.00	
GETSTOR				
Total requests	263	1.29	.32	
Cumulative size	1,043,832	5,116.82	1,281.07	
Errors	0	.00	.00	
FREESTOR				
Total requests	248	1.22	.30	
Cumulative size	1,121,712	5,498.59	1,376.65	
Errors	0	.00	.00	
Start 16Jan2018 14:18:19:85				
IMS Performance Analyzer				
Internal Resource Usage - IFDE				
End 16Jan2018 14:31:54:66 Page 75				
STE Statistics			Interval : 13.35 (HHMM.MM.SS)	
	Count	/Transact	/Second	

CTL Common				
Number of allocated STEs	621			
Number of bytes tracked - 24-bit storage	37,888			
Number of bytes tracked - 31-bit storage	2,649,496			
Number of bytes tracked - 64-bit storage	0			
STE enqueue failures	0	.00	.00	
STE dequeue failures	0	.00	.00	
CTL Private				
Number of allocated STEs	234			
Number of bytes tracked - 24-bit storage	18,904			
Number of bytes tracked - 31-bit storage	1,043,248			
Number of bytes tracked - 64-bit storage	0			
STE enqueue failures	0	.00	.00	
STE dequeue failures	0	.00	.00	
DLI Common				
Number of allocated STEs	1			
Number of bytes tracked - 24-bit storage	0			
Number of bytes tracked - 31-bit storage	1,368			
Number of bytes tracked - 64-bit storage	0			
STE enqueue failures	0	.00	.00	
STE dequeue failures	0	.00	.00	
DLI Private				
Number of allocated STEs	15			
Number of bytes tracked - 24-bit storage	352			
Number of bytes tracked - 31-bit storage	77,104			
Number of bytes tracked - 64-bit storage	0			
STE enqueue failures	0	.00	.00	
STE dequeue failures	0	.00	.00	

Figure 60. IMS Performance Analyzer IMODULE Statistics report

EWLM Statistics

The IMS Internal Resource Usage Enterprise Workload Manager (EWLM) report provides information on Enterprise Workload Manager (EWLM) statistics.

Enterprise Workload Manager Statistics			Interval :	1.50.44 (HHMM.MS.SS)
	Count	/Transact	/Second	
Table entries created	0	.00	.00	
Timed out table entries	0	.00	.00	
Table entries currently active	0	.00	.00	
Active entries in overflow table	0	.00	.00	
Failed table entry lookups	0	.00	.00	
Failed allocate calls	0	.00	.00	
Highwater mark	3,823,289,284			

Figure 61. IMS Performance Analyzer EWLM Statistics report

64-bit Cache Statistics

The IMS Internal Resource Usage 64-bit Cache Statistics report provides information about the various 64-bit storage cache pools used by IMS.

64-bit Cache Manager Statistics		Interval :	13.35 (HHMM.MS.SS)
Pool Name	ACBIN64		
Pool Size (MAXPOOLSIZE)	2,147,483,648		
Percentage of pool in use	0		
Active buffers in pool	28		
Total buffers in pool	37		
FIND calls	0		
Successful DFS4SMFN calls	0		
Unsuccessful DFS4SMFN calls	0		
DFS4SMAD calls	28		
Deletes (DFS4SMDE and castout)	0		
Name of largest buffer	MQATPGM		
Length of largest buffer	8,192		
Name of smallest buffer	DFSSAM04		
Length of smallest buffer	512		

Figure 62. IMS Performance Analyzer 64-bit Cache Statistics report

Fast Path 64-bit Buffer Statistics

The IMS Internal Resource Usage Fast Path 64-bit Buffer Statistics report provides information about the various 64-bit Fast Path storage pools used by IMS.

Fast Path 64-bit Buffer Manager Statistics			Interval : 13.35 (HHHH.MM.SS)		
General Information					
	Available	Used	Unknown	Total	
Common subpool buffers	48	0	0	48	
System subpool buffers	24	0	0	24	
Total subpool buffers	72	0	0	72	
Total ECSA used for buffers	16,384				
Total ECSA used for DMHR	33,408				
Total ECSA used for other control	2,368				
Total ECSA used	57,588				
Total 64-bit storage used	32,768				
Total EPVT used for buffers	0				
Total EPVT used for DMHR	0				
Total EPVT used for other control	624				
Total EPVT used	792				
System Pools					
Subpool name	DBFS0001	DBFS0002	-	-	-
Buffer size	512	1,024	0	0	0
Number of times waited for buffer	0	0	0	0	0
Number of buffers	16	8	0	0	0
Number of buffers available	16	8	0	0	0
Number of buffers in use	0	0	0	0	0
Number of buffers in unknown status	0	0	0	0	0
Maximum number of buffers used	1	1	0	0	0
Buffer storage in base section	8,192	8,192	0	0	0
DMHR storage in base section	7,424	3,712	0	0	0
Buffer storage in extents	0	0	0	0	0
DMHR storage in extents	0	0	0	0	0
Total ECSA used	16,208	12,496	0	0	0
Total EPVT used	156	156	0	0	0
Total 64-bit used	0	0	0	0	0
Start 16Jan2018 14:18:19:85	IMS Performance Analyzer		End 16Jan2018 14:31:54:66		Page 78
	Internal Resource Usage - IFDE				
Fast Path 64-bit Buffer Manager Statistics					
-----			Interval : 13.35 (HHHH.MM.SS)		
Common Pools					
Subpool name	DBFC0001	DBFC0002	-	-	-
Buffer size	512	1,024	0	0	0
Number of times waited for buffer	0	0	0	0	0
Number of buffers	32	16	0	0	0
Number of buffers available	32	16	0	0	0
Number of buffers in use	0	0	0	0	0
Number of buffers in unknown status	0	0	0	0	0
Maximum number of buffers used	1	0	0	0	0
Buffer storage in base section	16,384	16,384	0	0	0
DMHR storage in base section	14,848	7,424	0	0	0
Buffer storage in extents	0	0	0	0	0
DMHR storage in extents	0	0	0	0	0
Total ECSA used	15,440	8,016	0	0	0
Total EPVT used	156	156	0	0	0

Figure 63. IMS Performance Analyzer Fast Path 64-bit Buffer Statistics report

User Exit Statistics

The IMS Internal Resource Usage User Exit Statistic report provides statistics for User Exit modules.

User Exit Statistics			Interval :	13.35 (HHHH.MM.SS)
	Count	/Transact	/Second	

User Exit type: PPUE				
User Exit name	KOIPPUE0			
Active instances	0			
Number of calls	1			
Elapsed time in this user exit module	0.030			
Last load timestamp	14:18:08.54			
Size in bytes of exit module	1,888			
User Exit type: RESTART				
User Exit name	IEFBR14			
Active instances	0			
Number of calls	1			
Elapsed time in this user exit module	0.000			
Last load timestamp	14:18:08.51			
Size in bytes of exit module	8			
User Exit type: INITTERM				
User Exit name	IEFBR14			
Active instances	0			
Number of calls	0			
Elapsed time in this user exit module	0.000			
Last load timestamp	14:18:08.53			
Size in bytes of exit module	8			
User Exit type: ICQSEVNT				
User Exit name	IEFBR14			
Active instances	0			
Number of calls	0			
Elapsed time in this user exit module	0.000			
Last load timestamp	14:18:08.52			
Size in bytes of exit module	8			
User Exit type: IMSMON				
User Exit name	KOIMON00			
Active instances	0			
Number of calls	14,823			
Elapsed time in this user exit module	0.006			
Last load timestamp	14:18:08.53			
Size in bytes of exit module	2,160			

Figure 64. IMS Performance Analyzer User Exit Statistics report

Individual TCB Statistics

The IMS Internal Resource Usage Individual TCB Statistics report provides information on individual TCBs. Some IMS task control block (TCB) types have multiple TCBs and, for some of these types such as the OTMA input message (OIM) and the asynchronous logical unit manager (ALM), it is useful to see details of individual TCBs.

For TCB types with multiple TCBs, IMS writes a 4518 log record for each TCB, in addition to the cumulative statistics for the TCB type in the 450F log record. This report provides details of the individual TCBs.

Individual TCB Statistics			Interval :		13.35 (HHHH.MM.SS)
	Count	/Transact	/Second		
TCB Name & ASID	RRS - 0D03				
TCB Address	00879E88				
Total ITASK Creates	1	.00	.00		
Total ITASK Dispatches	1	.00	.00		
Total Dispatcher Suspends	1	.00	.00		
Total Real Time for this TCB (hh.mm.ss.ms)	0.011				
IMS Busy Time/TCB (Non-Susp) (hh.mm.ss.ms)	0.011			100.00% of IMS Real Time	
CPU Time/TCB (hh.mm.ss.ms)	0.000			6.74% of IMS Real Time	
Total # wrong TCB ITASK terminations	0	.00	.00		
Total suspend backouts	0	.00	.00		
Cumulative count of ECBs on queues	0				
Maximum ECBs on queues since chkpt	0				
Time between RESUME and MVS disp of TCB	0.000			.00% of IMS Real Time	
Maximum TCB resume time since chkpt	0.000			.00% of IMS Real Time	
DBFSLEEP suspends	0	.00	.00		

Figure 65. IMS Performance Analyzer Individual TCB Statistics report

64-bit Storage Statistics

The IMS Internal Resource Usage 64-bit Storage Statistics report provides information about the size and usage of the 64-bit storage pool. IMS has a 64-bit storage manager that helps reduce below-the-bar storage constraints.

64-bit Storage Manager Statistics		Interval : 13.35 (HHHH.MM.SS)									
Pool Name	OPTLAYER00										
Buffer allocation size	256										
Block size	262,144										
Object size in 1Mb increments	1										
Current pool size (1M incr)	1										
Max pool size (1M incr) since Init	1										
Max pool size (1M incr) since Ckpt	1										
Current # of secondary segments	0										
# of new secondary segments since Init	0										
# of allocated oversize segments	0										
# of new oversize segments since Init	0										
Total size of oversize segments (1M incr)	0										
Length of pool header blocks	66,032										
Total buffer area size (in bytes)	524,288										
Buffer Size	248	504	1,016	2,040	4,088	8,184	16,376	32,760			
# of buffers in a block	1,024	512	256	128	64	32	16	8			
# blocks on BSE allocated block chain	0	0	0	0	0	0	0	0			
# blks on BSE compression pending queue	0	0	0	0	0	0	0	0			
Current # of in-use buffers	0	0	0	0	0	0	0	0			
Max in-use buffer count since Init	0	0	0	0	0	0	0	0			
Max in-use buffer count since last Ckpt	0	0	0	0	0	0	0	0			
Max in-use block count since Init	0	0	0	0	0	0	0	0			
Max in-use block count since last Ckpt	0	0	0	0	0	0	0	0			
# of times larger buff size used	0	0	0	0	0	0	0	0			
# of times this buff used for smaller	0	0	0	0	0	0	0	0			
# of requests satisfied by this size	0	0	0	0	0	0	0	0			
Total Get requests for buffer size	0	0	0	0	0	0	0	0			
Total Get requests last compression cycle	0	0	0	0	0	0	0	0			
Buffer Size	65,528	131,064	262,136								
# of buffers in a block	4	2	1								
# blocks on BSE allocated block chain	0	0	0								
# blks on BSE compression pending queue	0	0	0								
Current # of in-use buffers	0	0	0								
Max in-use buffer count since Init	0	0	0								
Max in-use buffer count since last Ckpt	0	0	0								
Max in-use block count since Init	0	0	0								
Max in-use block count since last Ckpt	0	0	0								
# of times larger buff size used	0	0	0								
# of times this buff used for smaller	0	0	0								
# of requests satisfied by this size	0	0	0								
Total Get requests for buffer size	0	0	0								
Total Get requests last compression cycle	0	0	0								

Figure 66. IMS Performance Analyzer 64-bit Storage Statistics report

OTMA TPIPE Statistics

The IMS Internal Resource Usage Member OTMA TPIPE Statistics report provides information about each OTMA Member's TPIPEs and YTIBs. The Global OTMA TPIPE Statistics report summarizes information for all OTMA Members' TPIPEs and YTIBs.

Key performance indicators on the following reports include the number of TPIPEs allowed and the Highwater number of TPIPEs. Transaction pipes (TPIPEs) use a significant amount of IMS resources, so it is best to fine-tune the maximum number of TPIPEs allowed for each OTMA Member. This is specified for an OTMA Member (client) with MAXTP parameter on the OTMA client descriptor in the DFSYDTx member of the IMS.PROCLIB data set. Suppose an input transaction from an OTMA client requires an additional TPIPE, and one is unavailable due to the defined maximum. In that case, OTMA rejects the transaction with a NAK message, and new input messages from that client are suppressed.

Another key performance indicator is the Current Number of YTIBs allocated. Many transaction instance blocks (YTIBs) indicate that the IMS subsystem cannot process messages from an OTMA client quickly enough and that there is a build-up of YTIBs in storage. This can exhaust below-the-line storage and potentially result in an S40D system abend. To prevent this OTMA message flood condition, you might need to re-route OTMA input messages to a different IMS subsystem or stop the OTMA clients. Also, ensure that the IMS regions that process the OTMA transactions are active. When message flood detection is active in IMS, you can watch the following IMS Console for the message:

```
DFS3428W THE TOTAL OTMA INPUT MESSAGES(TIB) HAVE REACHED XX% OF THE GLOBAL LIMIT ZZZZ.
```

Start 09Jun2023 11:42:12:03	IMS Performance Analyzer Internal Resource Usage - IMS1	End 09Jun2023 11:49:53:76	Page 1
Global OTMA TPIPE Statistics	-----	Interval :	7.42 (HHHH.MM.SS)
	Count /Transact /Second		
Current number of TPIPEs	-----1-----		
Max # of TPIPEs allowed	0		
Highwater # TPIPEs since previous Ckpt	1		
Time of TPIPE highwater mark	11:48:35.15		
Number of lightweight TPIPEs	0		
Current number of YTIBs	0		
Maximum number of YTIBs allowed	10,000		
Highwater # YTIBs since previous Ckpt	1		
Time of YTIB highwater mark	11:48:35.16		
Current number of YQABs	1		
Start 09Jun2023 11:42:12:03	IMS Performance Analyzer Internal Resource Usage - IMS1	End 09Jun2023 11:49:53:76	Page 2
Member OTMA TPIPE Statistics	-----	Interval :	7.42 (HHHH.MM.SS)
	Count /Transact /Second		
Member name	-----HWS1-----		
Current number of TPIPEs	0		
Max # of TPIPEs allowed	0		
Highwater # TPIPEs since previous Ckpt	0		
Time of TPIPE highwater mark	N/A		
Number of lightweight TPIPEs	0		
Current number of YTIBs	0		
Maximum number of YTIBs allowed	5,000		
Highwater # YTIBs since previous Ckpt	0		
Time of YTIB highwater mark	N/A		
Start 09Jun2023 11:42:12:03	IMS Performance Analyzer Internal Resource Usage - IMS1	End 09Jun2023 11:49:53:76	Page 3
Member OTMA TPIPE Statistics	-----	Interval :	7.42 (HHHH.MM.SS)
	Count /Transact /Second		
Member name	-----VC5-----		
Current number of TPIPEs	1		
Max # of TPIPEs allowed	0		
Highwater # TPIPEs since previous Ckpt	1		
Time of TPIPE highwater mark	11:48:35.15		
Number of lightweight TPIPEs	0		
Current number of YTIBs	0		
Maximum number of YTIBs allowed	5,000		
Highwater # YTIBs since previous Ckpt	1		
Time of YTIB highwater mark	11:48:35.16		

Figure 67. IMS Performance Analyzer Internal Resource Usage Global OTMA TPIPE Statistics report

For more information on managing OTMA TPIPEs and YTIBs, refer to the [Managing system resources and OTMA](#) topic in the IBM IMS documentation.

MSC Link Statistics report

The IMS MSC Link Statistics report provides summary information on the overall usage of MSC links and a detailed breakdown of Send and Receive data for each MSC link. The MSC Link Statistics report can help you validate and tune MSC links bandwidth.

You can request one or both of the following reports:

General Statistics

Summary information on the overall usage of each MSC link.

Send/Receive Statistics

Summary information for each MSC link with a more detailed breakdown of Send and Receive traffic.

Log records: This report is derived from IMS log record 4513.

Options

To specify the report options, select **MSC Link Statistics** from the Resource Usage and Availability Reports in a Log Report Set.

You can select to show general statistics for overall usage of each link, or a breakdown of Send and Receive statistics for each link, or both. If you select none, then both reports are produced by default.

To obtain meaningful reports, the log must contain at least two checkpoints. You can select to print the set of reports after each completed checkpoint. If this option is not selected, then one set of reports is produced for the entire time range.

You can report on particular IMS subsystems by specifying an IMS Subsystem ID Object List to include or exclude.

A report interval can be specified. This applies to the reduced data file after the Global (or Run-time) report interval is effected.

The report output data set is controlled by specifying the Report Output DDname.

Content

Start 01Feb2018 11:39:57:87 Page 1			IMS Performance Analyzer				End 01Feb2018 11:47:44:30		
			MSC Link Statistics - IFD3						
General Statistics (times in microseconds)							Interval : 7.46 (HHHH.MM.SS)		
Link Name	Link Number	Start time for statistics	Number ITASK Dispatches	Total ITASK Proc Time	Min ITASK Proc Time	Max ITASK Proc Time	Log Check Writes	Log Check Writes IO	
MSCLK3T	1	2018-02-01-09.53.44.762573	0	0	0	0	0	0	
MSCLK34M	2	2018-02-01-09.53.44.759867	288	0.056917	0.000008	0.002198	96	96	
MSCLK3	3	2018-02-01-09.53.44.762248	0	0	0	0	0	0	
MSCLK3S	4	2018-02-01-09.53.44.761940	0	0	0	0	0	0	
MSCLK36M	5	2018-02-01-09.53.44.760056	72	0.013663	0.000001	0.000887	24	24	
MSCLK6	6	2018-02-01-09.53.44.762735	0	0	0	0	0	0	
Total			360	0.070581	0	0.002198	120	120	
Start 01Feb2018 11:39:57:87 Page 2			IMS Performance Analyzer				End 01Feb2018 11:47:44:30		
			MSC Link Statistics - IFD3						
Send/Receive Statistics (times in microseconds)							Interval : 7.46 (HHHH.MM.SS)		
Link Name	Link Number	Number of Msgs	Total Bytes	QMGR/SHQ Calls	Message Size	QMGR/SHQ Call Time	I/O Time		
MSCLK34M Send	2	48	26,550	192	507	0	0	Min	
					555	0.000085	0	Max	
					26,262	0.002516	0	Total	
					547	0.000052	0	Average	
Recv	2	48	28,526	144	556	0	0	Min	
					595	0.000046	0	Max	
					28,238	0.001914	0	Total	
					588	0.000039	0	Average	
MSCLK36M Send	5	12	6,641	48	507	0	0	Min	
					555	0.000042	0	Max	
					6,569	0.000615	0	Total	
					547	0.000051	0	Average	
Recv	5	12	7,154	36	558	0	0	Min	
					597	0.000042	0	Max	
					7,082	0.000563	0	Total	
					590	0.000046	0	Average	

Figure 68. MSC Link Statistics report

The **General Statistics** report contains the following information:

Link Name

Link name.

Link Number

Link number.

Start time for statistics

Start date and local time for the statistics in the format YYYY-MM-DD HH:MM:SS.thmiju. For option RESET,CHKPT, this will be the last IMS checkpoint time. For option NORESET,CHKPT, this will be when the last UPDATE MSLINK START STATISTICS OPTION(RESET) command was issued. Refer to IMS Command Reference, Volume 2.

Number ITASK Dispatches

Total number of ITASK dispatches.

Total ITASK Proc Time

Total ITASK process time, in microseconds.

Min ITASK Proc Time

Low ITASK process time, in microseconds.

Max ITASK Proc Time

High ITASK process time, in microseconds.

Log Check Writes

Total number of log check writes.

Log Check Writes IO

Total number of log check writes with I/O.

The **Send Statistics** are:

Link Name

Link name.

Link Number

Link number.

Number of Msgs

Total number of messages sent.

Total Bytes

Total number of bytes sent.

QMGR/SHQ Calls

Total number of message get-related calls to QMGR or shared queues. Includes GU, GN, and DEQ calls.

Message Size

Low, high, total, and average number of message bytes sent.

QMGR/SHQ Call Time

Low, high, total, and average send GU/GN time, in microseconds.

I/O Time

Low, high, total, and average send I/O time, in microseconds.

The **Receive Statistics** are:

Link Name

Link name.

Link Number

Link number.

Number of Msgs

Total number of messages received.

Total Bytes

Total number of bytes received.

QMGR/SHQ Calls

Total number of message put-related calls to QMGR or shared queues. Includes ISRT and ENQ calls.

Message Size

Low, high, total, and average number of message bytes received.

QMGR/SHQ Call Time

Low, high, total, and average receive ISRT/ENQ time, in microseconds.

I/O Time

Low, high, total, and average receive I/O time, in microseconds.

Message Queue Utilization report

The IMS Message Queue Utilization report contains information on the use of message queues. This IMS Performance Analyzer report can help you balance the I/O between long and short message data sets and adjust record and buffer sizes for the most efficient use of these two data sets. Thus this report helps you reduce storage and minimize I/O.

This information can help you:

- Balance the I/O between long and short message data sets
- Adjust record and buffer sizes for the most efficient use of these two data sets

Thus this report helps you reduce storage and minimize I/O.

Log records: This report is derived from IMS log records 01, 03, 34, 40.

Uses

Ideally, all messages short enough for the short message data set are written to it; all other messages short enough for the long message data set are written there. There should be very few messages too long for the record size of the long message data set. The Message Queue Utilization report shows you how closely these ideals were approached.

If a significant number of short messages are written to the long message data set, you may want to increase the short message queue record size. If a significant number of long messages are written to the short message data set, then you may want to decrease the short message queue record size. On the other hand, these anomalies are often the result of large variations in the sizes of output responses. If this is the case, you may be able to exercise some control over input scheduling. Also, the ratio of long message record size to short message record size can be deduced from the record sizes shown. For I/O balancing, this same ratio should apply to the number of messages written to the short and to the long message data sets. If too many records are written to one or the other data set, I/O operations may not be well balanced. You can make adjustments by changing buffer sizes for the message data sets.

MFS messages are directed according to expanded, external message sizes, not internal sizes. For these messages, average record size has meaning only for message switches and program switches.

To fully utilize the information in this report, you should be familiar with the IMS algorithm for calculating the length of messages that are assigned to the short or long message queue data sets. See the MSGQUEUE macro. The message length is determined by a combination of factors, not just the length of the message text. The message prefix and any applicable segment extensions including system, security, WLM, MSC, APPC, OTMA also contribute to the message length.

Options

To specify the report options, select **Message Queue Utilization** from the Resource Usage and Availability Reports in a Log Report Set.

The **Record Size Interval** option specifies the record size interval, in bytes, to be reported on each line of this report.

To report only messages that are enqueued in message data sets, select the **Report Only Enqueued Messages** option. This allows you to more accurately dissect the use of message queues so you can better adjust the sizes of these data sets.

To report individual records, not complete messages, select the **Record length (not message)** option. This option may be used for shared queues where OBJAVGSZ is determined based on individual records, not complete messages which may span multiple records.

Specify an **Object List** to include or exclude particular IMS subsystems from the report.

Specify a **Report Interval** for the reduced data file after the Global (or Runtime) report interval is effected.

Specify the **Report Output DDname** to control the report output data set.

Content

The Message Queue Utilization report is produced by IMS Subsystem ID (displayed in the heading) and is ordered by message interval size. It reports on message queue records that result from input transactions, message switches, program switches, and output messages.

You can specify the size of the interval that is to be reported. Each row of the report contains information about all messages whose lengths are within the interval size for that row. Interval sizes are not printed if there were no messages in those sizes.

A major subdivision in the report is indicated by two horizontal lines:

- All report entries above the first line are for messages short enough to fit into the short message queue.
- All entries between the two lines are for messages too long for the short message queue but short enough for the long message queue.
- The entries below the lower line are for messages too long for either queue; these messages have to be split and inserted into one or the other or both queues.

Start 04Jun2023 15.08.21.87				IMS Performance Analyzer										End 04Jun2023 17.32.56.58 Page 1					
Message Queue Utilization-IMSA																			
Msg Length Interval	Msg Avg Length	Input Count	Transaction ShMsg	LgMsg	-Message Switch-- Count	ShMsg	LgMsg	-Program Switch-- Count	ShMsg	LgMsg	-Output Message-- Count	ShMsg	LgMsg	-----Totals----- Count	ShMsg	LgMsg	Pct	Acc Pct	
00000-00009	0	-	-	-	-	-	-	-	-	-	84	-	-	84	-	-	0	0	
00440-00449	446	37733	27245	10488	-	-	-	11379	9731	1648	11732	5339	6393	60844	42315	18529	46	46	
00450-00459	459	63	63	-	-	-	-	1207	1207	-	-	-	-	1270	1270	-	1	47	
00460-00469	468	1	1	-	-	-	-	1409	1409	-	-	-	-	1410	1410	-	1	48	
⋮																			
00680-00689	688	91	89	2	2	2	-	327	323	4	1127	1114	13	1547	1528	19	1	57	
⋮																			
01110-01119	1113	65	65	-	-	-	-	10	10	-	506	506	-	581	581	-	0	75	
01120-01129	1126	-	-	-	-	-	-	2	2	-	251	251	-	253	253	-	0	75	
01130-01139	1135	255	255	-	-	-	-	3	3	-	219	219	-	477	477	-	0	75	
⋮																			
01140-01149	1146	-	-	-	-	-	-	1090	-	1090	19	-	19	1109	-	1109	1	76	
01150-01159	1151	-	-	-	-	-	-	-	-	-	441	-	441	441	-	441	0	77	
01160-01169	1165	32	-	32	-	-	-	4	-	4	732	-	732	768	-	768	1	77	
01170-01179	1177	18	-	18	-	-	-	-	-	-	69	-	69	87	-	87	0	77	
⋮																			
05570-05579	5570	-	-	-	-	-	-	-	-	-	1157	-	2314	1157	-	2314	1	100	
⋮																			
05740-05749	5748	-	-	-	-	-	-	-	-	-	2	-	4	2	-	4	0	100	
05900-05909	5906	-	-	-	-	-	-	-	-	-	39	-	78	39	-	78	0	100	
06130-06139	6130	-	-	-	-	-	-	-	-	-	1	-	2	1	-	2	0	100	
⋮																			
1482C-1482C	1482C	-	-	-	-	-	-	-	-	-	2	-	78	2	-	78	0	100	
1540C-1540C	1540C	-	-	-	-	-	-	-	-	-	2	-	82	2	-	82	0	100	
1597C-1597C	1597C	-	-	-	-	-	-	-	-	-	1	-	42	1	-	42	0	100	
Total		1060	49333	35572	13773	5	5	-	23072	19672	3400	61046	25117	38860	133K	80366	56033	-/-	-/-
168 cancelled msg(s) encountered																			
Length of longest SHMSG record is 1139																			
Length of shortest LGMSG record is 5695																			

Figure 69. Message Queue Utilization report

The **ShMsg** and **LgMsg** values indicate the number of "slots" used in the queues to accommodate the messages, whereas the **Count** is the number of messages.

For message lengths greater than 99999, the length reported is the actual length divided by 100 with a C appended. For message counts greater than 999999, the count reported is the actual count divided by 1000 with a K appended.

The length of the longest SHMSG record, and the length of the shortest LGMSG record is displayed at the bottom of the report. For actual SHMSG and LGMSG sizes, see ["Message Queue Pool Statistics"](#) on page 127.

MQR can be used to help you set MSG data set LRECLs, but it takes some analysis. See ["Message Queue Utilization report"](#) on page 157 for a useful introduction to the MQR report that may help with the tuning of SHMSG/LGMSG data set record sizes. Also, one statistic from the MQR report we use for tuning is the Accumulated Percentage (the last column on the right hand side of the report). This statistic (Acc Per) indicates the percentage of messages that are of this length or less.

Seek out the 50% line in the report. This report line indicates that 50% of the messages are this length or less and 50% are this length or more. This is the balance point, so if you wanted to balance SH and LG messages evenly, you would set the SHMSG LRECL to the average record length as reported at this 50% mark.

You may also decide that the LGMSG LRECL needs to cater for 95% of long messages (or whatever percentage you want to aim for). So look at the 95% line because its average record length is the LGMSG LRECL that will achieve this.

In well tuned IMS systems, there is usually very little SHMSG/LGMSG data set I/O (see the IRUR “Message Queue Pool Statistics” on page 127 report), so changing LRECL settings may not improve performance. However, one gain that tuning LRECL can provide is in the area of Logging. If LGMSG LRECL is too small, then IMS must split the message into multiple records and each record is written to the log, causing additional logging overhead and larger log files.

Database Update Activity report and extract

The IMS Database Update Activity report can help you determine the cost of database calls. It indicates the number of purge writes at sync point time to a database and provides a count of actual updates made to each database in the time period being reported. If your database is a HALDB, you can also report on specific HALDB partitions because the name of the partition is found on the database name field of the various records used in this report. This IMS Performance Analyzer report can optionally be written to an extract data set as a CSV file.

The Database Update Activity report shows:

- Number of blocks updated
- Number of physical segments changed by Insert, Delete, and Replace calls (Get calls are not reported because they are not recorded on the log)
- Number of database Open calls
- Time of the first and last updates to each database
- Databases being updated when the report ended and which, therefore, need to be backed out if system failure occurred during the reporting period

If your database is a HALDB, you can also report on specific HALDB partitions because the name of the partition is found on the database name field of the various records used in this report.

Log records: This report is derived from IMS log records 07, 20, 21, 31, 40, 41, 50.

Uses

Your Database Administrator will probably want to receive this report daily as several useful things are reported. The number of blocks updated gives the minimum possible number of writes caused by DL/I update calls. The actual number of DL/I calls may be somewhat larger than the number of blocks updated, which means that some blocks were updated more than once before a physical I/O occurred. Conversely, the number of DL/I calls could also be smaller than the number of blocks updated, as is the case with path calls.

You want the actual number of blocks updated to be as close as possible to the ideal number. To help make these determinations, list the VSAM index or use the Pool Statistics reported in the Internal Resource Usage reports to get the actual number of physical writes to compare with the minimum (ideal) number of blocks updated in this report. The actual number of physical writes may be greater than the number of blocks updated because of space writes (or VSAM background writes) or because several index levels must be changed for an update. The former case usually means that the buffer pool sizes are too small or that VSAM background writes are creating a write bottleneck while trying to relieve read bottlenecks. Taking fewer sync points could help.

There should be one database open operation for each DDname. If this number is greater than one, it probably means one of the following:

- The DMB buffers are too small
- A close occurred (for example, dump or recovery)
- An error occurred

A glance at the time ranges for the first and last updates for each database can tell you which databases are used most often. It can also tell you the time range of interest if you need to do a backout or want to look elsewhere for related information.

The extract data set is suitable for analysis graphing tools.

Options

To specify the report options, select **Database Update Activity** from the Resource Usage and Availability Reports in a Log Report Set.

Reports can be generated in Format 1 or Format 2. Format 2 provides a faster, more concise breakdown of database update activity and is the recommended report option.

A report interval can be specified. This applies to the reduced data file after the Global (or Run-time) report interval is effected.

Optionally, the report can be ordered by Program name within Database name. The report output data set is controlled by specifying the Report Output DDname. Selection Criteria can be specified to include or exclude specific Databases and IMS Subsystems from the report.

To request the extract, specify an extract data set name. DDname DBUAXTRO identifies the extract output file. The extract file contains field headings as the first record in the file provided that option is selected on the Log Global Options panel. The data fields are fixed length and separated by a blank or a comma depending on the delimiter specified on the Log Global Options panel.

Content: Database update activity (FORMAT2)

Database Update Activity reports generated using the FORMAT2 (recommended) operand can be ordered by Database name (the default) or by Program name within Database name.

Start 06Dec2021 11:11:19:45			IMS Performance Analyzer Database Update Activity-IMS1							End 06Dec2021 11:12:27:74			Page	1
Database	Program	Proc	5050 Total	Updates	ISRT	DLET	REPL	ROLx	New Block	Free Space	5052 Insert	5051 Problem	20 Open/	24 Error
CUALTA1	APPL		267	DLI I/O	267 184	0 67	0 117	0	0	67	16	0	0	0
CUALTA2	APPL		353	DLI I/O	353 242	0 88	0 154	0	1	88	22	0	0	0
CUALTA3	APPL		360	DLI I/O	360 246	321 81	39 0	0 165	0	93	18	0	0	0
CUALTA4	APPL		146	DLI I/O	146 99	146 36	0 63	0	2	36	9	0	0	0
CUALTB1	APPL		336	DLI I/O	336 230	310 78	26 0	0 152	0	86	18	0	0	0
CUALTB2	APPL		179	DLI	179	166	13	0	0		9	0	0	0
				I/O	123	42	0	81	0	46				
		B/O	8	DLI	8	8	0	0	0		0	0	0	0
:				I/O	5	0	0	5	0	3				
Total	APPL		102,688	DLI	100,308	71,457	9,476	19,713	338		16,130	219	0	0
				I/O	71,557	31,235	0	40,322	1,632	18,594			0	0
		B/O	720	DLI	720	558	78	84	0		78	0	0	0
				I/O	455	0	0	455	6	108				

Figure 70. Database Update Activity report: FORMAT2 operand

Start 06May2021 14:26:10:43				IMS Performance Analyzer Database Update Activity-IDDE						End 06May2021 14:30:43:14 Page 1					
Database	Program	Proc	5050 Total	Updates	ISRT	DLET	REPL	ROLx	New Block	Free Space	5052 Insert	5051 Problem	20 Open/ 24 Error		
DI21PART	CEXSPGM	APPL	36	DLI	36	9	18	9	0	0	0	9	0	0	
				I/O	27	9	0	18							
	CEXTPGM	APPL	76	DLI	76	19	38	19	0	0	0	19	0	2	
				I/O	57	19	0	38							
	CEXTPGM	B/O	10	DLI	10	4	4	2	0	0	0	2	0	0	
				I/O	8	0	0	8							
	DFSSAM04	APPL	29	DLI	29	19	10	0	0	0	0	3	0	0	
				I/O	18	4	0	14							
	MQATPGM	APPL	8	DLI	8	2	4	2	0	0	0	2	0	0	
				I/O	6	2	0	4							
	Total	APPL	149	DLI	149	49	70	30	0	0	0	33	0	2	
				I/O	108	34	0	74							
Total	B/O	10	DLI	10	4	4	2	0	0	0	2	0	0		
			I/O	8	0	0	8								
IVPDB1	DFSIVP1	APPL	20	DLI	20	11	8	1	0	0	6	0	0	1	
				I/O	14	3	0	11							
IVPDB1I	DFSIVP1	APPL	6	DLI	6	3	3	0	0	0	3	0	1		
				I/O	3	3	0	0							
IVPDB2	DFSIVP2	APPL	16	DLI	16	9	6	1	0	0	6	0	0	0	
				I/O	10	3	0	7							
	DFSIVP3	APPL	32	DLI	32	18	12	2	0	0	12	0	0	1	
				I/O	20	6	0	14							
	DFSIVP35	APPL	32	DLI	32	18	12	2	0	0	12	0	0	0	
				I/O	20	6	0	14							
	Total	APPL	80	DLI	80	45	30	5	0	0	30	0	0	1	
				I/O	50	15	0	35							
	Total	APPL		255	DLI	255	108	111	36	0	0	36	0	0	5
					I/O	175	55	0	120						
		B/O		10	DLI	10	4	4	2	0	0	2	0	0	0
					I/O	8	0	0	8						

Figure 71. Database Update Activity report: FORMAT2 with PROGRAM operand

The report contains the following information:

Database

Database name.

Program

Program name. Use the PROGRAM batch operand to report a breakdown by program name within the database name. If there are two or more programs for the database then the database total (*Total*) is reported.

Proc

Processing taking place when record was written. Can be one of:

APPL

Record written during application processing.

B/O

Record written during Transaction Backout.

OLR

Record written during online recovery.

5050 Total

The total number of 5050 (Database Update) records (sum of the ISRT, DLET, REPL, and ROLx columns).

Updates

The total number of block updates.

- For DLI application calls, this value is the sum of the ISRT, DELT, and REPL columns minus the ROLx column.
- For Physical I/O, this value is the sum of the ISRT, DELT, and REPL columns.

ISRT/DELT/REPL

The number of physical segments changed by ISRT, DLET and REPL calls.

ROLx

The number of rollbacks.

New Block

The number of requests to create new blocks.

Free Space

The number of changes to free space elements.

5052 Insert

The number of 5052 (Database Update prior to KSDS insert) records.

5051 Problem

The number of 5051 (Database Update – prior action was unsuccessful) records.

20 Open

The number of 20 (Database Open) records (row above).

24 Error

The number of 24 (Database Error) records (row below).

Content: Database update activity (FORMAT1)

Database Update Activity reports generated using the FORMAT1 (default) operand can be ordered by Database name (the default) or by Program name within Database name.

Start 14Jun2021 10.15.00.00			IMS Performance Analyzer				End 14Jun2021 10.16.00.00			
			Data Base Update Activity-IMSW							
Database	DDname	Blocks Updated	** Generated Inserts	Update Deletes	Counts ** Replaces	DB Open Calls	****First Date	Update**** Time	****Last Date	Update**** Time
DATTENT	DBURAU	2	0	8	0	0	14Jun2021	10.15.03.90	14Jun2021	10.15.39.40
DBURAU		0	0	0	0	0				
DCOMPT		2	2	0	5	0	14Jun2021	10.15.03.90	14Jun2021	10.15.19.80
		2	4	0	0	0	14Jun2021	10.15.03.90	14Jun2021	10.15.19.80
DECHTXT	DHISTOR	32	64	0	17	0	14Jun2021	10.15.00.50	14Jun2021	10.15.56.90
DHISTOR		1	5	0	0	0	14Jun2021	10.15.03.70	14Jun2021	10.15.03.70
		1	1	0	0	0	14Jun2021	10.15.03.70	14Jun2021	10.15.03.70
		2?	0	2	0	0	14Jun2021	10.15.03.90	14Jun2021	10.15.39.40
DIDXATT	DIDXCON	1?	1	1	0	0	14Jun2021	10.15.03.70	14Jun2021	10.15.03.70
DIDXCON		1?	0	0	2	0	14Jun2021	10.15.03.90	14Jun2021	10.15.39.40
DIDXNOM		0	0	0	0	0				
DMATQSD		0	0	0	0	0				
DMATQSI	DMATQSI	0	0	0	0	0				
DMATQSI		0	0	0	0	0				
DMEMOIR		61	82	0	14	0	14Jun2021	10.15.01.20	14Jun2021	10.15.59.70
DRECRSS		0	0	0	0	0				
DRPETAT	DRPETAT	0	0	0	0	0				
DRPETAT		0	0	0	0	0				
DRPJOB		0	0	0	0	0				
DRPJOB		0	0	0	0	0				
DSAISIE	DSOCIET	4?	3	0	1	0	14Jun2021	10.15.07.40	14Jun2021	10.15.39.70
DSOCIET		7	3	2	21	0	14Jun2021	10.15.03.70	14Jun2021	10.15.41.10
		1	1	0	0	0	14Jun2021	10.15.03.70	14Jun2021	10.15.03.70
		2	4	0	0	0	14Jun2021	10.15.39.10	14Jun2021	10.15.39.20
DSTBUT	DSTBUT	2?	1	0	1	0	14Jun2021	10.15.02.90	14Jun2021	10.15.02.90
Total		121	171	13	61	0				

Figure 72. Database Update Activity report: FORMAT1 operand, ordered by Database (default)

Start 12Jul2021 05.47.12.73			IMS Performance Analyzer					End 12Jul2021 11.02.17.78			
Database Update Activity-IMS											
Database	Program	DDname	Blocks Updated	** Generated Inserts	Update Deletes	Counts ** Replaces	DB Open Calls	****First Date	Update**** Time	*****Last Date	Update***** Time
QDBINDXD	KDSCPDD	QDBINDXD	0	0	0	0	1				
QDBINDXX	KDSCPDD	QDBINDXX	0	0	0	0	1				
QDINDEXD	KDSCPDD	QDINDEXD	0	0	0	0	1				
QDINDEXX	KDSCPDD	QDINDEXX	0	0	0	0	1				
QESUEOKD	KDSCPDD	QESUEOKD	0	0	0	0	1				
QGJIGTXD	KDSCPHH	QGJIGTXD	48	141	21	0	1	12Jul2021	08.55.19.68	12Jul2021	10.57.59.93
QGJIGTXX	KDSCPHH	QGJIGTXX	69?	48	21	0	1	12Jul2021	08.55.19.68	12Jul2021	10.57.59.93
QGKAITRD	KDSCPFH	QGKAITRD	136	372	0	0	0	12Jul2021	09.03.20.45	12Jul2021	10.48.54.86
	KDSCPHH	QGKAITRD	33	84	0	0	1	12Jul2021	08.55.17.91	12Jul2021	10.57.59.93
QGKAITRX	KDSCPFH	QGKAITRX	128?	134	0	0	0	12Jul2021	09.03.20.45	12Jul2021	10.48.54.86
	KDSCPHH	QGKAITRX	29?	29	0	0	1	12Jul2021	08.55.17.91	12Jul2021	10.57.59.93
QGKAKEID	KDSCPFH	QGKAKEID	4	8	0	1	0	12Jul2021	09.44.36.75	12Jul2021	10.28.38.72
	KDSCPHH	QGKAKEID	28	0	0	28	1	12Jul2021	08.55.17.91	12Jul2021	10.57.59.93

Figure 73. Database Update Activity report: FORMAT1 operand, ordered by Database and Program

The report is produced by IMS Subsystem ID and contains the following information:

Database

Database name.

Program

Program name. Breakdown by program name within database name is only reported if requested by specifying DBUPDATE (PROGRAM).

DDname

A > symbol to the left of a DDname means that the program updating that database had not terminated at log termination or at IMS PA reset. (Reset occurs at a discontinuity in log sequence numbers.) So for those databases, there might have been more activity if the programs had been able to terminate normally. If a system failure occurs during the reporting period, these are the data sets to be backed out.

Blocks Updated

The number of physical database blocks updated includes pointers and bit maps, as well as data.

In some cases, the block counts are not entirely correct. Correct block counts require either an open (type 20) record or a close (type 21) record, and they require nonkeyed data sets. But the open record may have occurred before the report start time and, therefore, is unavailable. With keyed updates to KSDS data sets, keys cannot be related to blocks. Also, several index levels may also require updating. And for indexed or HISAM databases using OSAM (not VSAM), the relative record numbers (RRNs) for overflow writes to the OSAM data set cannot be translated into block identification without the blocking factors from the open or close records. In these cases, the reported number of blocks updated is actually the number of records updated, and the reported number has a question mark (?) appended to it; this denotes records, rather than blocks, updated.

The Blocks Updated count includes purge writes (at sync points). There may have been other write operations. For example, space writes occur between checkpoints when buffers need to be flushed.

Generated Update Counts

The number of physical segments changed by ISRT, DLET and REPL calls.

The number of physical segments changed by replaces, inserts, and deletes is not necessarily the same as the number of DL/I calls issued by the application program. For example, a single path call may generate several replace calls.

Another example is when replacing a concatenated segment, two physical segments might be changed. In addition, indexes, pointers, and bit maps are frequently updated as well as data. This is shown in the following figure where a single path call (ISRT) by an application updates a database (DBD1) and its index (DBD2) in such a way that three physical segments are updated and six blocks are written. The three segments updated are a DBD1 root segment and a dependent segment, and a DBD2 index segment. Updating the root segment causes three blocks to be written: the root segment, the PTF pointer and the bit map. Updating the dependent segment causes one block to be written. Updating the index causes two blocks to be written: the index chain and the pointer.

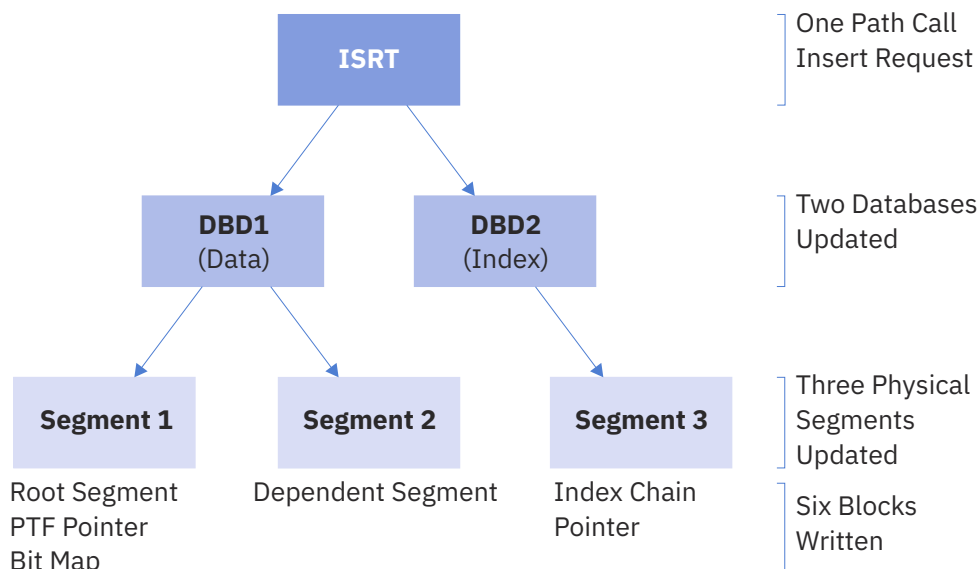


Figure 74. Generated Update Counts: a single path call can result in multiple segment updates

DB Open Calls

The number of database Open calls.

First Update

The date and time of the first update to the database. The date format for the report is *DDMMYYYYYY*.

The date format for the extract is *YYYY/MM/DD*.

Last Update

The date and time of the last update to the database. The date format for the report is *DDMMYYYYYY*.

The date format for the extract is *YYYY/MM/DD*.

Content: Extract file

This is an example of the contents of the Database Update Activity extract file.

IMSID	,Database,DDname	,Blk_Updt	,Inserts	,Deletes	,Replaces	,Opens	,1st_Date	,1st_Time	,Last_Date	,Last_Time
IX23	,DACACDDB,GACACDDB,	122,	0,	0,	122,	1,	2023/02/02,16.06.21.19,	2023/02/02,16.13.40.80		
IX23	,DACACCIA,GACACCIA,	0,	0,	0,	0,	1,				
IX23	,DACACCIB,GACACCIB,	0,	0,	0,	0,	1,				
IX23	,DACACCIC,GACACCIC,	0,	0,	0,	0,	1,				
IX23	,DACACCID,GACACCID,	0,	0,	0,	0,	1,				
IX23	,DACERRDB,GACERRDB,	5,	5,	0,	0,	1,	2023/02/02,16.10.52.98,	2023/02/02,16.12.29.68		
IX23	,DACIDLDB,GACIDLDB,	32,	64,	0,	0,	1,	2023/02/02,16.06.50.99,	2023/02/02,16.13.29.86		
IX23	,DACTBLDB,GACTBLDB,	9,	3,	6,	0,	1,	2023/02/02,16.09.49.14,	2023/02/02,16.13.14.10		
IX23	,DACTREDB,GACTREDB,	2,	4,	0,	0,	1,	2023/02/02,16.03.22.53,	2023/02/02,16.13.29.68		
IX23	,DACTREIA,GACTREIA,	2,	2,	0,	0,	1,	2023/02/02,16.03.22.53,	2023/02/02,16.13.29.68		

Figure 75. Extract file content: Database Update Activity

The attributes of the extract data set are RECFM=FB, LRECL=132.

The field headings are optionally included as the first record in the extract file depending on the extract options set in Log Global Options. The headings line up with the column data fields that they describe. The data fields are fixed length, and are separated by a blank or comma depending on the delimiter character specified in Log Global Options.

The extract data set can be used as input to other reporting and statistical analysis tools. Ensure that the delimiter character you specify is suitable for use by these tools.

Region Histogram report

The IMS Region Histogram report is a graphic display of region activity. It shows the times a region is active or idle, and the patterns of transaction scheduling in each region. The Region Histogram report highlights parallel scheduling issues. It lets you view which transactions are scheduled into which regions and when. You can quickly tell whether some regions are heavily scheduled while others are relatively idle. You can also tell which transactions are waiting on which other transactions.

Log records: This report is derived from IMS log records 03, 07, 08, 40.

Options

To specify the report options, select **Region Histogram** from the **Resource Usage and Availability Reports** in a **Log Report Set**.

A report interval can be specified. This applies to the reduced data file after the Global (or Run-time) report interval is effected.

The report output data set is controlled by specifying the Report Output DDname.

A Region ID Object List can be specified to include specific regions in the report. Region ID may be specified by PST number or Message Region Job name. If not specified, the default is to include the first 13 regions encountered in the log records processed for the report.

An IMS Subsystem ID Object List can be specified. The included regions then apply to each included IMS subsystem.

OSAM Sequential Buffering report

The IMS OSAM Sequential Buffering report provides detailed I/O and buffer-usage statistics that allow you to assess the benefit of OSAM sequential buffering. You should use the OSAM Sequential Buffering report to determine whether sequential buffering is providing a benefit to each application that uses it.

Log records: This report is derived from IMS log record 09.

Options

To specify the report options, select **OSAM Sequential Buffering** from the Resource Usage and Availability Reports in a Log Report Set. Sections 1 and 2 of the report are produced by selecting the Activity Log option. Section 3 of the report is produced by selecting the Program (PSB) Summary option.

A report interval can be specified. This applies to the reduced data file after the Global (or Run-time) report interval is effected.

The report output data set is controlled by specifying the Report Output DDname.

Records can be included in or excluded from the report based on Program (PSB) name, Database name, and IMS Subsystem ID.

Content

The OSAM Sequential Buffering report has three sections: Activity Log Summary, Activity Log Detail, and Program Summary. From this report, you can determine if the application benefited from the use of sequential buffering (SB).

The contents of the sections 1 and 2 of the report are described in *IMS Version 12 System Utilities* (SC19-3023). Section 3 presents the information from Part A of section 2, formatted as one line per PSB.

The IMS Subsystem ID precedes each entry.

OSAM SB Activity Log

04Jun2023 07.51.04.22

Sequential Buffering Summary for Region

IMS Id	IMSA	
Jobname	IMSREG01	
Pgm	IMSPGM01	
PSB	IMSPSB01	

SBONLINE Control card provided:	Yes	
/STOP SB in effect:	No	
DFSSBUX0 disallowed usage of SB:	No	
DFSSBUX0 requested conditional SB activation:	Yes	
At least one SB= keyword in PSB:	Yes	
At least one SBPARM Control stmt for application:	Yes	
DFS2352W Some SB Control Blocks could not be Getmained		
DFS2353W Some SB Buffers could not be Getmained		
DFS2354W MAXSB= limit exceeded		
DFS2355W Some buffers or blocks could not be page-fixed		
DFS2356W IO SB or ITASK Blocks could not be acquired		

Number of search requests issued by OSAM BH:		
Search	75,174	

Number of Read I/O:		
Random Read	56,947	
Sequential Read	7,254	

Number of blocks read:		
Total number of Blocks read	311,670	
Number of Blocks read at random	56,947	Pct of Total: 18.27
Number of Blocks read sequentially	254,723	Pct of Total: 81.72

Percent read per search request	85.40
---------------------------------	-------

Number of Sequential I/O errors	2
---------------------------------	---

Figure 76. OSAM Sequential Buffering report: SB Summary for Region

The OSAM Sequential Buffering Summary report shows why sequential buffering was or was not used. It tells you whether:

- A SBONLINE control card was provided in DFSVSMxx (this applies only to IMS™ DC environments).
- A /STOP SB command was in effect when the application program started (this applies only to IMS DC environments).
- The SB Initialization Exit Routine (DFSSBUX0) disallowed use of SB. The SB Initialization Exit Routine (DFSSBUX0) requested conditional activation of SB by default.
- At least one SB= keyword was provided during PSBGEN.
- The //DFSCTL file contained at least one SBPARM control statement that applied to the application program. SBPARM control cards have been read. If the answer is Yes, the following statistics indicate what SBPARM keywords were used. This can be helpful in determining why sequential buffering was or was not used for the application program.
- At least one PSB= keyword was specified on an SBPARM control card and it matched the PSB used by the application. At least one DB= keyword was specified on an SBPARM control card where the PSB matched or was not specified, and the database matched one used by the application.
- At least one PCB= keyword was specified on an SBPARM control card where the PSB and DB matched or were not specified, and the PCB name matched one used by the application.
- At least one DD= keyword was specified on an SBPARM control card where the PSB, DB, and PSB matched or were not specified, and the DD name matched one used by the application.
- Whether SBPARM control cards have been read. If the answer is "yes," the following statistics indicate what SBPARM keywords were used. This is helpful in determining why sequential buffering was or was not used for the application program.
- At least one PSB= keyword was specified on a SBPARM control card and it matched the PSB used by the application.

The report also shows:

Number of search requests issued by OSAM BH

How many times the OSAM buffer handler asked the SB buffer handler to search the SB buffer pools for a specific OSAM block. The value in this field is equal to the number of OSAM random read I/O operations that would have been issued without SB.

Number of Read I/O

The number of OSAM random and sequential read I/O operations it took to satisfy requests made by the application program. The sum of these two numbers is the total number of OSAM read I/O operations issued on behalf of the application. You can subtract this sum from the Number of search requests issued by OSAM BH field to calculate how many read I/O operations you saved by using SB.

Number of blocks read

How many OSAM data set blocks were read to satisfy requests from the application program. It shows you:

- The total number of blocks read
- The number and percentage of blocks read with a random read
- The number and percentage of blocks read with a sequential read

If the percentage of blocks read with a sequential read is high, SB probably helped reduce the elapsed time of the application program.

Percent read per search request

The number of read I/O operations issued by the SB buffer handler expressed as a percentage of the number of times the OSAM buffer handler asked the SB buffer handler to search for a block. A low percentage indicates that many of the search requests were satisfied without issuing an I/O operation. Therefore, a low number in this field shows that SB probably helped reduce the elapsed time of the application program.

Number of Sequential I/O errors

The number of sequential reads that resulted in I/O errors. When an I/O error is detected during a sequential read, IMS increments this field and marks the 10 SB buffers involved in the read as invalid. Then IMS issues a random read for the block that was requested by the OSAM buffer handler.

Start 04Jun2023 07.51.04.22		IMS Performance Analyzer		Page	2
		<u>OSAM SB Activity Log</u>			
04Jun2023 07.51.04.23		*** SB Detail Statistics (Part A) ***			
IMS Id	IMSA				
Jobname	IMSREG01				
Pgm	IMSPGM01				
PSB	IMSPSB01				
DB	IMSDBD01				
PCB	IMSPCB01				
DB-PCB Number	1				
DSG-CB Number	1				
DD	IMSDD01				
DB-ORG	HDAM				
DD-Type	*PSDATA				
Number of Bufsets	12				
COMPARE-OPTION is active					
** Number of search requests issued by OSAM BH:					
Search		134			
** Number of Read I/O:					
Total		252			
Random Read		127			
Synchronous Sequential Read		12			
Overlapped Sequential Read		113			
** Number of Blocks read:					
Total		1,627			
Random Read		127	Pct of Total:	7.80	
Synchronous Sequential Read		144	Pct of Total:	8.85	
Overlapped Sequential Read		1,356	Pct of Total:	83.34	
** Average I/O Wait Times (millisec):					
Random Read		.44			
Synchronous Sequential Read		2.66			
Overlapped Sequential Read		.07			

Figure 77. OSAM Sequential Buffering report: SB Detail Statistics (Part 1 of 3)

OSAM SB Activity Log

*** SB Detail Statistics: Reference Statistics (Part B) ***

```

** References in Buffer-Sets:
    Ratio .12
** References in Random SRAN CBs:
    Ratio .03
** Random SRAN CBs which have been converted:
    Number 12
    Pct of stolen Random SRAN 3.23

**** Distribution of references in Buffer-Sets ****
Reference count  Nbr of occurrences  Pct of occurrences  Accumul. Pct
0                34                2.85             2.85
1                127               10.65            13.50
2                176               14.76            28.27
3                165               13.84            42.11
4                254               21.30            63.42
5                128               10.73            74.16
6                76                6.37            80.53
7                187               15.68            96.22
8                26                2.18            98.40
9                12                1.00            99.41
=> 10             7                .58            100.00

**** Distribution of references in Random SRAN CBs ****
Reference count  Nbr of occurrences  Pct of occurrences  Accumul. Pct
0                2                .53              .53
1                17               4.58             5.12
2                45              12.12            17.25

```

Figure 78. OSAM Sequential Buffering report: SB Detail Statistics (Part 2 of 3)

OSAM SB Activity Log

*** SB Detail Statistics: Internal Counters and Values (Part C) ***

```

** Deactivations:
    Number of SB-deactivation 5
    Number of Monitoring-deactivation 3

** Results of Evaluation of Sequentiality:
    Number of Positive Results 5
    Number of Negative Results 2

** Results of Evaluation of Activity Rate:
    Number of Positive Results 6
    Number of Negative Results 3

** Number of Random Read:
    During Sequential Buffering phases 125
    During "Monitoring-only" phases 1
    While not monitoring Reference Pattern 1

** Number Random Reads with Sequential Reference Pattern:
    Access to invalid buffers 2
    Access at Data Set end 1

** Number of Buffering positions: 45

** Internal SB-algorithm values:
    SDSGBPTR: Blocks per track 12
    SDSGNBRB: Blocks per Bufset 12
    SDSGSCST: Relative Seq I/O costs 3.54
    SDSGTUNE: Tune 32
    SDSGSINB: Size of Neighborhood 32,756
    SDSGTHR1: Threshold Current+1 6
    SDSGTHR2: Threshold Overlap 5
    SDSGTHR3: Threshold Neighb 5
    SDSGTHRN: Threshold New Pos 8
    SDSGTHRO: Threshold New Pos+1 9

```

Figure 79. OSAM Sequential Buffering report: SB Detail Statistics (Part 3 of 3)

Start 04Jun2023 07.51.04.22					IMS Performance Analyzer						End 04Jun2023 07.51.04.33			
<u>OSAM SB Program Summary</u>														
PSB	Search	** Read	IO	Counts	**	***** Block		Read	Counts	*****		Pct of Read	per	Sequential
Name	Requests	Random	Seq	Seq		Total	Random	Pct	Seq	Pct		Search Request	IO Errors	
IMSPSB00	75,174	56,947		7,254		311,670	56,947	18.27	254,723	81.72		85.40		2
IMSPSB01	150,348	113,894		14,508		623,340	113,894	18.27	509,446	81.72		85.40		4
IMSPSB02	150,348	113,894		14,508		623,340	113,894	18.27	509,446	81.72		85.40		4

Figure 80. OSAM Sequential Buffering report: SB Program Summary

Deadlock report

The IMS Deadlock report provides a comprehensive analysis of deadlock events. In addition the report summarizes deadlock activity to show the frequency of each losing transaction/database combination and the associated winning transaction/database combinations. This IMS Performance Analyzer report is a useful aid for tuning applications and adjusting scheduling parameters to avoid this expensive overhead. Deadlocks involving Db2 are also reported.

The report shows at a glance:

- The frequency of each losing transaction/database combination
- The associated winning transaction/database combinations

The information provided is a useful aid for tuning applications and adjusting scheduling parameters to avoid this expensive overhead. Deadlocks involving Db2 are also reported.

Log records: This report is derived from the 67FF SNAP Trace log record that meet the following criteria:

- Terminated with Abend Code U0777
- DEADLOCK elements, including EXTERNAL deadlock elements

When analyzing deadlock issues in the IMS Log, taking advantage of the Forms-Based report feature can be beneficial. A sample Forms-Based report job for the deadlock analysis can be as follows:

```

//jobname JOB (ACCOUNT),'NAME'
//IPI EXEC PGM=IPIMAIN,PARM='Vnnn' nnn is version of IMS log
//STEPLIB DD DSN=your.imspa.steplib,
// DISP=SHR
//* Input Data Sets
//LIMSD001 DD DSN=your.ims.log,
// DISP=SHR
//* SYSOUT Data Set
//SYSPRINT DD SYSOUT=*
//DEADLOCK DD SYSOUT=*
//DEDLKDD DD SYSOUT=*
//IPIDIAGS DD SYSOUT=*
//SYSUDUMP DD SYSOUT=*
//IPICMD DD *
* Form-based Transit Summary Report
* Report Form - DEADLOCK
* Description - Deadlock Summary
* Report Output File - SUMM0001
* Digit Grouping by Seconds
* Precision - 6,2
* Tranmix - 1
* Report Filter - ABND0777
* Filter Conditions: COMPCODE EQ U0777
IMSPALOG SUMMARY(
DESC('Deadlock Summary'),
DDNAME(SUMM0001),
SECGROUP,
PRECISION(6,2),
TRANMIX(1),
COND(
(COMPCODE,EQ,U0777)),
FIELDS(STARTDEP(TIME,ASCEND),
COMPCODE(ASCEND),
TRANCODE(ASCEND),
TRANCNT,
PROCESS(AVE),
PROCESS(MAX),
TOTALTM(AVE),
TOTALTM(MAX),
CPUTIME(AVE),
CPUTIME(MAX),
DBCALLS(MAX),
FFLOCK(MAX),
FPLOCK(MAX),
LOCKMAX(MAX),
LOCKTIME(MAX)))
IMSPALOG DEADLOCK(
LIST,
SUMMARY,
LISTDDN(DEADLOCK),
SUMMDDN(DEDLKDD))
IMSPALOG EXECUTE
/*

```

By creating a sample Forms-Based report job, you can use a Filter to find only ABEND U0777 to focus solely on deadlocks. It is important to note that when IMS handles a deadlock, it issues an IMS Pseudo ABEND U0777, which is why this specific Filter is helpful. However, if you want more details on all ABENDS, you can modify the Filter by changing the condition to COMPCODE GT 0. This enables you to obtain additional information on all ABENDS, not just those related to deadlocks. By customizing the Forms-Based reports, you can better understand the deadlocks issues on the IMS Log.

Uses

The Deadlock report is used to analyze IMS and Db2 deadlock events. The IMS Deadlock report includes detailed information on the resource and resource blockers for each deadlock and includes details such as number of resources, call type, and Lock name. Db2 (External) Deadlocks show deadlock information as recorded in the log record.

The IMS Deadlock List report can be used to analyze why the deadlocks occurred, including the resources and transactions involved. This information will assist the user in minimizing the number of deadlocks and improving the performance of their IMS systems. The deadlock entries in this report are listed in log record sequence.

The IMS Deadlock Summary report provides a summary of all IMS deadlocks showing details of Losing Programs (transactions requesting a resource and failing due to deadlock) and Winning Programs (transactions holding the resource and continuing after deadlock resolution) for each database. This report can be used to identify databases and transactions or jobs, that are most prone to deadlocks. It can be used in conjunction with the List report to identify and minimize the cause of deadlocks. The Summary report is sorted by Losing Program and shows the associated Winning Programs. It includes the Deadlock count for each Losing Program and the Wait count for each Winning Program.

Options

To specify the report options, select the **Deadlock** report from the Resource Usage and Availability Reports in a Log Report Set.

You can request a List report or Summary report or both. The default is the **Summary** report.

Specify a **Report Interval** for the reduced data file after the Global (or Runtime) report interval is effected.

Specify the **Report Output DDname** to control the report output data set. The default is DEADLOCK, but you can separate the List and Summary report output by specifying a different DDname for each.

Selection Criteria are not applicable to this report.

IMS Deadlock List report

The IMS Deadlock List report provides a list of deadlocks based on 67FF log records (U0777 pseudo abends). The report shows details of all resources implicated in the deadlock.

The List report is presented by lock name and begins with lock 1 of *n*, showing the database name being locked, the lock name length, and the Lock name itself. For example, the following report shows Lock name 0017280400030140 (Resource 02) Waiter as the Victim (or losing program). The lock 1 of 4 indicates that there were 4 resources with dependencies involved in the deadlock.

Familiarity and some understanding of DL/I locking terminology and data organizations is needed for a full understanding of the formatted deadlock information provided. See *IMS Administration Guide: Database Manager* for a description of locking.

```

Start 15Apr2019 14:21:10:04          IMS Performance Analyzer
Page      1
                                Deadlock List
                                -----
Pseudo abend record          Abend No = U0777      Time   14:21:31:90 Date 15Apr2019      Recno = 000000000A46345F

Deadlock Analysis Report - Lock Manager is IRLM
.....

Resource DMB-name Lock-len Lock-name
01 of 02 IB000A03      08      000016C0806403C6 (RBA = 0016C000, DMCB# = 8064, AN = 03, F-Lock)

Key for resource is not available

      IMS-name Tran/Job PSB-name PCB--DBD PST#  RGN  Call Lock  State      Lockfunc
Blicker IBTS      WD      ATMWD      00134 MPP      GET  GFPLL 08  (Excl)
Waiter IBTS      TR      ATMTRAN IB000      00015 MPP      GET  GFPLL 08  (Excl)
                                           904004F0 Func=Get FP Lock
                                           Mode=Uncond
                                           State=Excl
                                           Flag=Get,Fast Path,Local
.....

Resource DMB-name Lock-len Lock-name      ** Waiter for this resource is VICTIM **
02 of 02 IB000A02      08      00003FE0806402C6 (RBA = 003FE000, DMCB# = 8064, AN = 02, F-Lock)

Key for resource is not available

      IMS-name Tran/Job PSB-name PCB--DBD PST#  RGN  Call Lock  State      Lockfunc
Blicker IBTS      WD      ATMTRAN IB000      00015 MPP      GET  GFPLL 08  (Excl)
Waiter IBTS      WD      ATMWD      IB000      00134 MPP      GET  GFPLL 08  (Excl)
                                           904004F0 Func=Get FP Lock
                                           Mode=Uncond
                                           State=Excl
                                           Flag=Get,Fast Path,Local

Deadlock Analysis Report - End of Report

Start 15Apr2019 14:21:10:04          IMS Performance Analyzer
Page      2
                                Deadlock List
                                -----
Pseudo abend record          Abend No = U0777      Time   14:23:47:04 Date 15Apr2019      Recno = 000000000A4B366F

Deadlock Analysis Report - Lock Manager is IRLM
.....

Resource DMB-name Lock-len Lock-name
01 of 02 RM000A01      08      00058A30808B01C6 (RBA = 058A3000, DMCB# = 808B, AN = 01, F-Lock)

Key for resource is not available

      IMS-name Tran/Job PSB-name PCB--DBD PST#  RGN  Call Lock  State      Lockfunc
Blicker IBTS      IBSYS000 IBSYS000 00002 MPP      GET  GFPLL 08  (Excl)
Waiter IBTS      FO      IBR0000 RM000      00116 MPP      GET  GFPLL 08  (Excl)
                                           904004F0 Func=Get FP Lock
                                           Mode=Uncond
                                           State=Excl
                                           Flag=Get,Fast Path,Local
.....

Resource DMB-name Lock-len Lock-name      ** Waiter for this resource is VICTIM **
02 of 02 LC000A07      08      00000130806A07C6 (RBA = 00013000, DMCB# = 806A, AN = 07, F-Lock)

Key for resource is not available

      IMS-name Tran/Job PSB-name PCB--DBD PST#  RGN  Call Lock  State      Lockfunc
Blicker IBTS      FO      IBR0000 00116 MPP      GET  GFPLL 08  (Excl)
Waiter IBTS      IBSYS000 IBSYS000 LC000      00002 MPP      GET  GFPLL 08  (Excl)
                                           904004F0 Func=Get FP Lock
                                           Mode=Uncond
                                           State=Excl
                                           Flag=Get,Fast Path,Local

Deadlock Analysis Report - End of Report
:

```

Figure 81. Deadlock report: IMS List

The following fields appear in the report:

Pseudo abend record

Exception Condition SNAP Trace record type.

Abend No

Abend code. Always U0777. The application program terminated abnormally because a potential resource was in the deadlock condition.

Time and Date

Log record time and date.

Recno

Log record sequence number.

Deadlock Analysis Report

Beginning of Deadlock report.

Lock Manager is IRLM

The lock manager was IRLM (Internal Resource Lock Manager).

Lock Manager is PI

The lock manager was PI (Program Isolation).

Resource

The resource number and total number of resources involved in the deadlock.

DMB-name

Database name.

Lock-len

Lock name length.

Lock-name

Lock name, up to 35 characters. The lock name is composed of codes that provide information about the lock such as its Relative Block Address (RBA), whether the lock occurred in a Full Function (FF) or Fast Path (DEDB) database, and in the case of a DEDB, whether the lock occurred at the Control Interval (CI) level or at the segment level.

RBA=

For a Full Function database, the RBA is displayed in bytes 1-4 of the lock name. For example, in lock name 00000924800501D7, the RBA= 924. Determining the RBA of a lock in a FP database is slightly more complex. The lock name of a FP database is broken down as shown in the following table:

Byte Position**Lock Information**

1

Lock ID

2-4

Relative Block Address

5-6

DMCB Number

7

Area Number

8

Fast Path ID=C6

For a Fast Path database, the first two digits (Byte 1) display the code X'80' if the lock occurred at the segment level. In this case, the next three bytes displayed indicate the 30 bit RBA. To obtain the true RBA, the value in this field is multiplied by 4.

If the lock occurred at the CI level, the first two digits indicate the code X'00'. In this case, the next three bytes displayed indicate the 24 bit RBA. To obtain the true RBA, the value in this field is multiplied by 256 (X'100'). In addition, for any lock that occurred in a FP database, the last two digits (Byte 8) of the lock name display the code X'C6'. For example, the lock name 80000C02800101C6 occurred in a FP database at the segment level with an RBA of 00003008.

The translation of the remainder of the Lock-name field is dependent on the type of database base being locked, one format for Fast Path database requests and another for Full Function database requests, as follows.

Fast Path (8th byte of lockname=C6)**DMCB#**=

DEDB Master Control Block number (5th & 6th bytes of Lockname).

AN=

Area number (7th byte of Lockname).

Full Function**DMB#**=

DMB (Data Management Block) number (5th & 6th bytes of Lockname).

DCB=

DCB number (7th byte of Lockname).

Common to both Fast Path and Full Function databases**x-Lock or Local**

x is replaced by the translation of the 8th byte of the Lockname, unless the byte contains X'40' (blank) in which case Local is printed. The value of x is the lock type, for example, X'C6' = F for Fast Path.

SSID=

Subsystem ID used for local IRLM requests. This field is only displayed if the key length is 10 bytes.

Waiter for this resource is VICTIM

The waiter for this resource is the one that failed due to the deadlock.

In many cases, the lock is for a database record for which the root key is known. The next lines provide information about the root key for the database record being locked. The following are the possible report statements for the root key.

Key is Root Key of database record associated with Lock

This statement is the most common. It indicates that the key that follows is the root key for the database record involved in the lock. You see this report statement, for example, when a HIDAM or PHIDAM root is retrieved using the index. The key is known when the lock on the root is requested.

Key for resource is not available

This statement indicates that the key for the database record being locked is not available. You see this report statement, for example, when a GN call for an HDAM or PHDAM database causes DL/I to lock the next root anchor. When this lock request is one of the resources involved in the deadlock, it is not possible to print the key associated with the lock.

Locking prior Root for HIDAM Root INSERT, Key displayed is for next higher Root

This statement can occur when a root is inserted in HIDAM or PHIDAM and the root has twin forward and backward pointers. You see this report statement, for example, if the keys 10 and 12 are present and 11 is being inserted. The key displayed is key 12 but the lock is on key 10.

Locking on next HIDAM Root for GN call, Key displayed is for prior HIDAM Root

This statement can occur when using HIDAM or PHIDAM with twin forward and backward pointing, and keys 10, 11, and 12 exist, and position is on key 10; a GN call requires a lock on 11. When the lock is required, the key is not known, so the key of the prior root is displayed.

Locking on HDAM Anchor, Key displayed is HDAM Key requested

This statement can occur when using HDAM or PHDAM. The item locked is the anchor. When the anchor is locked, the key that will be retrieved is not known but the key that is requested is known, and it is displayed.

The next section contains the record key. The key of record requesting lock (if available) is displayed in both Hex and Character formats, up to 256 bytes.

The lock waiter and blocker information is printed next. Each waiting and holding work unit is identified by IMSID, transaction or job name, PSB name, PST number, and region type. The WAITER listed is the work unit that the database key information pertains to.

There are some differences between the two lines of waiter and blocker information. The current PCB name, the DL/I call, and the lock request pertains only to the Waiter. This information is not available for the blocker of the lock.

IMS-name

IMS subsystem name requesting/holding the lock.

Tran/Job

Transaction or jobname requesting/holding the lock.

PSB-name

PSB name of the application requesting/holding the lock.

PCB-DBD

PCB name of the application requesting the lock.

PST#

PST number of the transaction requesting/holding the lock.

RGN

Region type of the transaction requesting/holding the lock:

MPP

Message Processing Program

BMP

Batch Message Processing Program

IFP

IMS Fast Path Program

BAT

Batch

DBT

DB Control Thread

JBP

Java Batch Program

???

Unknown region type

Call

Database call that resulted in the lock request. The current DL/I call being processed is reported as one of the following:

GET

DL/I call was GU, GHU, GN, GHN, GNP or GHNP (the captured information does not allow a breakdown of the specific GET call Function)

REPL

Replace

ISRT

DL/I call was ISRT or ASRT

DLET

Delete

POS

DL/I call was POS call on MSDB

COMIT

Commit

???

Unknown

Lock

The lock request function identifies deadlocks caused by block level data sharing, by application programs accessing data in a different order, or mixtures of both. For deadlock purposes, the lock request functions can be summarized by the following (see IMS macro DFSLR for full list):

GBID

Get a block lock. Block level sharing only.

GZID

Get a data-set-busy lock. Used only to serialize data set opens, closes, and extensions. Any involvement in a deadlock is probably an indication of an error in IMS code.

GXID

Get a data-set-extend lock. Used to serialize the extending of a data set. Block level sharing only and probably a HISAM database.

GRID

Get a lock on the root of a database record.

GQCM

Get a Q command code lock. This is an application-originated lock on specific data. The GQCM function applies to full function only (Fast Path does not obtain a new lock when the Q command code is issued).

GSEG

Get a segment lock for a dependent segment. This is not used when IRLM is the lock manager.

GFPLL

Get a Fast Path lock.

Lockfunc

Provides specific Lock information.

Func=

Lock function.

Mode=

Lock mode.

State=

Lock state.

Flag=

Lock flag.

State

The level of the lock.

The States used to reflect the level of the lock are not the same for the two lock managers, the Internal Resource Lock Manager (IRLM) and the Program Isolation (PI) manager. PI supports four states, the IRLM supports eleven, though IMS uses only eight. Sometimes the lock states are referred to with names rather than numbers. The names used and compatibility descriptions of the four States are:

Name

Compatibility Description

1. Read

The Lock can be held concurrently with one Update level blocker and multiple Read level blockers, or with multiple Read level and multiple Share level blockers.

2. Share

The Lock can be held concurrently with Read level and /or other Share level blockers.

3. Update

The Lock can be held concurrently with Read level.

4. Exclusive

The Lock is held exclusively.

For the IRLM, the state can have an attribute of private. The private attribute is only significant when using block level data sharing. The private attribute has no impact on granting locks to different threads of a single IMS. The private attribute indicates that the lock should be private (only granted) to this IMS.

Restriction: Any thread of another IMS sharing the data cannot be granted the lock.

The report can show any of the following messages:

Input did not start with the beginning of a data element.
Element starting address is assumed to be 0.
Start of this data element is probably on the prior Log data set.

These messages are displayed when a Deadlock record indicates that it is not the first element in the deadlock, but the first element was not received. The most likely cause of this problem is that the first element was probably written to the log data set prior to the one specified in the JCL. To resolve, concatenate the previous log data set with the data set specified, then rerun the report.

If a deadlock abend x'67FF' record does not contain deadlock abend information, the following message will be issued:

Deadlock information not available.

Db2 (External) Deadlock List report

The Db2 (External) Deadlock List report prints data found in the 67FF Deadlock External log record. The data in this type of record is in message format and is reported as is.

Start 21May2021 10.53.33.77		IMS Performance Analyzer	
		Deadlock List	
Pseudo abend record	Abend No = U0777	Time 10:56:02:08	Date 21May2021 Recno = 0000000000000072
EXTERNAL SUBSYSTEM DB2P DETECTED A DEADLOCK DURING NORMAL CALL			
REGION TYPE : IFP			
REGION NUMBER : 0001			
JOB NAME : MKR#LKA			
PSB NAME : FUNPSB02			
SMB NAME :			
RECOVERY TOKEN: C9D4C4F34040404000000000100000000			

Figure 82. Deadlock report: Db2 (External) Deadlock List

The report contains the following information:

Pseudo abend record

Exception Condition SNAP Trace record type.

Abend No

Abend code. Always U0777. The application program terminated abnormally because a potential resource was in the deadlock condition.

Time and Date

Log record time and date.

Recno

Log record sequence number.

All the remaining data is as provided in the DEADLOCK EXTERNAL record.

Note: The first eight characters of the Recovery Token field are translated back to printable characters and used as IMS Region ID in the Db2 Summary report.

IMS Deadlock Summary report

The IMS Deadlock Summary report provides a summary of deadlocks by database. It provides a high level view of database deadlock activity which can be used to identify databases that may be impacting performance and require further analysis.

Start 21May2021 16.24.57.06					IMS Performance Analyzer							End 21May2021 16.30.22.96		
<div>Deadlock Summary</div>														
***** Losing Program *****					***** Winning Program *****									
DMB-name	IMS-name	Tran/Job	PSB-name	PCB--DBD	Deadlocks	DMB-name	IMS-name	Tran/Job	PSB-name	PCB--DBD	# Waits			
DBD01P	IMD3	MKR#LK1A	FUNPSB01	DBD01P	1	DBD01P	IMD3	MKR#LK1B	FUNPSB01	DBD01P	1			
						DBD01P	IMD3	MKR#LK1C	FUNPSB01	DBD01P	1			
						DBD01P	IMD3	MKR#LK1D	FUNPSB01	DBD01P	1			
DBD01P	IMD3	MKR#LK1D	FUNPSB01	DBD01P	1	DBD01P	IMD3	MKR#LK1A	FUNPSB01	DBD01P	1			
						DBD01P	IMD3	MKR#LK1B	FUNPSB01	DBD01P	1			
						DBD01P	IMD3	MKR#LK1C	FUNPSB01	DBD01P	1			
Total number of Deadlocks =					2									

Figure 83. Deadlock report: IMS Deadlock Summary

The report contains the following information:

Losing Program

Program failing Lock request with U0777 deadlock error.

DMB-name

DMB name

IMS-name

IMS Subsystem ID

Tran/Job

Transaction or Job name

PSB-name

PSB name

PCB-DBD

PCB database name

Deadlocks

Total number of deadlocks for the losing program

Winning Program

Program holding resources implicated in deadlock.

DMB-name

DMB name

IMS-name

IMS Subsystem ID

Tran/Job

Transaction or Job name

PSB-name

PSB name

PCB-DBD

PCB database name

Waits

Total number of Waits by the winning program

Total number of Deadlocks =

Total number of deadlocks for all losing programs in the report.

Db2 (External) Deadlock Summary report

The Db2 (External) Deadlock Summary report provides a count of external deadlocks.

Start 21May2023 10.53.33.77				IMS Performance Analyzer		End 21May2023 11.06.00.50	
				Db2 Deadlock Summary			
***** Losing Program *****							
Subsystem	IMS-name	SMB/Job	PSB-name	Deadlocks			
-----	-----	-----	-----	-----			
DB2P	IMD3	MKR#LKA	FUNPSB02	3			
DB2P	IMD3	MKR#LKA7	FUNPSB02	5			
Total number of Deadlocks =				8			

Figure 84. Deadlock report: Db2 (External) Summary

The report contains the following information:

Losing Program

Program failing Lock request.

Subsystem

Name of the Db2 subsystem requesting the lock

IMS-name

IMS Subsystem

SMB/Job

SMB or Job name requesting the lock

Note: The SMB name takes precedence over the Job name and therefore the Job name is only used if the SMB name field is blank.

PSB-name

PSB name requesting the lock

Deadlocks

Total number of deadlocks for the losing program

Total number of Deadlocks =

Total number of Db2 deadlocks in the Summary report.

System Checkpoint report

The IMS System Checkpoint report provides a detailed analysis of IMS internal checkpoint activity. This IMS Performance Analyzer report provides details of your IMS resources, including databases (with system definition information), transactions (with system definition information and basic usage indicators), and terminals (with system definition information and basic usage indicators). The report also provides a summary of checkpoint activity, including breakdown of checkpoint records by type, and frequency and overhead of internal checkpoint processing. You can extract results to a z/OS data set in CSV format or stream them in JSON format to a TCP listener with ASCII encoding.

The report provides details of your IMS resources, including:

- Databases, with system definition information
- Transactions, with system definition information and basic usage indicators
- Terminals, with message statistics

The report also provides a summary of checkpoint activity, including:

- A breakdown of checkpoint records by type
- The frequency and overhead of internal checkpoint processing

Log records:

The reports are derived from the type 40 log records and are based on data in the last completed checkpoint in the log file. A complete checkpoint is one that starts with a 4001 record and ends with a 4098 record.

If IMS PA processes all checkpoint records in the log file but is unable to find a complete checkpoint and thereby produce a meaningful report, the following error message is printed:

No valid checkpoint records found in Log file

All checkpoint record subtypes are used to provide statistical data for the Summary report. For the detailed reports, only the following checkpoint record subtypes are used:

Subtype	Record blocks	Description	Report
4001	None	Begin Checkpoint	None
4003	CNT	Communication Name (Node) Table	LTERM, PTERM
4004	SMB	Scheduler Message Block	Transaction Definition
4005	CTB	Communication Terminal Block	LTERM, PTERM
4006	DDIR	DMB Directory Entry	Database Definition
4007	PDIR	PSB Directory Entry	Transaction Definition
4014	SPQB	Subpool Queue Block	LTERM, PTERM
4098	None	End Checkpoint	None

Options

To specify the report options, select the **Checkpoint** report from the Resource Usage and Availability Reports in a Log Report Set.

A set of reports is created for each IMS Subsystem ID. You can request any of the following reports:

- Database Definitions.
- Transaction Definitions.
- Terminal, sorted by LTERM.
- Terminal, sorted by PTERM.
- Record Events.

Additionally, a **Record Summary** is always produced. See “Checkpoint Summary report” on page 185 for an example of the report contents. This summary shows checkpoint statistics including checkpoint count, average duration and frequency, as well as statistics on all record subtypes contained in the reporting checkpoint. Record Summary is always produced if the log file contains at least one complete checkpoint. The Record Summary also prints details of the last checkpoint, unless Record Events is selected.

A report interval can be specified. This applies to the reduced data file after the Global (or Runtime) report interval is effected.

The report output is written to the data set specified by the Report Output DDname. The default is CHECKPT.

You can specify Selection Criteria to include or exclude from the report particular values for the following:

Checkpoint Database Definitions report

The Checkpoint Database Definitions report shows a list of databases and is produced from data in the DDIR blocks.

Start 21Jan2023 11.49.45.70										IMS Performance Analyzer Database Definitions - IMS1										End 21Jan2023 12.58.45.16										Page 1									
Database		R	I	S	O	Database		R	I	S	O	Database		R	I	S	O	Database		R	I	S	O	Database		R	I	S	O	Database		R	I	S	O				
ACMDIRIO		R	I	2	0	ACMDIRPO		R	I	1	0	ACMDIRX1		R	I	1	0	ACMTRNIO		I	3	0	ACMTRNPO		I	2	0	ACMTRNX1		R	I	2	0	ACMTRNX0		R	I	1	0
FUNDBXS0				1	0	FUNDBX20		I	2	0	FUNDBX30		I	1	0	FUNDBX31		R	2	0	FUNDBX32		R	1	0	FUNDBX40		I	3	0	FUNDBX39				2	0			
FUNDBX50		R	I	1	0	FUNDBX70		I	2	0	FUNDB050				3	0	FUNDB010				2	0	FUNDB020		I	2	0	FUNDB030		I	1	0	FUNDB031		I	2	0		
FUNDB040						FUNDB050		I	2	0	FUNDB060		I	2	0	FUNDB070				3	0	CRIBADD0				2	0	CRIBADD1				2	0	CRIBADD2		R	2	0	
CRIBAF3B				2	0	CRIBAF3M		R	I	1	0	CRIBAF3X		R		2	0	CRIBAF31		R	1	0	CRIBAF33		R		3	0	CRIBAF4B		R		2	0	CRIBAF4C		I	3	0

Figure 85. System Checkpoint report: Database Definitions

The report is produced by IMS Subsystem ID and contains the following information:

Database

Database name.

R

Resident DMB.

I

Index Database.

S

Share Level (SHARELVL).

S can be one of the following values:

0

The database is not to be shared.

1

Sharing is at the database level.

2

Sharing is at the block level but only within the scope of a single IRLM and a single MVS.

3

Sharing is at the block level by multiple IMS subsystems on multiple IRLMs.

O

Database is open.

Checkpoint Transaction Definitions report

The Checkpoint Transaction Definitions report provides a list of transactions and is created from data contained in the SMB and PDIR blocks.

Start 21Jan2023 11.49.45.70					IMS Performance Analyzer										End 21Jan2023 12.58.45.16					Page 1	
Transaction Definitions - IMS1																					
TranCode	Program	S	REG		**Priority**	**PROCLIM**	**SPA*	PAR	MAX	--- Messages---											
		T	TYP	MODE	CLS	NRM	LIM	LIMCT	Count	CPU	Size	TF	Limit	RGN	Enq	Deq	Len	Options			
ADDINV	DFSSAM04	1	MPP	MULT	1	2	4	2	65535	65535					0	0	0	RSP NR			
ADDPART	DFSSAM04	1	MPP	MULT	1	2	4	2	65535	65535					132	4032	4032	WFI INQ			
CLOSE	DFSSAM05	1	MPP	MULT	1	2	4	2	65535	65535								FPP FPX			
CMDBMP	CMDBMP	1	BMP	MULT	1	0	0	65535	65535	65535			65535	0					RMT DLO RES		

Figure 86. System Checkpoint report: Transaction Definitions

The report is produced by IMS Subsystem ID and contains the following information:

TranCode

Transaction Code.

Program

Program Name.

ST

Schedule Type: 1, 2, 3 or 4.

REG TYP

Region type: MPP or BMP.

Mode

Single or Multiple.

CLS

Message Class

Priority**NRM**

The normal priority.

LIM

The limit priority.

LIMCT

Limit count of transactions queued and waiting to be processed.

PROCLIM**Count**

Number of transactions that a program can process in a single scheduling.

CPU

Amount of CPU time allowable to process a single transaction.

SPA Size TF

Length of SPA (Scratch Pad Area).

PAR Limit

Parallel processing threshold value.

MAX RGN

Maximum number of MPP regions that can be concurrently scheduled to process this transaction code.

Messages**Enq**

Number of messages enqueued. This field has a limit of 32K and wraps around once the limit is reached. Therefore, it is not a valid counter. To be used as an indicator of activity only.

Deq

Number of messages dequeued. This field has a limit of 32K and wraps around once the limit is reached. Therefore, it is not a valid counter. To be used as an indicator of activity only.

Len

Average message length.

Options**RSP**

Response Mode

NR

Non-recoverable

WFI

Wait-For-Input

INQ

Inquiry Only

- FPP**
Fast Path Potential
- FPX**
Fast Path Exclusive
- RMT**
Remote
- DLO**
Dynamic Load Option PSB
- RES**
Resident PSB
- SER**
Serial

Checkpoint Terminals report

The Checkpoint Terminals report provides a list of terminals derived from data contained in the CNT, CTB and SPQB blocks.

You can request the report sorted by LTERM or by PTERM or both.

Start 21Jan2023 11.49.45.70						IMS Performance Analyzer Sorted in LTERM Sequence - IMS1						End 21Jan2023 12.58.45.16 Page 1							
LTERM		VTAMNODE /PTERM		-----Messages-----						LTERM		VTAMNODE /PTERM		-----Messages-----					
				Input	Outpt	Enq	Deq	Len					Input	Outpt	Enq	Deq	Len		
ACDV1A		ACDV1A				0	0	132	ACDV1B		ACDV1B		0	0	0	0	0		
ACDV18		ACDV18		34	34	534	534	232	ACDV19		ACDV19		0	0	0	0	0		
AC1P11		AC1P11		0	0	0	0	0	AC1P12		AC1P12		0	0	0	0	0		
AC1P31		AC1P31				0	0	0	ACDV1B		ACDV1B		0	0	0	0	0		
AC1P35		AC1P35		0	0	0	0	0	AC1P36		AC1P36		0	0	0	0	0		

Figure 87. System Checkpoint report: Terminals (sorted in LTERM sequence)

Start 21Jan2023 11.49.45.70		IMS Performance Analyzer										End 21Jan2023 12.58.45.16			
Page 1		Sorted in PTERM Sequence - IMS1													
VTAMNODE /PTERM LTERM		-----Messages-----					VTAMNODE /PTERM LTERM		-----Messages-----						
		Input	Outpt	Enq	Deq	Len			Input	Outpt	Enq	Deq	Len		
ACDV1A	ACDV1A			0	0	132	ACDV1B	ACDV1B	0	0	0	0	0		
ACDV18	ACDV18	34	34	534	534	232	ACDV19	ACDV19	0	0	0	0	0		
AC1P11	AC1P11	0	0	0	0	0	AC1P12	AC1P12	0	0	0	0	0		
AC1P31	AC1P31			0	0	0	ACDV1B	ACDV1B	0	0	0	0	0		
AC1P35	AC1P35	0	0	0	0	0	AC1P36	AC1P36	0	0	0	0	0		

Figure 88. System Checkpoint report: Terminals (sorted in PTERM sequence)

Each report is printed by IMS Subsystem ID and contains the following information:

LTERM

Logical terminal name.

VTAMNODE/PTERM

VTAM node/Physical terminal node name

Messages

Input

Number of input messages. This field is contained in the CTB and is not applicable for ETO. This value has a limit of 32K and wraps around when the limit is reached. To be used as an indicator of activity only.

Outpt

Number of output messages. This field is contained in the CTB and is not applicable for ETO. This value has a limit of 32K and wraps around when the limit is reached. To be used as an indicator of activity only.

Enq

Number of messages enqueued. This field has a limit of 32K and wraps around once the limit is reached. Therefore, it is not a valid counter. To be used as an indicator of activity only.

Deq

Number of messages dequeued. This field has a limit of 32K and wraps around once the limit is reached. Therefore, it is not a valid counter. To be used as an indicator of activity only.

Len

Average message length.

Checkpoint Summary report

The Checkpoint Summary report gives checkpoint statistics including checkpoint count, average duration and frequency, as well as statistics on all records subtypes contained in the reporting checkpoint.

The report is always produced (if the log file contains at least one complete checkpoint).

Start 21Jan2023 11.49.45.70		IMS Performance Analyzer Checkpoint Summary - IMS1		End 21Jan2023 12.58.45.16 Page 111	
Completed Checkpoints	=	7			
Average Checkpoint Duration	=	0.204	(hhhh.mm.ss.ths)		
Average Checkpoint Frequency	=	11.29.713	(hhhh.mm.ss.ths)		
CPL0G	=	46613			
Checkpoint Start: 21Jan2023 12:58:45:16 End: 21Jan2023 12:58:45:41 Number : 117					
Subtype	Description	Count	Bytes	%Total	
01	Begin Checkpoint	1	1,504	0.24	
03	CNT - Communication Name (Node) Table	2	6,064	0.49	
04	SMB - Scheduler Message Block	173	685,128	42.09	
05	CTB - Communication Terminal Block	1	3,488	0.24	
06	DDIR - DMB Directory Entry	50	50,080	12.17	
07	PDIR - PSB Directory Entry	82	83,720	19.95	
08	CLB - Communication Line Block	1	192	0.24	
0D	CCB - Conversational Control Block	1	1,376	0.24	
0F	LCB - Link Control Block	1	176	0.24	
10	CRB - Communication Restart Block	1	352	0.24	
14	SPQB - Subpool Queue Block	16	60,636	3.89	
21	VTCT - VTAM Terminal Control Block	8	30,796	1.95	
22	Queue Anchor block (LU 6.2)	1	32	0.24	
30	RRE - Residual Recovery Element	6	5,330	1.46	
31	SIDX - Subsystem Index Entry	1	132	0.24	
32	OTMA TPIES/QABS	1	240	0.24	
33	OTMA MTES/MCBS	1	248	0.24	
80	Fast Path Begin Checkpoint	1	307	0.24	
83	RCTE - Routing Code Table Entry	1	56	0.24	
84	DMCB - DEDB Master Control Block	49	32,396	11.92	
86	DMHR - Fast Path Buffer Header	3	13,176	0.73	
87	ADSC - Area Data Set Control Block	8	7,696	1.95	
89	Fast Path End Checkpoint	1	52	0.24	
98	End Checkpoint	1	40	0.24	
TOTAL		411	983,217	100.00	

Figure 89. System Checkpoint report: Summary

A Checkpoint Summary report is produced for each IMS Subsystem ID and contains the following information:

Completed Checkpoints

Number of completed Checkpoints found in the log file. A complete checkpoint is one that starts with a 4001 record and ends with a 4098 record.

Average Checkpoint Duration

The average elapsed time per checkpoint in the format *hhhh.mm.ss.ths*.

If there are insufficient completed checkpoints to allow a meaningful calculation, the following message is printed: Insufficient Checkpoints to calculate.

Average Checkpoint Frequency

The average time between Checkpoints, or how frequently Checkpoints are taken, in the format *hhhh.mm.ss.ths*.

If there are insufficient completed checkpoints to allow a meaningful calculation, the following message is printed: Insufficient Checkpoints to calculate.

CPLOG

Checkpoint frequency. The average number of log records written between checkpoints.

Checkpoint**Start:**

Checkpoint start date and time.

End:

Checkpoint end date and time.

Number:

Checkpoint number.

Subtype

Checkpoint record subtype.

Description

Subtype description.

Count

Total number of Checkpoint records of this subtype.

Bytes

Total bytes of Checkpoint records of this subtype.

%Total

Percentage of records of this subtype over all Checkpoint records.

Total**Count**

Total number of records in the Checkpoint.

Bytes

Total number of bytes of all records in the Checkpoint.

%Total

Should always be 100.00.

Checkpoint Duration distribution report

The Checkpoint Duration distribution is optional. This graphical report is produced if a distribution (member in the distribution data set) is specified.

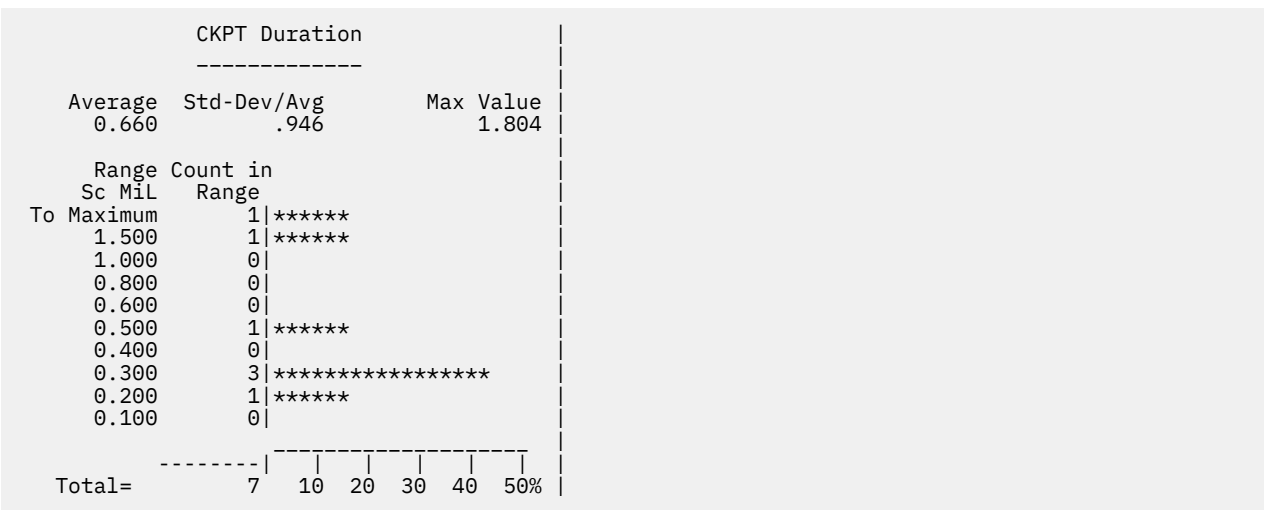


Figure 90. System Checkpoint report: Checkpoint Duration distribution

BMP Checkpoint report

The IMS BMP Checkpoint report provides an analysis of BMP checkpoint frequency that can affect online performance and system restartability. The detailed List report provides a breakdown of individual BMP checkpoint activity. The Summary report provides an overview of each BMP program.

Log records: The report is derived from IMS log records 06, 07, 08, 18, 37, 40, 41, 47.

Uses

The reports can be used to measure BMP checkpoint frequency, highlighting the impact they have on IMS system restartability.

A known difficulty in the IMS programming world is determining an appropriate checkpoint frequency for batch programs. Business requirements often determine (limit) when checkpoints may be taken and these requirements often conflict with technical requirements. Checkpointing too frequently causes excessive resource consumption; checkpointing not frequently enough can cause resource conflicts; checkpointing at the wrong time can violate business requirements.

A hidden consequence of inappropriate checkpointing is the extension of the IMS Control Region restart time: the longer a BMP holds on to a resource, the longer IMS may have to process (roll-back and roll-forward) when performing an emergency restart. Usually, the first time that one becomes aware of this problem is when IMS is taking too long to restart after a crash. There is little you can do at that point but, because SLA conditions have probably been violated, a report on what caused the elongation and possible preventative measures will likely be requested.

You can run the IMS Performance Analyzer BMP Checkpoint reports after the event to determine which BMPs (if any) might have caused the elongated IMS restart. Or you can run the reports proactively (for example, each night) to identify potential problems.

Options

To specify the report options, select the **BMP Checkpoint** report from the Resource Usage and Availability Reports in a Log Report Set.

The report output is written to the data set specified by the Report Output DDname. The default is BMPCHKP.

Content: List report

The BMP Checkpoint List report provides a detailed list of all events that are relevant to BMP and IMS checkpoints. The data is presented in the order the log records are read from the IMS log.

Start 12Feb2018 11:19:08:55				IMS Performance Analyzer BMP Checkpoint List					Page 1	
Time of Event	CD Event	PST	IMID	Job Name	PSB Name	TranCode	OASN	COMN	-----Time Since Last----- BMP CHKP IMS CHKP	IMS CHKPs
12Feb 11:19:08.55	06 IMS Start		IFDZ							
12Feb 11:19:26.53	40 IMS CHKP		IFDZ							
12Feb 11:20:16.32	08 BMP Start	3	IFDZ		DFSIVPC		00000003	00000000		
12Feb 11:20:16.53	07 BMP End	3	IFDZ	NMCIVP1J	DFSIVPC		00000003	00000007	0.211153	49.998122
12Feb 11:20:17.08	08 BMP Start	3	IFDZ		DFSIVP6		00000004	00000000		
12Feb 11:20:17.53	07 BMP End	3	IFDZ	IV3H208J	DFSIVP6		00000004	00000000	0.452558	51.002933
12Feb 11:20:17.64	08 BMP Start	3	IFDZ		DFSIVP9		00000005	00000000		
12Feb 11:20:18.08	07 BMP End	3	IFDZ	IV3H208J	DFSIVP9		00000005	00000000	0.439164	51.552203
12Feb 11:20:18.19	08 BMP Start	3	IFDZ		DFSIVP7		00000006	00000000		
12Feb 11:20:18.71	07 BMP End	3	IFDZ	IV3H208J	DFSIVP7		00000006	00000000	0.524529	52.181368
12Feb 11:20:18.82	08 BMP Start	3	IFDZ		DFSSAM09		00000007	00000000		
12Feb 11:20:19.29	07 BMP End	3	IFDZ	IV3H208J	DFSSAM09		00000007	00000000	0.465452	52.758121
12Feb 11:20:19.44	08 BMP Start	3	IFDZ		DFSSAM09		00000008	00000000		
12Feb 11:20:19.55	08 BMP Start	6	IFDZ		DFSIVP6		00000009	00000000		
12Feb 11:20:19.80	07 BMP End	3	IFDZ	IV3H208J	DFSSAM09		00000008	00000000	0.356856	53.263411
12Feb 11:20:19.92	08 BMP Start	3	IFDZ		DBFSAMP5		0000000A	00000000		
12Feb 11:20:20.64	07 BMP End	3	IFDZ	IV3H208J	DBFSAMP5		0000000A	00000000	0.723036	54.106329
12Feb 11:20:20.64	37 XRST	6	IFDZ	NMCIVP1J	DFSIVP6		00000009	00000000	1.092555	54.108852
12Feb 11:20:48.61	07 BMP End	6	IFDZ	NMCIVP1J	DFSIVP6		00000009	00000000	27.968439	1:22.077291
12Feb 11:20:48.74	08 BMP Start	6	IFDZ		DFSIVP7		0000000B	00000000		
12Feb 11:20:48.79	37 XRST	6	IFDZ	NMCIVP1J	DFSIVP7		0000000B	00000000	0.055882	1:22.261290
12Feb 11:20:51.91	07 BMP End	6	IFDZ	NMCIVP1J	DFSIVP7		0000000B	00000000	3.120324	1:25.381614
12Feb 11:20:52.06	08 BMP Start	6	IFDZ		DFSIVP8		0000000C	00000000		
:										

Figure 91. BMP Checkpoint report: List

The BMP Checkpoint List report contains the following information:

Time of Event

The Date and Time in hours, minutes, and seconds from the IMS log record when an event occurred.

CD

The IMS log record code.

Event

A description of the IMS log code. Possible values are:

06

IMS Start / IMS Stop.

07

BMP Stop.

08

BMP Start.

18

CHKPX; Extended checkpoint. Only the last record for an extended checkpoint is reported if relevant to a BMP that is being reported.

37

XRST; BMP extended restart. This record signals a transfer of message from temporary to permanent destination at sync point. Only records with bit QLXFFBMP set on in the field QLXFFLGs are reported.

40

IMS CHKP; IMS region checkpoint. Only records with subtype 4001 (checkpoint begin) are reported.

41

CHKP; BMP batch checkpoint.

47

Active BMP; Only reported if dependent PST lists are BMP regions.

PST

The PST number associated with this event. If no PST is associated with the event, N/A is printed.

IMID

The IMS subsystem ID.

Job Name

MVS job name for the region running the BMP.

PSB Name

The PSB used by the BMP. If the PSB Name is unknown it will appear as *UNKNOWN.

TranCode

The Transaction Code used by the BMP when referencing the IMS Message Queue. If the BMP does not reference the IMS Message Queue, this will be blank. If the Transaction Code is unknown it will appear as *UNKNOWN.

OASN

The Origin Application Sequence Number. This is a linearly increasing number representing the Schedule number. The OASN is reset after a Cold Start of the IMS Control Region.

COMN

The number of commits for this BMP.

Time Since Last

Note: Times are displayed in the format MM:SS.ssssss where M is minutes, S is seconds, and s is fractions of a second.

BMP CHKP

The difference in time between this entry and the previous BMP checkpoint. If the first BMP checkpoint has not occurred then this field will be blank.

IMS CHKP

The difference in time between this entry and the previous IMS checkpoint. If there are no previous IMS checkpoints then the field will be blank.

IMS CHKPs

For log record type 07 and 37, the number of IMS checkpoints that have occurred since the last BMP checkpoint. For log record type 47, the number of IMS checkpoints since the time specified in the CAPUORTM field. A value greater than one could have resulted in an elongated emergency restart if one had been performed at this point.

Tip: Recovery Token = IMID + OASN + COMN.

Content: Summary report

The BMP Checkpoint Summary report provides an overview of each BMP program. It provides details about the overhead of checkpointing, average duration, total and average number of checkpoints, average and longest time between checkpoints. This information is used to determine whether checkpoints are occurring at the correct frequency or not. Too often may be an unnecessary overhead. Too few potentially holds resources that affect online performance.

Start 12Feb2018 11:19:08:55			IMS Performance Analyzer						End 16Feb2018 10:28:27:51			
Page 4			BMP Checkpoint Summary - IFDZ									
			----- Between BMP Syncpoints									
			Average	----Frequency----			-- SYNC Count --		----- Elapsed Time -----		--- IMS CKPTs	
PSB Name	TranCode	Count	Duration	/Sec	/Min	Ind	Average	Total	Average	Long	Average	Max
-----			-----									
DBFSAMP5		1	0.723036	N/C			0.0	0	0.000000	0.000000	N/C	
DFSIVPC		1	0.211153	N/C			0.0	0	0.000000	0.000000	N/C	
DFSIVP6		7	16.509388		3.12	Lo	0.8	6	2.898917	15.887568	N/C	
DFSIVP67		1	0.373916	N/C			0.0	0	0.000000	0.000000	N/C	
DFSIVP7		6	8:02.416323		.10	Lo	0.8	5	9:22.298701	46:51.432755	N/C	
DFSIVP8		5	5.126845	N/C			0.0	0	0.000000	0.000000	N/C	
DFSIVP9		1	0.439164	N/C			0.0	0	0.000000	0.000000	N/C	
DFSSAM09		2	0.411154	N/C			0.0	0	0.000000	0.000000	N/C	

Figure 92. BMP Checkpoint report: Summary

The BMP Checkpoint Summary report is keyed on IMSID, PSB Name and Transaction Code. There is a new report for each IMS ID, which appears in the title of the report.

Note: Times are displayed in the format MM:SS.ssssss where M is minutes, S is seconds, and s is fractions of a second.

PSB Name

The PSB used by the BMP. If the PSB name is not known it will be left blank.

TranCode

The Transaction Code used by the BMP when referencing the IMS Message Queue. If the BMP does not reference the IMS Message Queue, this will be blank. If the Transaction Code is not known it will appear as *UNKNOWN.

Count

The number of BMPs that ran during the reporting interval. It is the sum of:

- The number of BMPs that finished (type 07 log record), plus
- The number of active BMPs at IMS shutdown time (type 06), plus
- The number of active BMPs at the end of the reporting period (end-of-file)

It cannot be calculated based on the presence of individual log records only.

Average Duration

The average elapsed time of each BMP.

Frequency

Checkpoint frequency.

Note: A value of N/C indicates that the value could not be determined.

Sec

Number of checkpoints per second.

Min

Number of checkpoints per minute.

Ind

Frequency indicator. Can be one of the following values:

Lo

Where a reported checkpoint rate results in a value lower than the requested minimum rate an indicator of Lo is included in the report to highlight that checkpoints are not being taken at the desired rate, for example, too infrequently.

Hi

Where a reported checkpoint rate results in a value higher than the requested maximum rate an indicator of Hi is included in the report to highlight that checkpoints are being taken at more than the desired rate, for example, too frequently.

blank

The reported checkpoint rate falls within the minimum and maximum requested rate.

N/A

Updates were made, but the rate was unable to be calculated.

Note: To adjust the minimum and maximum values used by the frequency indicator, use the **Average Checkpoint Frequency** option. For more information, see the *IMS Performance Analyzer User's Guide*.

SYNC Count

Sync point statistics.

Average

The average number of sync points issued by the BMP. This is a measure of the reported sync points, not the value in the last four bytes of the Recovery Token.

Note: It is possible for there to be a discrepancy between the reported sync points and the number in the Recovery Token. IMS increments the sync point number in the Recovery Token each time a program reaches a sync point. However, IMS does not necessarily write a Type 41 (Batch Checkpoint) record if the program has no recoverable items at the time of a CHKP call.

Total

The total number of sync points for each BMP.

Between BMP Syncpoints

Time between BMP syncpoint for this BMP.

Elapsed Time**Average**

The average time between BMP sync points for this BMP.

Long

The maximum elapsed time between BMP sync points for this BMP.

IMS CKPTs

Checkpoint activity for the BMP in relation to IMS system checkpoint activity. This information is used solely to determine how long IMS emergency restarts may take. A high number of IMS system checkpoints between BMP checkpoints will cause /ERE to take longer because IMS needs 2 BMP checkpoints to successfully restart. Ideally there should be at most one IMS system checkpoint between BMP checkpoints, so that in the event of an /ERE, it can occur quickly.

Average

The average number of IMS checkpoints between BMP sync points for this BMP. If this value is greater than one there is a possibility of an elongated IMS emergency restart. N/C appears in this column if the average IMS sync points between BMP checkpoints is unable to be calculated.

Max

The maximum number of IMS checkpoints between BMP sync points for this BMP. A value greater than 1 could have resulted in an elongated emergency restart if one had been performed at this point.

Log Gap Analysis report

The IMS Log Gap Analysis report shows periods of time where log records are not being cut, potentially highlighting an external system event that may have caused IMS to slow down.

Log records: This report is derived from all available IMS log records.

Options

To specify the report options, select **Gap Analysis** from the Resource Usage and Availability Reports in a Log Report Set.

Specify a **Report Interval** for the reduced data file after the Global (or Runtime) report interval is effected.
Specify the **Report Output DDname** to control the report output data set.

Content

IMS Performance Analyzer Log Gap Analysis							Page	1
Data from:	14.18.09.97	16Jan2018						
ID	Time	System	Elapsed	File	LSN	Code		
01	14.18.20.269584	IFDE		LIFDE001	00000000000009F	35		
	14.23.08.546187	IFDE	288.276603	LIFDE001	0000000000000A0	02		
02	14.23.08.553850	IFDE		LIFDE001	0000000000000A4	33		
	14.23.20.999813	IFDE	12.445963	LIFDE001	0000000000000A5	63		
03	14.23.26.076296	IFDE		LIFDE001	0000000000000B4	63		
	14.23.31.246475	IFDE	5.170179	LIFDE001	0000000000000B5	63		
04	14.23.32.245710	IFDE		LIFDE001	0000000000000B7	16		
	14.23.57.636979	IFDE	25.391269	LIFDE001	0000000000000B8	03		
05	14.24.06.711603	IFDE		LIFDE001	00000000000001A0	35		
	14.24.12.866714	IFDE	6.155111	LIFDE001	00000000000001AE	63		
06	14.24.18.110761	IFDE		LIFDE001	0000000000000215	5600		
	14.24.23.112868	IFDE	5.002107	LIFDE001	0000000000000216	5600		
07	14.24.24.125920	IFDE		LIFDE001	0000000000000239	5600		
	14.24.34.129810	IFDE	10.003890	LIFDE001	000000000000023A	5600		
08	14.24.59.080841	IFDE		LIFDE001	0000000000000680	63		
	14.25.06.997889	IFDE	7.917048	LIFDE001	0000000000000681	63		
09	14.25.12.085565	IFDE		LIFDE001	00000000000006E6	5600		
	14.25.17.089420	IFDE	5.003855	LIFDE001	00000000000006E7	5600		
10	14.25.18.122388	IFDE		LIFDE001	0000000000000708	5600		
	14.25.28.126695	IFDE	10.004307	LIFDE001	0000000000000709	5600		
11	14.25.38.449072	IFDE		LIFDE001	00000000000009EF	63		
	14.25.46.804019	IFDE	8.354947	LIFDE001	00000000000009F0	63		
12	14.26.18.566915	IFDE		LIFDE001	0000000000000E02	63		
	14.26.25.929441	IFDE	7.362526	LIFDE001	0000000000000E03	63		
13	14.26.57.757895	IFDE		LIFDE002	0000000000001220	63		
	14.27.05.861683	IFDE	8.103788	LIFDE002	0000000000001221	63		
14	14.27.22.168799	IFDE		LIFDE002	00000000000012AA	63		
	14.27.31.096919	IFDE	8.928120	LIFDE002	00000000000012AB	63		
15	14.27.44.548864	IFDE		LIFDE002	00000000000012FB	63		
	14.27.56.157948	IFDE	11.609084	LIFDE002	00000000000012FC	63		
16	14.28.12.513644	IFDE		LIFDE002	00000000000014E5	63		
	14.28.21.195776	IFDE	8.682132	LIFDE002	00000000000014E6	63		
17	14.28.37.795876	IFDE		LIFDE002	000000000000163A	63		
	14.28.45.295292	IFDE	7.499416	LIFDE002	000000000000163B	63		
18	14.29.22.312311	IFDE		LIFDE002	000000000000197C	33		
	14.29.32.312301	IFDE	9.999990	LIFDE002	000000000000197D	5600		
19	14.30.18.557820	IFDE		LIFDE002	0000000000001D22	33		
	14.30.23.561175	IFDE	5.003355	LIFDE002	0000000000001D23	5600		
20	14.30.37.125197	IFDE		LIFDE002	0000000000001EA9	63		
	14.30.47.455282	IFDE	10.330085	LIFDE002	0000000000001EAA	63		
21	14.30.55.934944	IFDE		LIFDE002	0000000000001FC2	63		
	14.31.06.113836	IFDE	10.178892	LIFDE002	0000000000001FC3	03		
22	14.31.47.510071	IFDE		LIFDE002	000000000000257E	63		
	14.31.54.551576	IFDE	7.041505	LIFDE002	000000000000257F	03		

Figure 93. Log Gap Analysis report

Cold Start Analysis report

The IMS Cold Start Analysis report provides a snapshot of in-train activity in the event of a cold start to determine what transactions were lost from the IMS message queue, what were the incomplete units of work, what database changes were made and not backed-out, and what external subsystem activity was left in doubt.

An IMS cold start initializes the message queues, the dynamic log, and the restart data sets. The consequences of a cold start can be destructive:

1. All input and output messages on the IMS message queue are lost
2. If IMS terminated abnormally, incomplete transactions may have:
 - Full-function database changes that are not backed-out, leaving databases corrupted
 - External subsystem activity that is left in doubt

Log records: This report is derived from all IMS log records.

Options

To specify the report options, select **Cold Start Analysis** from the Resource Usage and Availability Reports in a Log Report Set.

The format of the report command is:

```

IMSPALOG      COLDSTART(
               [DDNAME(ddname),]          default COLDSTAR
               [FROM(date,time),]
               [TO(date,time),]
               [UOW,]
               [MSG,]
               [AT(date,time),]
               [DETAIL,]
               [SUMMARY])

```

You can specify **UOW** to include all incomplete units of work with database update or ESAF activity. You can also specify **MSG** to include all messages enqueued but not dequeued. These options apply to the Detail report and are ignored by the Summary report.

The report is produced at the end of file or at a specified point in time.

Content

An example of the Cold Start Analysis report is shown in the following figure.

IMS Performance Analyzer									
Cold Start Analysis									
Data at: 07Apr2021 12.00.05.00									
Active Units of Work									
Recovery Token	Start LSN	Start time	Time in progress	Trancode	Reg	Database	Block updates	ESAF	
IMSA/0002B97C0000F892	00000009606ECDDF	12.00.04.877622	0.122378	INV2410	MPP			DB2A	
IMSA/0002BD8C00000370	00000009606ECE1F	12.00.04.899782	0.100218	PRT223	MPP			DB2A	
IMSA/0002BD6F00002492	00000009606ECE86	12.00.04.925301	0.074699	ACC345	MPP			DB2A	
IMSA/0002B9750000D0A1	00000009606ECF14	12.00.04.954346	0.045654	INV2410	MPP			DB2A	
IMSA/0002B8AC0000DEFD	00000009606ECF20	12.00.04.958853	0.041147	INV2410	MPP			DB2A	
IMSA/0002BD5200007D7F	00000009606ECF31	12.00.04.966937	0.033063	ACC345	MPP			DB2A	
IMSA/0002BCAB0000CA46	00000009606ECF4D	12.00.04.974316	0.025684	PRT223	MPP			DB2A	
IMSA/0002BD5B0000420A	00000009606ECF4F	12.00.04.974943	0.025057	ACC345	MPP			DB2A	
IMSA/0002BD4D000058B9	00000009606ECF80	12.00.04.985851	0.014149	PRT223	MPP			DB2A	
IMSA/0002BD44000056C9	00000009606ECF91	12.00.04.991138	0.008862	PRT223	MPP			DB2A	
IMSA/0002BCE3000091ED	00000009606ECF9B	12.00.04.993454	0.006546	PRT223	MPP			DB2A	
IMSA/0002BD170000532B	00000009606ECF9D	12.00.04.993488	0.006512	PRT223F	MPP			DB2A	
IMSA/0002BD070000C85F	00000009606ECF9F	12.00.04.993522	0.006478	ACC345	MPP			DB2A	
IMSA/0002BD16000082C0	00000009606ECFA1	12.00.04.993550	0.006450	PRT223F	MPP			DB2A	
IMSA/0002BD8900000630	00000009606ECFAD	12.00.04.994949	0.005051	PRT223	MPP			DB2A	
IMSA/0002BD23000079FA	00000009606ECFC0	12.00.04.996666	0.003334	PRT223F	MPP			DB2A	
Active UOWs . .	16	Pending database updates . .	0						
Summary by Trancode									
Trancode	Input Queue Count	UOW Count	Database Updates	Databases	External subsystems				
INV2410	0	3	0		DB2A				
PRT223	0	6	0		DB2A				
PRT223F	0	3	0		DB2A				
ACC345	0	4	0						
DB2A									
Summary by External Subsystem									
ESAF	Active UOW Count								
DB2A	16								

Figure 94. Cold Start Analysis report

Enqueue/Dequeue report

The IMS Enqueue/Dequeue report shows an activity of IMS messages that are enqueued and dequeued.

The Outstanding Messages List report provides the following details:

- Input messages queued but not processed, or processed and abended or otherwise re-queued to the IMS Message Queue
- Output messages enqueued to a destination but not dequeued or deleted from the IMS message queue

The Dequeued Messages List report provides details for each Message counted in the Destination Summary report.

The Destination Summary report provides an overview of the volume of input and output messages which are queued to each destination (SMB/CNT).

Options

To specify the report options, select **Enqueue/Dequeue** from the Resource Usage and Availability Reports in a Log Report Set.

The format of the report command is:

```
IMSPALOG      ENQDEQ(
               [FROM(date,time),]
               [TO(date,time),]
               [LISTDDN(ddname),]      default NQDQLIST
               [MSGLDDN(ddname),]      default NQDQMSGL
               [SUMMDDN(ddname),]      default NQDQSUMM
               [SMB,]
               [CNT,]
               [MSGDEQ,]
               [MSGOUT,]
               [SUMMARY,]
               [BYIMID,]
               [INTERVAL(HH:MM:SS),]
               [EXTRACT,]
               [CSVDPREF(prefix),]
               [CSVDISP(dis),])
```

Content: Dequeued Message List report

An example of the report is shown in the following figure.

Start 13Jun2021 00:01:01:35												
IMS Performance Analyzer Dequeued Messages Report												
Timestamp	Input Cnt Name	Output Dest	Dest Type	Input Terminal	Userid	Org ID	Org STCK Token	Tracking UOW Proc ID	Proc STCK Token	Log Seq Number	I	
00:01:01.351259	DFSMTCNT	PSECPRIN	CNT			IMS	D2ADABD1E3D4F4D5	IMS	D2ADABD1E3D4F4D5	00000001FF7677C2	-	
00:01:01.351335	DFSMTCNT	MAST	CNT			IMS	D2ADABD1E3D3E7D5	IMS	D2ADABD1E3D3E7D5	00000001FF7677C4		
00:01:01.357165	DFSMTCNT	PSECPRIN	CNT			IMS	D2ADABD1E5465BC2	IMS	D2ADABD1E5465BC2	00000001FF7677CC		
00:01:01.357230	DFSMTCNT	MAST	CNT			IMS	D2ADABD1E54530C2	IMS	D2ADABD1E54530C2	00000001FF7677CE		
00:01:02.187337	DFSMTCNT	PSECPRIN	CNT			IMS	D2ADABD2AFF395D4	IMS	D2ADABD2AFF395D4	00000001FF7677D7		
00:01:02.187407	DFSMTCNT	MAST	CNT			IMS	D2ADAC0A049605C2	IMS	D2ADAC0A049605C2	00000001FF76786F		
00:02:00.205717	DFSTCFI	TD983	SMB	00040001		IMS	D2ADAC0A049605C2	IMS	D2ADAC0A049605C2	00000001FF76786F		
00:02:01.008286	DFSTCFI	TD981	SMB	00040001		IMS	D2ADAC0A049605C2	IMS	D2ADAC0AC88822D5	00000001FF76787C		
:												

Figure 95. Dequeued Messages List report

Content: Outstanding Messages List report

An example of the report is shown in the following figure.

Start 13Jun2021 00:01:01:35												
IMS Performance Analyzer Outstanding Messages Report												
Timestamp	Input Cnt Name	Output Dest	Dest Type	Input Terminal	Userid	Org ID	Org STCK Token	Tracking UOW Proc ID	Proc STCK Token	Log Seq Number	I	
09:05:44.051843	BIPM0021	BIPM0021	CNT	BIPM0021	A140430	IMS	D2AE2592870BABC8	IMS	D2AE25928A6796CD	00000001FF79FEE5	-	
13:12:44.942982	BIPM0024	BIPM0024	CNT	BIPM0024	A125637	IMS	D2AE5CC8D86830D2	IMS	D2AE5CC8D86830D2	00000001FF7B27B5		
22:15:02.636168	X'FFFF'	SF04	CNT			IMS	D2AED5FF2F0AFC05	IMS	D2AED5FF350399D5	00000001FF81716E		

Figure 96. Outstanding Messages List report

Content: Destination Summary report

An example of the report is shown in the following figure.

Start 13Jun2021 00:01:01:35									
IMS Performance Analyzer									
Enqueue/Dequeue Summary									
Dest Name	Dest Type	Enq Count	Rate/Sec	Deq Count	Rate/Sec	Deq %	Abend/Req Count	Output Req Count	
BIPM0019	CNT	38	0.00	38	0.00	100.00	0	0	
BIPM0021	CNT	11	0.00	10	0.00	90.90	0	0	
BIPM0023	CNT	40	0.00	40	0.00	100.00	0	0	
BIPM0024	CNT	14	0.00	13	0.00	92.85	0	0	
BIPM0026	CNT	14	0.00	14	0.00	100.00	0	0	
CSQ800AB	CNT	86	0.00	86	0.00	100.00	0	0	
CSQ800AD	CNT	88	0.00	88	0.00	100.00	0	0	
CSQ800AF	CNT	315	0.00	315	0.00	100.00	0	0	
:									
Total		41,472	0.48	41,457	0.47	99.96	60	0	

Figure 97. Destination Summary report

Chapter 10. Fast Path Transit reports

The Fast Path Transit reports are used for monitoring the performance of Fast Path transactions, gathering diagnostic information, and tuning IMS.

Monitoring the performance of Fast Path transactions

On a daily basis, you will probably want to know whether anything happened in the system that significantly affected Fast Path transaction response time. You'd like to determine this at a quick glance, rather than having to study pages of tabulated listings. The Fast Path Transit reports are designed for this purpose.

You'll probably want to look at the [“Fast Path Transit Analysis report” on page 198](#) by Transaction Code or by Time. The "Time" section shows any spikes in transit time and whether the overall pattern differs from the normal pattern. If there is a spike or deviation, then you may be directed to the "Transaction Code" (or R"outing Code") sections, which may highlight a particular transaction code that is performing badly. You may then want to rerun IMS Performance Analyzer to produce other reports for the spike periods, to get more detailed perspectives or different views of the data. For example, the [“Fast Path Transit Log report” on page 201](#) produces a chronological log of individual transactions and their response times. Also, the [“Fast Path Transaction Exception Log report” on page 208](#) produces a more comprehensive log of individual transactions with their response times and resource usage. This report can be filtered to show only poor performing transactions, by setting expectation criteria for transit times, DL/I calls and DB waits, and so on.

The following examples demonstrate how this process might occur.

Example 1

Suppose a transaction stays in a region for an unusually long time. The "Time" section of the [“Fast Path Transit Analysis report” on page 198](#) shows a spike for the time period in which the transaction is completed, and the spike indicates lengthy processing time. Further, the input queue transit time may be lengthening, because transactions are waiting for a region to become free. By looking at the "Transaction Code" section of the report, you should be able to identify the problem transaction.

You can request the [“Fast Path Transit Log report” on page 201](#) or [“Fast Path Transaction Exception Log report” on page 208](#) to determine which occurrences of the problem transaction caused the problem. Perhaps you will find that the problems all occurred for the same userid.

If necessary, you can consult more detailed IMS Performance Analyzer reports to help determine the cause of the problem. For example, the [“DEDB Update Activity report” on page 227](#) shows update activity on the databases used by the problem transaction. The [“DEDB Update Trace report” on page 254](#) shows all DEDB activity for each transaction. The [“IFP Region Occupancy report” on page 225](#) shows which IFP regions are processing the transactions most efficiently.

Example 2

If the "Time" section of the [“Fast Path Transit Analysis report” on page 198](#) indicates only long input queue times, and not abnormally long processing times, then this could mean that your system is overloaded or that too few regions are available. The [“IFP Region Occupancy report” on page 225](#) report should help you analyze this symptom.

Tuning IMS and gathering diagnostic information

The other way in which IMS Performance Analyzer Fast Path Transit reports are used is as a source of system tuning and diagnostic information. The reports help you determine whether a transaction code, userid, or a certain time of day contributes to poor transit time. The activity reports help you specifically identify problem areas.

Understanding Fast Path Transit Time

IMS Performance Analyzer breaks down Fast Path transaction transit time into four intervals: input queue time, processing time, output queue time, output time.

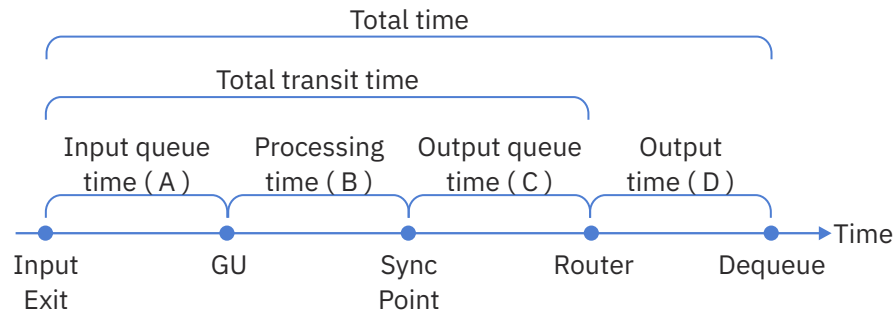


Figure 98. Transit Time intervals

(A)

Input queue time. The period from input exit to the Get Unique (GU) call of the application program. It includes:

1. EMH/BALG queue time
2. Shared EMH queue time

(B)

Processing time. The period from the Get Unique (GU) call of the application program to sync point.

(C)

Output queue time. The period from sync point to entry to the output router.

Also reported in the total time, but not as part of the total transit time:

(D)

Output time. The period from output router entry to dequeue time.

In summary, the sum of (A), (B), and (C) is total transit time; that is, the time from input exit to entry to the output router. The sum of (A), (B), (C), and (D) is total time; that is, the time from input exit to dequeue.

The maximum interval that can be recorded on the log records is 65.535 seconds. If any transit time exceeds this, then it will be displayed as 65.535 seconds (or 65535 milliseconds).

IMS Performance Analyzer reports these times for the average transaction and for a peak load situation, as defined by you. Your analysis of these components can indicate whether corrective action is appropriate for transit time problems. For example, long input queue times suggest that there are not enough IFP regions.

For IMS shared EMH queue, IMS Performance Analyzer produces composite transit time reports by merging the data from the log input of the multiple IMS subsystems in the sysplex. For efficient batch report processing, it is advisable to specify a global **Start** and **Stop** time period that intersects the log input from all the IMS subsystems in the sysplex. For further details, see "Specifying the time period for Transit reports" in the *IMS Performance Analyzer for z/OS: User's Guide*.

Timer Units: The Fast Path 59 log records present elapsed queue times in timer units of 1.024 milliseconds. All IMS Performance Analyzer Fast Path Transit reports convert the timer units to actual milliseconds when reporting elapsed queue times, except for the Fast Path Transaction Exception report and extract, which give elapsed times in timer units.

Fast Path Transit Analysis report

The IMS Fast Path Transit Analysis report shows the times for the components of transaction transit time: Input queue time, Processing Time, Output queue time, and Global input and output queue times. The transaction code and routing code reports show areas in application design and region availability that may require attention. The userid report shows whether the distribution of service among system users is adequate. The time of sync point report notes performance problems caused by momentary surges

of transaction input. The display of transit time by time period is useful in isolating time periods of high response.

The reports are structured so that for a system with good performance, a daily glance at the reports is all that is needed; more detailed scrutiny can be done if a problem is noticed. For multi-subsystem log input, IMS Performance Analyzer assumes a sysplex environment with shared EMH queues and produces composite reports interrelating the data from the multiple subsystems.

Log records: This report is derived from IMS log records 5901, 5903, 5911, 5916, 5936, 5937, 5938.

Options

To specify the report options, select the Fast Path Transit **Analysis** report in a Log Report Set.

Several reporting sequences are available for this report. It can be ordered by:

- Transaction Code
- Routing Code
- Userid
- Time of sync point

Specific values can be included in or excluded from the report by specifying Object Lists for one or more of the following:

- Transaction Code
- Routing Code
- Userid

A report interval can be specified. This applies to the reduced data file after the Global (or Run-time) report interval is effected.

The report output is written to the data set specified by the Report Output DDname.

From the Fast Path (EMH) Transit Options panel, the following options can be specified:

- The percentile transit time
- The time increments
- Whether the time intervals begin with the first value encountered, or are adjusted to align on the hour

Content

This figure shows examples of the Fast Path Transit Analysis reports for both local and global (shared EMHQ) transaction processing.

Several report formats are available, ordered by:

- Transaction Code
- Routing Code
- User ID
- Time of sync point

IMS Performance Analyzer															
Fast Path (EMH) Transit Time Analysis by Transaction Code															
From 15Apr2023 19.00.43.88				To 15Apr2023 20.02.58.95				Elapsed= 1 Hrs 2 Mins		15.076.307 Secs					
Transact Code	Routing Code	Resp Count	Min Tran Time	--Average Input Queue	Transit Pgm Exec	Time-- Output Queue	Total	--90% Input Queue	Peak Pgm Exec	Transit Output Queue	Time-- Total	Max Tran Time	Global Count	--- Shared Average Input Output	EMHQ Time 90% Peak Input Output
INQUIRY	INQUIRY	1438	112	61	264	40	365	162	430	96	576	1200	1438	15	8 55 45
ORDER	ORDER	8619	35	270	48	41	359	727	81	94	816	1800	8619	158	6 529 30
PARTS	PARTS	3618	40	53	62	36	151	119	140	88	271	1103	3618	16	7 59 34
STOCK	STOCK	156	466	46	2661	41	2749	92	3735	113	3823	5971	156	9	4 27 18
System Totals		21839	30	189	104	39	332	576	488	93	856	5971	13839	104	6 411 33

Fast Path (EMH) Transit Time Analysis by Routing Code															
From 15Apr2023 19.00.43.88				To 15Apr2023 20.02.58.95				Elapsed= 1 Hrs 2 Mins		15.076.307 Secs					
Routing Code	Transact Code	Resp Count	Min Tran Time	--Average Input Queue	Transit Pgm Exec	Time-- Output Queue	Total	--90% Input Queue	Peak Pgm Exec	Transit Output Queue	Time-- Total	Max Tran Time	Global Count	--- Shared Average Input Output	EMHQ Time 90% Peak Input Output
INQUIRY	INQUIRY	1438	112	61	264	40	365	162	430	96	576	1200	1438	15	8 55 45
ORDER	ORDER	8619	35	270	48	41	359	727	81	94	816	1800	8619	158	6 529 30
PARTS	PARTS	3618	40	53	62	36	151	119	140	88	271	1103	3618	16	7 59 34
STOCK	STOCK	156	466	46	2661	41	2749	92	3735	113	3823	5971	156	9	4 27 18
System Totals		21839	30	189	104	39	332	576	488	93	856	5971	13839	104	6 411 33

Fast Path (EMH) Transit Time Analysis by Userid															
From 15Apr2023 19.00.43.88				To 15Apr2023 20.02.58.95				Elapsed= 1 Hrs 2 Mins		15.076.307 Secs					
User ID	Transact Code	Resp Count	Min Tran Time	--Average Input Queue	Transit Pgm Exec	Time-- Output Queue	Total	--90% Input Queue	Peak Pgm Exec	Transit Output Queue	Time-- Total	Max Tran Time	Global Count	--- Shared Average Input Output	EMHQ Time 90% Peak Input Output
JANE	INQUIRY	1	620	131	452	37	620	131	452	37	620	620	1	131	22 131 22
	ORDER	2	170	131	69	52	251	217	121	62	399	333	2	91	5 105 5
	PARTS	1	118	37	26	55	118	37	26	55	118	118	1	37	13 37 13
JANE	*Total*	4	118	107	154	49	310	185	411	61	599	620	4	87	11 137 21
JIM	INQUIRY	1	671	49	587	35	671	49	587	35	671	671	1	14	10 14 10
	ORDER	4	70	296	36	53	384	695	49	76	808	736	4	291	6 685 6
	PARTS	3	123	129	116	73	318	327	255	120	617	577	3	112	16 324 44
JIM	*Total*	8	70	202	135	58	395	514	386	92	748	736	8	189	10 506 26
System Totals		21839	30	189	104	39	332	576	488	93	856	5971	13839	104	6 411 33

Fast Path (EMH) Transit Time Analysis by Time															
From 15Apr2023 19.00.43.88				To 15Apr2023 20.02.58.95				Elapsed= 1 Hrs 2 Mins		15.076.307 Secs					
Start of Time Interval	Transact Code	Resp Count	Min Tran Time	--Average Input Queue	Transit Pgm Exec	Time-- Output Queue	Total	--90% Input Queue	Peak Pgm Exec	Transit Output Queue	Time-- Total	Max Tran Time	Global Count	--- Shared Average Input Output	EMHQ Time 90% Peak Input Output
19:00:00	INQUIRY	236	34	60	248	77	385	142	390	156	551	794	236	24	16 56 73
	ORDER	1337	62	217	51	71	339	415	115	146	562	1199	1337	175	14 367 63
	PARTS	522	58	76	77	63	216	168	173	136	367	1103	522	38	16 78 66
	STOCK	20	1445	60	2627	123	2810	103	3571	230	3762	4139	20	17	5 27 11
19:00:00	*Total*	2115	34	163	104	70	337	352	452	146	724	4139	2115	123	15 300 65
19:30:00	INQUIRY	957	26	39	228	30	296	78	343	68	419	817	957	6	4 16 14
	ORDER	5438	43	92	46	30	168	187	66	67	265	514	5438	35	4 108 14
	PARTS	2261	34	40	53	27	120	80	99	63	184	518	2261	7	4 18 13
	STOCK	97	430	39	2781	25	2845	77	3830	61	3900	4512	97	6	4 21 17
19:30:00	*Total*	8753	26	72	98	29	199	157	488	66	591	4512	8753	24	4 85 14
System Totals		21839	30	189	104	39	332	576	488	93	856	5971	13839	104	6 411 33

Figure 99. FP Transit Analysis report

The first two columns in the report are ordering columns according to your selection. For example:

- If you select Transaction Code as the ordering operand, the first two column headers are **Transact Code** and **Routing Code**. Each Routing Code within the transaction identifies it as being associated with the transaction code. Usually, there is a one to one correspondence between Transaction Code and Routing Code, and in this case, only one report line per transaction is written. When Transaction Codes are associated with more than one Routing Code, multiple report lines per transaction are written, one for each Routing Code. In this case, a ***TOTAL*** report line signifies the accumulated total of all Routing Codes for this Transaction Code.
- If you select Userid as the ordering operand, the first two column headers are **Userid** and **Transact Code**. For each userid, a report line is written for every transaction code processed on behalf of the user. Usually, each userid will have used more than one transaction code, and in this case, multiple report lines per userid are written, one for each Transaction Code. A ***TOTAL*** report line signifies the accumulated total of all transaction codes for this userid.
- If you select Time Interval, the first two column headers are **Start of Time Interval** and **Transaction Code**. Each transaction code that was processed during the time interval is reported. A ***TOTAL*** report line signifies the accumulated total of all transaction codes processed during the interval.

The report heading contains the reporting period. **From** specifies the date and time of the first transaction to be processed, and **To** specifies the date and time of the last transaction to be processed. **Elapsed** is the reporting period elapsed time, the time between the first and last transactions that were processed.

The following fields appear in the report after the two ordering fields:

Resp Count

Number of transactions completed during the time period being examined.

Min Tran Time

The shortest total transit time, in milliseconds, for a single transaction.

Average Transit Time

The average (mean) transit time, in milliseconds, required to process each transaction. These transit times are broken down into their component parts:

- Input queue time
- Program execution time
- Output queue time
- Total time

nnn% Peak Transit Time

A statistical estimate, based on a normal distribution, that *nnn%* (between 50% and 100% as specified by you) of all transactions had transit times less than the time shown. For example, it is estimated that *nnn%* of transactions completed within the total transit time shown. Times are in milliseconds. The estimated transit times are broken down into their component parts:

- Input queue time, which includes time on the shared EMHQ
- Program execution time
- Output queue time
- Total time

The total time is a statistical estimate itself, rather than the sum of the component estimates.

The peak values are a statistical estimate only, so care should be taken when interpreting the values if the transaction volume is low.

Max Tran Time

The longest total transit time, in milliseconds, for a single transaction.

Global Count

The number of transactions that were processed globally (shared EMHQ) during the time period being examined.

Average Shared EMHQ Time

The average (mean) elapsed time, in milliseconds, that the transaction's Input and Output message spent on the global SEMHQ.

nnn% Peak Shared EMHQ Time

A statistical estimate, based on a normal distribution, that *nnn%* (between 50% and 100% as specified by you) of all transactions had global SEMHQ Input and Output queue times less than the time shown. Times are in milliseconds.

The peak values are a statistical estimate only, so care should be taken when interpreting the values if the transaction volume is low.

Fast Path Transit Log report

The Fast Path Transit Log report is a chronological listing of all IFP transactions processed during the reporting interval. This report can help you diagnose problem areas and to isolate and diagnose problem transactions. It shows transit activity and DL/I call details of each IFP transaction. For multi-subsystem log input, IMS Performance Analyzer assumes global (shared EMHQ) processing, and produces a composite report by merging log data from all subsystems in the sysplex.

Log records: This report is derived from IMS log records 5901, 5903, 5911, 5916, 5936, 5937, 5938.

Options

To specify the report options, select the Fast Path Transit **Log** report in a Log Report Set.

A report interval can be specified. This applies to the reduced data file after the Global (or Run-time) report interval is effected.

The report output is written to the data set specified by the Report Output DDname.

Specific transaction codes can be included in or excluded from the report by specifying an Object List.

Content

This figure shows an example of the Fast Path Transit Log applicable to both local and global (shared EMHQ) transaction processing.

IMS Performance Analyzer Fast Path (EMH) Transaction Transit Log													Page	1
Log 30Jul2023 15:49:42:15														
Sync Point Time	Transact Code	Routing Code	Logical Terminal	User ID	Proc- IMID	PST	DB Call- DEDB MSDB	In-Q	Transit Time Proc Out-Q	Total	Output Time	Total Time	-SEMHO Input	Time- Outpt
15:49:42.15	DFSIVP4	*IFP			IADE	1	0 0	0	0 0	0	0	0		
16:19:56.39	IVTFD	IVTFD	FUNTRM12	FUNTRM12	IADE	1	1 0	0	420 268	688	6	694		
16:20:01.06	IVTFD	IVTFD	FUNTRM12	FUNTRM12	IADE	1	1 0	0	17 104	122	7	129		
16:20:04.94	IVTFD	IVTFD	FUNTRM12	FUNTRM12	IADE	1	1 0	0	10 237	247	7	254		
16:20:16.90	IVTFD	IVTFD	FUNTRM12	FUNTRM12	IADE	1	1 0	0	29 325	353	7	360		
16:20:20.04	IVTFD	IVTFD	FUNTRM12	FUNTRM12	IADE	1	1 0	0	1 196	197	7	204		
16:20:24.58	IVTFD	IVTFD	FUNTRM12	FUNTRM12	IADE	1	1 0	0	344 142	486	7	494		
16:20:28.59	IVTFD	IVTFD	FUNTRM12	FUNTRM12	IADE	1	1 0	0	10 138	148	8	157		
16:20:34.40	IVTFD	IVTFD	FUNTRM12	FUNTRM12	IADE	1	1 0	0	1 389	390	7	397		
16:20:38.37	IVTFD	IVTFD	FUNTRM12	FUNTRM12	IADE	1	1 0	0	2 135	137	8	145		
16:20:51.60	IVTFD	IVTFD	FUNTRM12	FUNTRM12	IADE	1	1 0	0	1 181	182	8	190		
9:38:04.77	IVTFD	IVTFD	FUNTRM65	DVP	IADE	1	1 0	0	10 347	357	6	364		
9:38:09.30	IVTFD	IVTFD	FUNTRM65	DVP	IADE	1	1 0	1	13 301	315	7	323		
9:38:14.23	IVTFD	IVTFD	FUNTRM65	DVP	IADE	1	1 0	0	14 118	132	6	138		
9:38:19.43	IVTFD	IVTFD	FUNTRM65	DVP	IADE	1	1 0	0	1 188	189	6	196		
9:38:27.60	IVTFD	IVTFD	FUNTRM65	DVP	IADE	1	1 0	0	1 292	293	6	299		
9:38:32.13	IVTFD	IVTFD	FUNTRM65	DVP	IADE	1	1 0	0	28 254	282	6	288		
9:38:37.59	IVTFD	IVTFD	FUNTRM65	DVP	IADE	1	1 0	0	13 313	327	7	334		
9:38:50.82	IVTFD	IVTFD	FUNTRM65	DVP	IADE	1	1 0	0	1 360	361	6	368		
9:38:54.07	IVTFD	IVTFD	FUNTRM65	DVP	IADE	1	1 0	0	1 358	359	7	367		
9:38:59.99	IVTFD	IVTFD	FUNTRM65	DVP	IADE	1	1 0	0	19 252	271	7	279		
9:39:12.80	IVTFD	IVTFD	FUNTRM65	DVP	IADE	1	1 0	1	1 164	166	7	173		
9:39:22.76	IVTFD	IVTFD	FUNTRM65	DVP	IADE	1	1 0	0	16 226	243	6	249		
9:39:26.00	IVTFD	IVTFD	FUNTRM65	DVP	IADE	1	1 0	0	1 233	234	7	242		
9:39:35.10	IVTFD	IVTFD	FUNTRM65	DVP	IADE	1	2 0	0	1 156	157	7	164		
11:03:54.70	IVTFD	IVTFD	3101	CEX002	IADE	1	1 0	0	77 0	77	0	77		
11:03:54.79	IVTFD	IVTFD	3101	CEX002	IADE	1	1 0	0	19 0	19	0	19		
11:03:54.90	IVTFD	IVTFD	3101	CEX002	IADE	1	1 0	0	13 0	13	0	13		

Figure 100. FP Transit Log report

The report heading contains the start of the reporting period. **Log** specifies the date and time of the first transaction to be processed.

The following fields appear in the report:

Sync Point Time

Time of day of the transaction sync point.

Transact Code

The transaction code that was processed.

Routing Code

The Routing Code of the IFP transaction, or

- *IFP for an IFP transaction that failed synchronization, or
- Region type for a non-IFP transaction, which can be:

*MPP

MPP region

APPLID

DBCTL, when the CICS system name is available

***DBC**

DBCTL, when the CICS system name is not available

Jobname

BMP, when the jobname is available

***BMP**

BMP, when the jobname is not available

Logical Terminal

The logical terminal (LTERM) at which the transaction is entered.

User ID

The userid associated with the transaction.

Proc

The IMS subsystem that processed the transaction, broken down into:

IMID

The IMS subsystem where the transaction was processed

PST

The dependent region PST ID that processed the transaction

DB Call

The number of DL/I calls issued by the transaction, broken down into:

DEDB

DL/I calls to DEDB databases

MSDB

DL/I calls to MSDB databases

Transit Time

The transit time, in milliseconds, required to process the transaction. These transit times are broken down into their component parts:

In-Q

Input queue time

Proc

Program execution time

Out-Q

Output queue time

Total

Total time

Output Time

The elapsed time, in milliseconds, that the output message took to be sent to the terminal.

Total Time

The transaction response time, in milliseconds, and is a sum of the total transit time and the output time.

SEMHQ Time

The elapsed time, in milliseconds, that the transaction spent on the shared EMH queue. These transit times are broken down into their component parts:

Input

Input queue time

Outpt

Output queue time

Fast Path Transit Extract by Interval

The IMS Fast Path Transit Extract by Interval report allows creation of extract files of Fast Path transit data by time interval. You can use the CSV extracts produced by IMS Performance Analyzer for further analysis in third-party tools.

Log records: This extract is derived from IMS log records 5901, 5903, 5911, 5916, 5936, 5937, 5938.

Options

To specify the extract options, select the Fast Path Transit **Extract by Interval** in the Log Report Set.

A report interval can be specified. This applies to the reduced data file after the Global (or Run-time) report interval is effected.

The report output is written to the data set specified by the Report Output DDname.

Select whether to accumulate data by time interval for individual transactions or for all transactions.

Specify the output data set which is to store the extract data. Optionally, specify an input data set containing previous extracts which are to be merged with the current extract.

Specific transaction codes can be included in or excluded from the extract by specifying an Object List.

The options on the Fast Path (EMH) Transit Options panel applicable to the extract are:

- Time interval
- Whether the time increments begin with the first value encountered, or are adjusted to align on the hour. Aligning to an even hour is recommended when merging extract files, so that start times are aligned and evenly spaced.

Content

The format of the Fast Path Transit Extract by Interval file is a proprietary format, the same as that produced by the Transaction Transit (MSQ) Extract by Interval. For more information, see [“Transaction Transit Extract by Interval” on page 75](#).

IMS Performance Analyzer provides facilities to filter and convert the extract data to an export file for use by external programs or to download to PC. For more information, see [“Exporting interval data to CSV” on page 76](#).

The following figure shows an example of a report which provides a summary of the extract processing. The **Start** date and time is that of the start of the first interval on the extract file. The **End** date and time is that of the start of the last interval on the extract file.

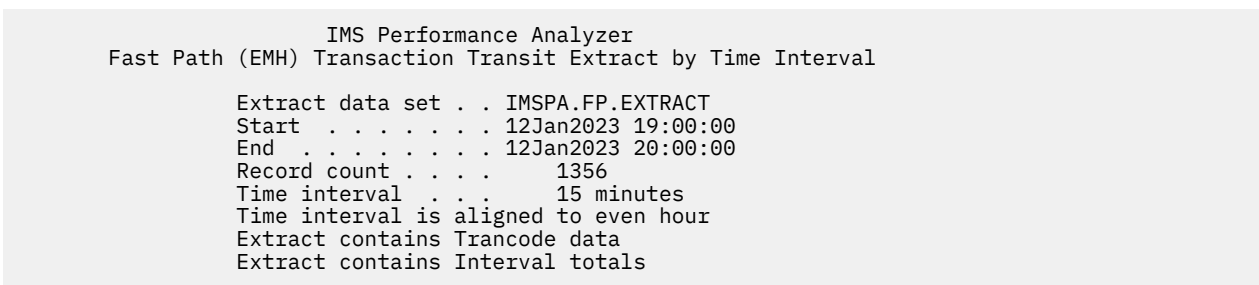


Figure 101. FP Transit Extract by Interval: Summary report

Fast Path Transaction Exception report and extract

The Fast Path Transaction Exception reports provide detailed and summary information about IFP transactions, as well as message queue transactions that use Fast Path databases. The series of reports provide detailed and summary information about IFP transactions, as well as message queue transactions that use Fast Path databases. Optionally, two extract files can be produced containing detail records of all IFP transaction activity, or exception transactions only.

The Fast Path Transaction Exception report consists of the following reports and extracts:

- Fast Path Transaction Exception Log. This is a chronological listing with comprehensive detail of every Fast Path transaction exception.
- Fast Path Transaction Exception Summary. This report summarizes the transactions reported in the Transaction Exception Log.
- Fast Path Sync Point Failure Summary. This report summarizes the reasons for transaction sync point failures.
- Fast Path Total Traffic data set. This extract data set is similar to the DBFULTA0 Total Traffic data set.
- Fast Path Exception Traffic data set. This extract data set is similar to the DBFULTA0 Exception Traffic data set.
- Fast Path Transaction Exception Recap. This report provides a summary of system activity in the report period.

Log records: This report is derived from IMS log records 5901, 5903, 5911, 5916, 5936, 5937, 5938.

Options

To specify the report options, select the Fast Path Transit **Transaction Exception** report in a Log Report Set.

A report interval can be specified. This applies to the reduced data file after the Global (or Run-time) report interval is effected.

The report output is written to the data set specified by the Report Output DDname.

Transaction exceptions are determined by the specification of an Expectation Set. A transaction is defined as an exception if it is outside the range defined in the Expectation Set for any of the following values:

- Input queue time
- Processing time
- Output queue time
- Total transit time
- FP DB DL/I calls
- DEDB waits

If the Expectation Set is not specified, then all transactions are treated as exceptions.

You can also select non-IFP transactions (message queue transactions that use FP databases) to always be treated as exceptions.

Specify the Total Traffic extract data set to create a file equivalent to the DBFULTA0 Total Traffic data set. All Fast Path transactions have a detail record written to this data set.

Specify the Exception Traffic extract data set to create a file equivalent to the DBFULTA0 Exception Traffic data set. Only Fast Path exception transactions have an exception record written to this data set.

Fast Path Transaction Exception Extract file

The record formats of the Total Traffic and Exception Traffic extract data sets are the same as the DBFULTA0 Fast Path transaction detail record FPTDR. The record layout is defined by the assembler macro IPIFPDR in the SIPIMAC library.

The extract contains similar information to the Fast Path Transaction Exception Log report, and is in a format suitable for import into Db2 or a PC reporting tool.

The field headings of the extract file are optionally included as the first record in the extract file, depending on the extract options set in Log Global Options. The headings line up with the column data fields that they describe.

Each data row represents a single IFP transaction, and details its execution statistics. Non-FP transactions that use Fast Path resources can also be included in the extract, however IFP statistics such as queue times will be left blank.

The data fields are fixed length, and can be separated by a blank or comma, depending on the extract options set in Log Global Options. Set the delimiter character to ensure that the extract is suitable for use by other reporting and statistical analysis tools.

The following table shows the record format of the extract file, mapped by macro IPIFPDR.

Table 3. Extract file record layout: Fast Path Transaction Transit Traffic

Field description	Column heading	Field length (bytes)
Sequence number	SeqNo	7
Transaction Code or PSB Name	Trancode	8
Sync point time (hh:mm:ss.th)	SyncTime	11
Sync point failure character	F	1
Routing Code	RoutCode	8
LTERM	Lterm	8
Region PST ID	PST	4
On queue count	OQcnt	5
Input Queue time (msecs)	InQ	4
Processing time (msecs)	Proc	4
Output Queue time (msecs)	OutQ	4
Total Transit time (msecs)	Total	5
Output time (secs)	OutTm	5
DEDB Call count	DEC	3
ADS Read count (number of CI's)	ADR	3
ADS Update count (number of CI's)	ADU	3
VSO Read count (CI's; DASD or DS)	VSR	3
VSO Update count (number of CI's)	VSU	3
MSDB Call count	MSC	3
Number of Buffers used	BfU	3
CI Contentions (Waits)	CI	2

Table 3. Extract file record layout: Fast Path Transaction Transit Traffic (continued)

Field description	Column heading	Field length (bytes)
UOW Contentions (Waits)	UW	2
Waits for OBA Allocation	OW	2
Waits for Common Buffers	CW	2
Region type: IFP, MPP, and so on	T	1
Special processing; G=GLOBAL, H=HSSP, R=REORG	S	1
Sync point date (YYDDD)	SPDat	5
IMS Release level	IMS	4
Phase 1 to Phase 2 time	Sync	4
Input message length	IMLn	4
Output message length	OMLn	4
Relative Physical Line number	Line	4
Relative Physical Terminal number	Term	4
GU	GU	3
GN	GN	3
GNP	GNP	3
GHU	GHU	3
GHN	GHN	3
GHNP	GHP	3
REPL	REP	3
ISRT	ISR	3
DLET	DLE	3
FLD	FLD	3
POS	POS	3
NBA Buffers	NBA	3
Overflow Buffers	OFB	3
Buffer Steals	BSt	3
Buffer Waits	BWt	3
OThread Updates	OTU	3
Unrelated Buffers	UrB	3
PVT Buffers	PVB	3
PVT Buffer Waits	PVW	3
ASync Reads	ASR	3
ASync Read Waits	ASW	3

Fast Path Transaction Exception Log report

The IMS Performance Analyzer Fast Path Transaction Exception Log report provides a detailed exception listing, the number of DL/I calls by type for DEDB calls, the amount of buffer use by type, VSO usage by transaction, and shared EMHQ information. This report is applicable to both local and global (shared EMHQ) transaction processing.

IMS Performance Analyzer Fast Path Transaction Exception Log Log 15Apr2023 17:18:39.48																			
Sync Point Time	S F	Transact Code	Routing Code	P T	User ID	PST Queue ID	Count	--Transit In-Q	Times (Msec) Proc	-- Out-Q	Total	Output (sec)	-DB Call- DEDB MSDB	--ADS-- Get Put	--VSO-- Get Put	Buf Use	--DB Wait-- CI UW OB CB		
17:18:39.48		TPCC0	TPCC0		WH022403	13	2	1	90	0	91	0.00	8	3	0	0	3	0	0
DEDB Calls	-	GU= 3	GN= 0	GNP= 5	GHU= 0	GHN= 0	GHNP= 0	REPL= 0	ISRT= 0	DLET= 0	FLD= 0	POS= 0	Total= 8						
Buffer	-	NBA= 3/5	OVFN= 0/10	STEAL= 0	WAIT= 0	OTHR= 0	NRDB= 0	PBUF= 0	PBWT= 0	ASIO= 0	AIOW= 0								
VSO	-	VGET= 0	VPUT= 0	DGET= 0	SDEP -	CI#= 0	SEG#= 0												
Shared EMHQ	-	MSG Transit= 0 (Msec)	MSG Transit= 0 (Msec)	Org IMS ID=IMS1	Proc IMS ID=IMS1														

Figure 102. IMS Performance Analyzer Fast Path Transaction Exception report

The report heading shows the start of the reporting period. **Log** specifies the date and time of the first transaction processed.

The report consists of one to five lines of information for each transaction:

1. Exception detail
2. DEDB Calls
3. Buffer
4. VSO
5. Shared EMHQ

The first line is the detailed exception listing and is always provided. The data is presented in columns. The other four lines are optional and can be requested individually to produce up to four rows of additional statistics.

The report provides the following information:

1. **Exception detail line.** Detailed exception listing. This is always produced. The column headings are:

Sync Point Time

The clock time at sync point processing.

SF

A reason code for transactions that fail synchronization processing. Synchronization failure is indicated by one of the following characters, and the corresponding report columns will be blank.

A

MSDB verify failure

B

MSDB arithmetic overflow

C

DEDB sequential dependent area full

D

DEDB sequential dependent insert caused buffer overflow

E

DEDB sequential dependent buffer overflow three times

F

DEDB area not available for use

G

Dynamic MSDB area full

H	MSDB required segment not found
I	DEDB FLD calls; lock for a CI could not be obtained
J	DEDB FLD calls; deadlock occurred
K	DEDB FLD calls; overflow occurred
L	ROLB call
M	DEDB FLD calls; verify failed
N	DEDB FLD calls; segment in CI was deleted
O	Out of resources
P	Inflight condition in /ERE
Q	RESYNC abort requested
R	Resource deadlock
S	Out of space in data sets
U	Application program abend

Transact Code

The transaction code, or PSB name.

Routing Code

Identification of the balancing group (BALG) of the IFP transaction, or

- *IFP for an IFP transaction that failed synchronization, or
- Region type for a non-IFP transaction, which can be:

***MPP**

MPP region

APPLID

DBCTL, when the CICS system name is available

***DBC**

DBCTL, when the CICS system name is not available

Jobname

BMP, when the jobname is available

***BMP**

BMP, when the jobname is not available

PT

The process type, either:

G	GLOBAL
H	HSSP

R

Reorganization

User ID

The identifier of the user logged onto the input terminal that initiated the transaction. When IMS does not use security and the User ID is not available, LTERM name is reported instead.

PST ID

The PST number.

Queue Count

The number of transactions in the balancing group (BALG) queue when this transaction entered sync point processing.

In-Q Transit Time (Msec)

Time interval (A) . Input Queue time in milliseconds. This will be marked N/A for Shared EMH input/output transit time when the transaction is:

- Local only.
- Global only, or local first transaction which is processed on other CEC while IMS Performance Analyzer is reading the log of the IMS backend.

An IFP transaction is classified as an exception if the Input Queue time falls outside the range specified for the transaction code in the Expectation Set.

In this report, the Transit Queue times are only applicable in an IFP environment. For non-IFP transactions, the Transit Queue times are left blank, indicating that they are not applicable. Use the Message Queue Transit Time Analysis and Transaction Exception reports to analyze the Transit Queue times of MPP and BMP transactions that use FP databases.

Proc Transit Time (Msec)

Time interval (B) . Processing time in milliseconds.

An IFP transaction is classified as an exception if the Processing time falls outside the range specified for the transaction code in the Expectation Set.

Out-Q Transit Time (Msec)

Time interval (C) . Output Queue time in milliseconds. This will be marked N/A for Shared EMH input/output transit time when the transaction is:

- Local only.
- Global only, or local first transaction which is processed on other CEC while IMS Performance Analyzer is reading the log of the IMS backend.

An IFP transaction is classified as an exception if the Output Queue time falls outside the range specified for the transaction code in the Expectation Set.

Total Transit Time (Msec)

The sum of time intervals (A) , (B) , (C) .

An IFP transaction is classified as an exception if the Total Transit time falls outside the range specified for the transaction code in the Expectation Set.

Output (sec)

Time interval (D) . Output time (to dequeue) in seconds.

DB Call

The number of calls of the following type:

DEDB

Total number of DEDB calls.

MSDB

Number of MSDB calls.

A transaction is classified as an exception if the number of DB Calls falls outside the range specified for the transaction code in the Expectation Set.

ADS

The number of CIs processed, broken down into:

Get

Number of CIs read.

Put

Number of CIs updated.

VSO

The number of CIs processed from the data space or coupling facility structure.

Get

Number of CIs read from the data space or coupling facility structure.

Put

Number of CIs updated in the data space or coupling facility structure.

Buf Use

The total number of buffers used from the common buffer pool. This number includes non-related buffers used for MSDBs and SDEPs.

DB Wait

The number of waits, broken down by:

CI

Number of waits for CIs.

UW

Number of waits for UOWs.

OB

Number of waits for overflow buffer allocation. This number should never be greater than 1.

CB

Number of waits for common buffers.

A transaction is classified as an exception if the number of DB Waits falls outside the range specified for the transaction code in the Expectation Set.

2. **DEDB Calls.** Optional. Contains the number of DL/I calls by type for DEDB calls. The different types of DL/I calls are:

GU

Number of GU calls.

GN

Number of GN calls.

GNP

Number of GNP calls.

GHU

Number of GHU calls.

GHN

Number of GHN calls.

GHNP

Number of GHNP calls.

REPL

Number of REPL calls.

ISRT

Number of ISRT calls.

DLET

Number of DLET calls.

FLD

Number of FLD calls.

POS

Number of POS calls.

Total

Total number of DL/I calls.

3. **Buffer.** Optional. Contains the amount of buffer use by type. The different types of buffer use are:

NBA

SYNCSNBA / SYNCSNBA#. The number of NBA (normal) buffers used. / The NBA value specified in the region startup procedure.

OVFN

SYNCOVFN / SYNCOBA#. The number of OBA (overflow) buffers. / The OBA value specified in the region startup procedure.

STEAL

Number of times buffer stealing is invoked by this transaction.

WAIT

Number of times the transaction waited for a buffer to become available.

OTHR

Number of buffers sent to OTHREAD.

NRDB

Number of buffers used by MSDB and SDEP processing.

PBUF

Number of private buffers used by HSSP or the High Speed DEDB Direct Reorganization utility in a transaction (one unit of work).

PBWT

Number of waits for private buffers by HSSP or the High Speed DEDB Direct Reorganization utility in a transaction (one unit of work).

ASIO

Number of UOW asynchronous read-aheads by HSSP or the High Speed DEDB Direct Reorganization utility in a transaction (one unit of work).

AIOW

Number of UOW asynchronous read-aheads to complete by HSSP or the High Speed DEDB Direct Reorganization utility in a transaction (one unit of work). This number should be either zero or one.

4. **VSO.** Optional. Contains information collected on VSO usage by transaction. The type of information collected is as follows:

VGET

The number of CI read requests satisfied from a data space or coupling facility structure.

VPUT

The number of CIs with updates to a data space or coupling facility structure. This number represents the number of CIs that would have been sent to OTHREAD if the areas were non-VSO.

DGET

The number of CIs read from DASD into a data space or coupling facility structure.

SDEP - CI#

SYNCSDEPCI#. Commit SDEP CI number used.

SDEP - SEG#

SYNCSDEPSEG#. Commit SDEP Segment number.

5. **Shared EMHQ.** Optional.

IMSG Transit

The elapsed time, in milliseconds, that the transaction input message spent on the shared EMH queue.

OMSG Transit

The elapsed time, in milliseconds, that the transaction output message spent on the shared EMH queue.

Org IMS ID

The IMS subsystem where the transaction originated.

Proc IMS ID

The IMS subsystem where the transaction was processed.

Fast Path Transaction Exception Summary report

This is an example of the Transaction Exception Summary report applicable to both local and global (shared EMHQ) transaction processing.

IMS Performance Analyzer																						
Fast Path Transaction Exception Summary																						
Log 15Apr2023 19.01.43.88																						
Transact Code	Routing Code	Resp Count	--Average Transit Time--				--Maximum Transit Time--				----- DB Calls -----				----- DB Waits -----							
			Input Queue	Exec	Pgm Queue	Output Queue	Input Queue	Exec	Pgm Queue	Output Queue	DEDB		MSDB		CI		UOW		OBA		CB	
INQUIRY	INQUIRY	1438	60	258	39	356	532	1073	311	1172	28	68	0	0	0	2	0	0	0	0	0	0
ORDER	ORDER	3637	424	49	32	504	1717	610	469	1758	14	18	0	0	0	0	0	0	0	0	0	0
PARTS	PARTS	1735	65	84	49	198	666	948	438	1077	4	7	0	0	0	2	0	0	0	0	0	0
STOCK	STOCK	156	45	2599	40	2684	253	5771	299	5831	282	485	0	0	0	0	0	0	0	0	0	0
System Totals		6974	251	158	38	446	1717	5771	469	5831	20	485	0	0	0	2	0	0	0	0	0	0

Figure 103. FP Transaction Exception report: Summary by Transaction

The report heading shows the start of the reporting period. **Log** specifies the date and time of the first transaction processed.

The following fields appear in the report:

Transact Code

The transaction code that was processed.

Routing Code

The Routing Code of the IFP transaction, or

- *IFP for an IFP transaction that failed synchronization, or
- Region type for a non-IFP transaction, which can be:

*MPP

MPP region

APPLID

DBCTL, when the CICS system name is available

*DBC

DBCTL, when the CICS system name is not available

Jobname

BMP, when the jobname is available

*BMP

BMP, when the jobname is not available

Resp Count

Number of transactions completed during the time period being examined.

Average Transit Time

The average (mean) transit time, in milliseconds, required to process each IFP transaction. These transit times are broken down into their component parts:

- Input queue time
- Program execution time
- Output queue time

- Total time

In this report, the Transit Queue times are only applicable in an IFP environment. For non-IFP transactions, the Transit Queue times are left blank, indicating that they are not applicable. Use the Message Queue Transit Time Analysis and Transaction Exception reports to analyze the Transit Queue times of MPP and BMP transactions that use FP databases.

Maximum Transit Time

The longest transit time, in milliseconds, required to process each IFP transaction. These transit times are broken down into their component parts:

- Input queue time
- Program execution time
- Output queue time
- Total time

DB Calls

Fast Path database DL/I call count, average and maximum, broken down into:

- DEDB DL/I calls
- MSDB DL/I calls

DB Waits

DEDB number of waits, average and maximum, broken down into:

CI

Waits for CIs.

UOW

Waits for UOWs.

OBA

Waits for overflow buffer allocation. This number should never be greater than 1.

CB

Waits for common buffers.

Fast Path Transaction Syncpoint Failure Summary report

This is an example of a Transaction Syncpoint Failure Summary report applicable to both local and global (shared EMHQ) transaction processing.

IMS Performance Analyzer Fast Path Syncpoint Failure Summary Log 15Apr2023 19.01.43.88			
S	Count	Synchronization Failure Description	
F	12	DEDB SDEP Area full	
C	297	ROLB call caused Sync failure	
L	15	Resource Deadlock	
R	154	Application Program or Pseudo ABEND	
U			

Figure 104. FP Transaction Exception report: Sync Failure Summary

The report heading shows the start of the reporting period. **Log** specifies the date and time of the first transaction processed.

The following fields appear in the report:

SF

Synchronization failure reason code.

Count

Number of transactions that failed sync point processing.

Synchronization Failure Description

Description of the Synchronization failure reason code.

Fast Path Transaction Exception Recap report

This is an example of the Transaction Exception Recap report applicable to both local and global (shared EMHQ) transaction processing. The Recap report is always produced after all requested reports and extract data sets have been generated. It provides a summary of the processing involved in generating the requested reports and extract files.

```

                                IMS Performance Analyzer
                        Fast Path Transaction Exception Recap
                        Log 15Apr2023 19.01.43.88

Total number of Fast Path transactions examined (detail records) . . . . . 13839
Number of Fast Path exception transactions (exception records) . . . . . 6974

Expectation Set used in the analysis . . . FPEXCEPT in Library IMSPA.V450.EXPSET

Breakdown of exceptions by type:
  IFP transactions where the expectation was not met . . . . . 6974
  IFP transaction Sync failures . . . . . 8
  IFP transactions where no dequeue record was found . . . . . 3977
  Non-IFP transactions (including Sync failures) . . . . . 0

Total Traffic Data set . . . . . IMSPA.FP.TTRAFFIC
Exception Traffic Data set . . . IMSPA.FP.XTRAFFIC
```

Figure 105. FP Transaction Exception report: Recap

The report heading shows the start of the reporting period. **Log** specifies the date and time of the first transaction processed.

Chapter 11. Fast Path Resource Usage reports

This report category provides detailed and summary information for analysis of the usage and availability of various Fast Path resources.

The Fast Path resources include:

- IFP Regions and Programs
- FP Transactions
- FP buffers
- DEDB databases and areas
- VSO
- DEDB and MSDB DL/I Calls
- Local and Global (SEMHQ) messages

Fast Path Resource Usage and Contention report

The IMS Fast Path Resource Usage and Contention report provides detailed statistics on the Fast Path resources used by IFP transactions and non-IFP programs. Use this report to view information on DEDB databases, area data sets, VSO, common buffers, locks, logging, sync point failures, and transaction throughput. Use this IMS Performance Analyzer report to gauge the performance of transactions that use DEDB databases. This report identifies transactions that issue excessive DL/I calls that cause area data set I/O, use excessive resources (including buffers and VSO), cause excessive contention, cause excessive logging, or fail during sync point processing.

Log records: This report is derived from IMS log records 5901, 5937, 5938.

Options

To specify the report options, select **Resource Usage and Contention** from the Fast Path Resource Usage Reports in a Log Report Set, then select **Resource Usage & Contention** from Reports Required. This is the default report selection, but it complements the Fast Path Buffer Usage report which you can request at the same time or separately.

The command for the Fast Path Resource Usage and Contention report is:

IMSPALOG	FPIRUC([BYIMID SYSPLEX,] RESUSAGE, [RESDDN(ddname),] default FPRUCRPT [FROM(date,time),] [TO(date,time),] [INCL(TRANCODE(list)) EXCL(TRANCODE(list)),] [INCL(IMSID(list)) EXCL(IMSID(list))])
IMSPALOG	EXECUTE

A report interval can be specified. This applies to the reduced data file after the Global (or Run-time) report interval is effected.

The report output is written to the data set specified by the Resource Report Output DDname. The default is FPRUCRPT.

By using Object Lists, you can specify that only certain values be included in or excluded from the report for:

- Transaction Codes
- IMS Subsystem IDs

Content

This figure shows an example of a Fast Path Resource Usage and Contention report applicable to both local and global (shared EMHQ) transaction processing.

The report was produced by the command:

```
IMSPALOG      FPIRUC (RESUSAGE,
IMSPALOG      RESDDN (FPRUCRPT))
IMSPALOG      EXECUTE
```

IMS Performance Analyzer																				Page 1						
Fast Path Resource Usage and Contention - IMSA																										
From 15Apr2023 19.00.43.88 To 15Apr2023 20.02.58.95 Elapsed=																				1 Hrs 2 Mins 15.076.307 Secs						
Transact	Routing	Count	---DEDB		Calls--		---ADS		I/O---		--VSO		Activity-		-Common		Buffer-		Contentions		LGNR	Stat	Totl	Tran		
Code	Code		Reads	Max	Avg	Updates	Max	Avg	Reads	Max	Updates	Avg	Max	Avg	Max	Avg	Max	Wts	Stl	Tot UOW	Tot OBA	CI/Sec	Total Comb	#CI Logd	Sync Fail	Rate /Sec
COSTING	*MPP	1758	12	45	0	0	0	6	7	0	0	0	0	0	0	2	4	0	0	0	0	0	0	0	23	
INQUIRY	INQUIRY	881	22	33	24	35	18	24	15	22	10	15	0	0	0	27	39	0	0	0	0	1	0	0	14	12
ORDER	ORDER	5576	13	18	0	0	3	5	0	0	0	0	0	0	0	3	5	0	0	0	0	0	0	0	73	
PARTS	PARTS	2323	3	3	4	4	4	5	4	4	0	0	0	0	0	5	5	0	0	0	0	2	0	0	31	
STOCK	STOCK	105	419	485	0	0	193	227	0	0	0	0	0	0	0	193	227	0	0	0	0	0	0	0	1	
System Totals		37892	16	485	3	35	7	227	3	22	1	15	0	0	0	8	227	0	0	0	0	3	0	0	14	117

Figure 106. Fast Path Resource Usage and Contention report

When processing multi-subsystem log files:

- One report is written for each subsystem, with the subsystem name in the report heading
- A total system wide report is written, with **Total** appearing in the report heading

The report heading contains the reporting period. **From** specifies the date and time of the first transaction to be processed, and **To** specifies the date and time of the last transaction to be processed. **Elapsed** is the reporting period elapsed time, the time between the first and last transactions that were processed.

The following fields appear in the report:

Transact Code

The Transaction Code name for an IFP transaction, or the program name for a non-IFP transaction.

Routing Code

The Routing Code of the IFP transaction, or the region type for a non-IFP transaction. The non-IFP region types can be:

*MPP

MPP region

APPLID

DBCTL, when the CICS system name (APPLID) is available

*DBC

DBCTL, when the CICS system name is not available

Jobname

BMP, when the jobname is available

*BMP

BMP, when the jobname is not available

*Batch

Batch job

*Utility

IMS Utility

*Unknown

When a X'5937' Syncpoint record is processed without a preceding X'5901' or X'5911'.

***SF=f**

Syncpoint failure reason code for transactions that fail synchronization processing. A non-blank character indicates synchronization failure, in which case the rest of the row is blank. The meaning of the codes is:

A	MSDB verify failure
B	MSDB arithmetic overflow
C	DEDB sequential dependent area full
D	DEDB sequential dependent insert caused buffer overflow
E	DEDB sequential dependent buffer overflow three times
F	DEDB area not available for use
G	Dynamic MSDB area full
H	MSDB required segment not found
I	DEDB FLD calls; lock for a CI could not be obtained
J	DEDB FLD calls; deadlock occurred
K	DEDB FLD calls; overflow occurred
L	ROLB call
M	DEDB FLD calls; verify failed
N	DEDB FLD calls; segment in CI was deleted
O	Out of resources
P	Inflight condition in /ERE
Q	RESYNC abort requested
R	Resource deadlock
S	Out of space in data sets
U	Application program abend

Count

The number of transactions that were processed in the report period.

DEDB Calls

The average and maximum number of DEDB calls, broken down into:

Reads

The total number of "Read" DL/I calls (GU, GN, GNP, GHU, GHN, GHNP, POS).

Updates

The total number of “Update” DL/I calls (REPL, ISRT, DLET, FLD).

ADS I/O

The average and maximum number of Area data set I/O calls, broken down into:

Reads

The total number of Area data set CIs read.

Updates

The total number of Area data set CIs updated.

VSO Activity

The average and maximum number of VSO activity calls, broken down into:

Reads

The total number of CI read requests satisfied from a data space or coupling facility structure

Updates

The total number of CIs with updates to a data space or coupling facility structure

Common Buffer Usage

The amount of buffer usage, broken down into:

Avg

The average number of calls

Max

The maximum number of calls

Wts

The total number of times a transaction waited for a buffer to become available

Stl

The total number of times buffer stealing was invoked for the transaction

Contentions

The number of other (not Common Buffer) contentions, broken down into:

Tot UOW

The total number of times unit-of-work contentions occurred for this transaction code

Tot OBA

The total number of times overflow buffer area contentions occurred for this transaction code

CI/Sec

The total number of CI contentions per second for this transaction code

LGNR Total Comb

The total number of times the LGNR specification was exceeded for this transaction code; either 0 or 1

Stat #CI Logd

The total number of times an entire CI was logged for this transaction code; either 0 or 1 and will only be 1 if **LGNR Total Comb** is also 1

Totl Sync Fail

The total number of occurrences of this transaction code that failed sync point processing

Tran Rate/Sec

The average number of transactions processed per second

Fast Path Buffer Usage report

The IMS Performance Analyzer Fast Path Buffer Usage report provides detailed statistics on Fast Path Buffer usage by IFP transactions and non-IFP programs. It complements the Fast Path Resource Usage and Contention report by providing a more comprehensive breakdown of Fast Path Buffer statistics.

Log records: This report is derived from IMS log records 5901, 5937, 5938.

Options

To specify the report options, select **Resource Usage and Contention** from the Fast Path Resource Usage Reports in a Log Report Set, then select **Buffer Usage** from Reports Required. The Fast Path Buffer Usage report complements the Fast Path Resource Usage and Contention report which you can request at the same time or separately.

The command for the Fast Path Buffer Usage report is:

```
IMSPALOG      FPIRUC([BYIMID|SYSPLEX,]
                BUFFER,
                [BUFDDN(ddname),]          default FPBUFRPT
                [PEAK(nnn),]              default 90%
                [FROM(date,time),]
                [TO(date,time),]
                [INCL(TRANCODE(list))|EXCL(TRANCODE(list)),]
                [INCL(IMSID(list))|EXCL(IMSID(list))])
IMSPALOG      EXECUTE
```

A report interval can be specified. This applies to the reduced data file after the Global (or Run-time) report interval is effected.

The report output is written to the data set specified by the Buffer Report Output DDname. The default is FPBUFRPT.

By using Object Lists, you can specify that only certain values be included in or excluded from the report for:

- Transaction Codes
- IMS Subsystem IDs

Content

This figure shows an example of the Fast Path Resource Usage and Contention report applicable to both local and global (shared EMHQ) transaction processing.

The report was produced by the command:

```
IMSPALOG      FPIRUC(BUFFER,
                BUFDDN(FPBUFRPT),
                PEAK(90))
IMSPALOG      EXECUTE
```

IMS Performance Analyzer																
Fast Path Transaction Buffer Usage - IX23																
From 17Jun2021 7.59.29.12			To 17Jun2021 8.11.51.99			Elapsed= 0 Hrs 12 Mins 22.870.286										
Secs	Transact Code	Routing Code	Count	NBA Val Min Max	NBA Used Avg 90% MAX	OBA Val Min Max	OBA Used Avg 90% MAX	Steal Avg Max	Wait Avg Max	OTHRD Avg Max	NRDB Avg Max	PBUF Avg Max	PBUFWT Avg Max			
WDB	*MPP		65	0 0	1 1 1	0 0	0 0 0	0 0	0 0	1 1	0 0	0 0	0 0			
WDB2	*MPP		2	0 0	1 1 1	0 0	0 0 0	0 0	0 0	1 1	0 0	0 0	0 0			
QASUBMPA	*BMP		1	0 0	0 0 0	0 0	0 0 0	0 0	0 0	0 0	0 0	0 0	0 0			
	SECIN23		13	0 0	20 24 24	0 0	2 6 6	144 295	0 0	19 25	0 0	0 0	0 0			
QASUBMPA	*Total*		14	0 0	19 24 24	0 0	2 4 6	134 295	0 0	18 25	0 0	0 0	0 0			
VAC3MUUP	*MPP		4	0 0	1 1 1	0 0	0 0 0	0 0	0 0	1 1	0 0	0 0	0 0			
VAC3UUEP	*MPP		6	0 0	1 1 1	0 0	0 0 0	0 0	0 0	1 1	0 0	0 0	0 0			
VASMIIBM	*MPP		77	0 0	1 1 2	0 0	0 0 0	0 0	0 0	1 1	0 0	0 0	0 0			
VASMSELM	*MPP		11	0 0	1 1 1	0 0	0 0 0	0 0	0 0	0 1	0 0	0 0	0 0			
VASTACKP	*MPP		1	0 0	2 2 2	0 0	0 0 0	0 0	0 0	2 2	0 0	0 0	0 0			
VASUDLET	*MPP		1	0 0	1 1 1	0 0	0 0 0	0 0	0 0	1 1	0 0	0 0	0 0			
VCTLMVUP	*MPP		2	0 0	1 1 1	0 0	0 0 0	0 0	0 0	1 1	0 0	0 0	0 0			
VIAMRLLD	DVPSIN23		46	0 0	6 6 6	0 0	0 0 0	1 1	0 0	0 0	0 0	0 0	0 0			
VOP3AINA	*MPP		3	0 0	2 2 2	0 0	0 0 0	0 0	0 0	2 2	0 0	0 0	0 0			
VOP3IAOP	*MPP		4	0 0	2 2 2	0 0	0 0 0	0 0	0 0	2 2	0 0	0 0	0 0			
VOP3IDOP	*MPP		35	0 0	2 3 4	0 0	0 0 0	0 0	0 0	2 2	0 0	0 0	0 0			
VOP3IPOP	*MPP		22	0 0	2 3 3	0 0	0 0 0	0 0	0 0	2 2	0 0	0 0	0 0			
VOP3ITOP	*MPP		9	0 0	8 14 20	0 0	0 0 0	0 0	0 0	4 7	0 0	0 0	0 0			
VOP3JUPA	*MPP		9	0 0	1 2 2	0 0	0 0 0	0 0	0 0	1 2	0 0	0 0	0 0			
. . .																
System Totals			1544	0 0	2 4 24	0 0	0 0 6	1 295	0 0	1 25	0 0	0 0	0 0			

Figure 107. Fast Path Buffer Usage report

When processing multi-subsystem log files:

- One report is written for each subsystem, with the subsystem ID in the report title
- A total system wide report is written, with **Total** appearing in the report heading

The report heading contains the reporting period. **From** specifies the date and time of the first transaction to be processed, and **To** specifies the date and time of the last transaction to be processed. **Elapsed** is the reporting period elapsed time, the time between the first and last transactions that were processed.

The following fields appear in the report:

Transact Code

The Transaction Code name for an IFP transaction, or the program name for a non-IFP transaction.

Routing Code

The Routing Code of the IFP transaction, or the region type for a non-IFP transaction. The non-IFP region types can be:

*MPP

MPP region

APPLID

DBCTL, when the CICS system name (APPLID) is available

*DBC

DBCTL, when the CICS system name is not available

Jobname

BMP, when the jobname is available

*BMP

BMP, when the jobname is not available

*Batch

Batch job

*Utility

IMS Utility

Count

The number of transactions that were processed in the report period.

NBA Val

SYNCNBA#. The Normal Buffer Allocation (NBA) specified in the region startup procedure. Minimum and Maximum values are reported.

NBA Used

SYNCNBA. The number of NBA buffers used. Average, Peak percentile and Maximum values are reported.

OBA Val

SYNCOBA#. The Overflow Buffer Allocation (NBA) specified in the region startup procedure. Minimum and Maximum values are reported.

OBA Used

SYNCOVFN. The number of OBA buffers used. Average, Peak percentile and Maximum values are reported.

Steal

SYNCBSTL. The number of Buffer Steals. Average and Maximum values are reported.

Wait

SYNCBFWT. The number of waits for buffers. Average and Maximum values are reported.

OThread

SYNCOTHR. The number of updated buffers sent to the OThread. Average and Maximum values are reported.

NRDB

SYNCNRDB. The number of buffers used for MSDB and SDEP processing. Average and Maximum values are reported.

PBUF

SYNCPBUF. The number of HSSP Private Buffers used. Average and Maximum values are reported.

PBUFWT

SYNCPBWT. The number of waits for HSSP Private Buffers. Average and Maximum values are reported.

Fast Path Database Call Statistics report

The IMS Fast Path Database Call Statistics report provides a breakdown of DL/I call function codes by transaction code, identifying transaction that issue excessive DL/I calls. After identifying transactions with poor response time (using the IMS Performance Analyzer Fast Path Transit Analysis report), or transactions using excessive resources (using the Fast Path Resource Usage and Contention report), use the Fast Path Database Call Statistics report to identify the DL/I call function codes most frequently used by the transactions. If your database is a HALDB, you can also report on specific HALDB partitions because the name of the partition is found on the database name field of the various records used in this report.

Log records: This report is derived from IMS log records 5901, 5937, 5938.

Options

To specify the report options, select **Database Call Statistics** from the Fast Path Resource Usage Reports in a Log Report Set.

A report interval can be specified. This applies to the reduced data file after the Global (or Run-time) report interval is effected.

The report output is written to the data set specified by the Report Output DDname.

By using Object Lists, you can specify that only certain values be included in or excluded from the report for:

- Transaction Code
- IMS Subsystem IDs

Content

This figure shows an example of the Fast Path Database Call Statistics report applicable to both local and global (shared EMHQ) transaction processing.

IMS Performance Analyzer																												
Fast Path Database Call Statistics - IMSA																												
From 15Apr2023 19.00.43.88								To 15Apr2023 20.02.58.95				Elapsed=		1 Hrs	2 Mins	15.076.307 Secs												
Transact Code	Routing Code	Count	.GU...		.GN...		.GNP...		.GHU...		.GHN...		.GHP...		.REPL...		.ISRT...		.DLET...		.FLD...		.POS...		.Total...		MSDB Calls	
			Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max
COSTING	*MPP	436	6	8	1	2	1	2	12	15	0	0	0	0	7	8	11	21	5	6	0	0	0	0	34	47	0	0
INQUIRY	INQUIRY	867	12	17	0	0	0	0	11	16	0	0	0	0	11	16	14	19	0	0	0	0	0	0	46	68	0	0
ORDER	ORDER	5576	3	3	0	0	10	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	18	0	0
PARTS	PARTS	2322	0	0	0	0	0	0	3	3	0	0	0	0	3	3	1	1	0	0	0	0	0	0	7	7	0	0
STOCK	STOCK	105	218	253	0	0	201	232	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	419	485	0	0
System Totals		13450	6	253	0	0	9	232	2	16	0	0	0	0	2	16	2	19	0	0	0	0	0	0	19	485	0	0

Figure 108. FP Database Call Statistics report

When processing multi-subsystem log files:

- One report is written for each subsystem, with the subsystem name in the report heading
- A total system wide report is written, with **Total** appearing in the report heading

The report heading contains the reporting period. **From** specifies the date and time of the first transaction to be processed, and **To** specifies the date and time of the last transaction to be processed. **Elapsed** is the reporting period elapsed time, the time between the first and last transactions that were processed.

The following fields appear in the report:

Transact Code

The Transaction Code name for an IFP transaction, or the program name for a non-IFP transaction.

Routing Code

The Routing Code of the IFP transaction, or the region type for a non-IFP transaction. The non-IFP region types can be:

*MPP

MPP region

APPLID

DBCTL, when the CICS system name (APPLID) is available

*DBC

DBCTL, when the CICS system name is not available

Jobname

BMP, when the jobname is available

*BMP

BMP, when the jobname is not available

*Batch

Batch job

*Utility

IMS Utility

Count

The number of transactions that were processed in the report period.

DEDB Calls

The average and maximum DEDB DL/I call counts, broken down into the individual function codes.

The **Total** column represents the average and maximum DEDB DL/I call counts for all function codes.

MSDB Calls

The average and maximum MSDB DL/I call counts.

IFP Region Occupancy report

The IFP Region Occupancy report provides approximate region occupancy rates for IFP regions. You can use this IMS Performance Analyzer report to determine if an appropriate number of IFP regions is available for processing the workload.

Log records: These reports are derived from IMS log records 07, 08, 5901, 5903, 5911, 5916, 5936, 5937, 5938, 5950.

Options

To specify the report options, select **IFP Region Occupancy** from the Fast Path Resource Usage Reports in a Log Report Set.

A report interval can be specified. This applies to the reduced data file after the Global (or Run-time) report interval is effected.

The report output is written to the data set specified by the Report Output DDname.

Object Lists can be used to specify that specific values be included in or excluded from the report for:

- Region ID by PST number
- Program name
- IMS Subsystem ID

Content

IMS Performance Analyzer												
Fast Path (IFP) Region Occupancy												
Page 1		From 01Feb2018 11:38:58:11 To 01Feb2018 11:54:25:66 Elapsed= 0 Hrs 15 Mins 27.548.899 Secs										
		<--- Proc+Sync ---> <--- Post Sync ---> <--- Occupied ---> <----- Idle -----> <Not										
-Region--	Program	Tran	Count	HH.MM.SS.THM	Pct	HH.MM.SS.THM	Pct	HH.MM.SS.THM	Pct	HH.MM.SS.THM	Pct	Pct
Active>												
IMID	PST	Name										
IFD3	2	DFSIVP5	9	0.001	0.0	0.000	0.0	0.001	0.0	14.29.347	93.7	6.3
IFD3	3	DFSIVP4	12	0.012	0.0	0.000	0.0	0.012	0.0	14.29.333	93.7	6.3
IFD4	1	DFSIVP5	9	0.001	0.0	0.000	0.0	0.001	0.0	14.28.610	93.6	6.4
IFD4	2	DFSIVP4	12	0.029	0.0	0.000	0.0	0.030	0.0	14.28.583	93.6	6.4

Figure 109. IMS Performance Analyzer IFP Region Occupancy report

When processing multi-subsystem log files, IFP regions from all subsystems are included in a single report, and the report is ordered by IMS subsystem ID, then PST number.

The report heading contains the reporting period. **From** specifies the date and time of the first transaction to be processed, and **To** specifies the date and time of the last transaction to be processed. **Elapsed** is the reporting period elapsed time, the time between the first and last transactions that were processed.

The following fields appear in the report:

Region

Fast Path region identification.

IMID

The IMS subsystem ID

PST

The dependent region PST ID

Program Name

The Program (PSB) that is active in the IFP region. The program name will be *UNKNOWN in the absence of DEDB update (5950) log records, as these are the only Fast Path log records that include the program name.

Tran Count

The number of transactions processed by the region during the report period.

Proc+Sync

Transaction processing time, including application processing and syncpoint elapsed times.

Regions with a high processing time compared to idle time have high utilization (**Pct**).

Post Sync

Post-processing in the IFP region after syncpoint completes; prior to either the region becoming idle (5904), or the next transaction being immediately processed (5901). For OTMA or APPC transactions, this time includes CHKW for the 5937 log record and the “send de-allocate” for the output message.

Occupied

The time spent by the region performing work on behalf of transactions, which is the sum of “Proc+Sync” and “Post Sync”.

Idle

The IFP region is idle, waiting for the next transaction to arrive.

Regions with a high idle time compared to processing time have low utilization (**Pct**).

Not Active

The time during which the region is not active or not available to process transactions. The Not Active time is the sum of the following times:

- The start of the reporting period to the commencement of transaction processing in the region
- The completion of the last transaction processed in the region to the end of the reporting period

The Not Active time also includes time when the region is not available, for example, if the region is shut down, the region has been restarted with another program, or the region has been restarted as a non-IFP region.

EMH Message Statistics report

The EMH Message Statistics report contains information on the number and length of EMH messages that are processed by balancing groups and shared EMH queues. This IMS Performance Analyzer report can be used to gauge the size and frequency of transaction messages processed by IFP regions and the ratio of transactions processed locally versus those processed globally.

Log records: This report is derived from IMS log records 5901, 5903.

Options

To specify the report options, select **EMH Message Statistics** from the Fast Path Resource Usage Reports in a Log Report Set.

A report interval can be specified. This applies to the reduced data file after the Global (or Run-time) report interval is effected.

The report output is written to the data set specified by the Report Output DDname.

Object Lists can be used to specify that specific values be included in or excluded from the report for:

- Transaction Codes

Content

This figure shows an example of the EMH Message Statistics report applicable to both local and global (shared EMHQ) transaction processing.

IMS Performance Analyzer																			
Fast Path (EMH) Message Statistics																			
From 14Apr2023 19.00.01.23						To 14Apr2023 20.01.02.39						Elapsed= 1 Hrs 1 Mins 16.089.795 Secs							
		----- Locally Processed -----						----- Globally Processed -----						----- Total (Local+Global) -----					
Transact Code	Routing Code	Count	In-Length		Out-Length		Count	In-Length		Out-Length		Count	In-Length		Out-Length				
			Avg	Max	Avg	Max		Avg	Max	Avg	Max		Avg	Max	Avg	Max			
INQUIRY	INQUIRY	3506	206	206	966	966	867	206	206	966	966	4373	206	206	966	966			
ORDER	ORDER	22418	42	42	428	584	5575	42	42	429	584	27993	42	42	428	584			
PARTS	PARTS	8677	54	54	412	592	2322	54	54	412	592	10999	54	54	412	592			
STOCK	STOCK	366	22	22	46	46	105	22	22	46	46	471	22	22	46	46			
System Totals		34967	61	206	474	966	8869	61	206	472	966	43836	61	206	474	966			

Figure 110. EMH Message Statistics report

When processing multi-subsystem log files, transaction messages from all IMS subsystems are combined into a single report.

The report heading contains the reporting period. **From** specifies the date and time of the first transaction to be processed, and **To** specifies the date and time of the last transaction to be processed. **Elapsed** is the reporting period elapsed time, the time between the first and last transactions that were processed.

The following fields appear in the report:

Transact Code

The IFP transaction code name.

Routing Code

The Routing Code of the IFP transaction.

Transaction messages are reported in three categories:

Locally Processed

Transaction messages processed locally

Globally Processed

Transaction messages processed globally via the shared EMHQ

Total (Local+Global)

Statistics for local and global messages combined

Within each category, the following statistics are presented:

Count

The number of transactions that were processed in the report period.

In-Length

The average and maximum input message length.

Out-Length

The average and maximum output message length.

DEDB Update Activity report

The IMS DEDB Update Activity report can help you determine the cost of data entry database (DEDB) calls, and shows the rate of processing against your DEDB databases. This IMS Performance Analyzer report can be used to determine the most highly used DEDB databases (and their areas), allowing you to prioritize their tuning, reorganization, and other database administration tasks, and to view DEDB database update activity when diagnosing application performance problems. The report shows the number of sequential dependent (SDEP) and direct dependent (DDEP) segments updated, the segment update rate, the number of database opens, and the number of database errors.

Log records: This report is derived from IMS log records 5921, 5924, 5950.

Options

To specify the report options, select **DEDB Update Activity** from the Fast Path Resource Usage Reports in a Log Report Set.

A report interval can be specified. This applies to the reduced data file after the Global (or Run-time) report interval is effected.

The report output is written to the data set specified by the Report Output DDname.

Object Lists can be used to specify that only certain values be included in or excluded from the report for:

- DEDB Database name
- DEDB Area name
- IMS Subsystem ID

Content

This figure shows an example of the DEDB Update Activity report applicable to both local and global (shared EMHQ) transaction processing.

IMS Performance Analyzer DEDB Update Activity - IMSA										
From 14Apr2023 8.54.43.80			To 14Apr2023 8.54.46.00			Elapsed=		0 Hrs	0 Mins	2.201.638 Secs
Database Name	Area Name	Root/DDEP Update	SDEP Insert	ADS Open	New EQE	Updates /sec	---- First Date	Update ---- Time	---- Last Date	Update ---- Time
ACCOUNTS	ACCOUNTS	9	12	0	0	16.2	14Apr2023	8.54.44.57	14Apr2023	8.54.45.86
CLIENTS	CLIENTA1	6	6	0	0	6.1	14Apr2023	8.54.43.86	14Apr2023	8.54.45.80
	CLIENTA2	2	2	0	0	6.8	14Apr2023	8.54.44.62	14Apr2023	8.54.45.21
CLIENTS	*Total*	8	8	0	0	8.2	14Apr2023	8.54.43.86	14Apr2023	8.54.45.80
FINANCE	FINANCE	103	0	1	0	49.9	14Apr2023	8.54.43.94	14Apr2023	8.54.46.00
ORDERS	ORDERS	27	74	0	0	48.9	14Apr2023	8.54.43.94	14Apr2023	8.54.46.00
STOCK	STOCKA1	1	21	0	0	22.0	14Apr2023	8.54.45.39	14Apr2023	8.54.45.39
	STOCKA2	2	43	0	0	154.1	14Apr2023	8.54.44.69	14Apr2023	8.54.45.21
	STOCKA3	2	46	0	0	78.9	14Apr2023	8.54.45.35	14Apr2023	8.54.45.96
	STOCKA4	1	22	0	0	23.0	14Apr2023	8.54.45.43	14Apr2023	8.54.45.43
STOCK	*Total*	6	132	0	0	160.5	14Apr2023	8.54.44.69	14Apr2023	8.54.45.96
System Totals		4804	721	1	0	2509.4	14Apr2023	8.54.43.80	14Apr2023	8.54.46.00

Figure 111. DEDB Update Activity report

When processing multi-subsystem log files:

- One report is written for each subsystem, with the subsystem name in the report heading
- A total system wide report is written, with **TOTAL** appearing in the report heading

The report heading contains the reporting period. **From** specifies the date and time of the first transaction to be processed, and **To** specifies the date and time of the last transaction to be processed. **Elapsed** is the reporting period elapsed time, the time between the first and last transactions that were processed.

The following fields appear in the report:

Database Name

DEDB database name

Area Name

DEDB Area name

Root/DDEP Update

The number of Root and Direct dependent (DDEP) segment updates

The values displayed in the **Root/DDEP Update** might be the result of various data manipulation methods used in the DL/I call such as ISRT, REPL, and DLET calls.

SDEP Insert

The number of Sequential dependent (SDEP) segment inserts

ADS Open

The number of times that the Area data set was opened during the report period

New EQE

The number of new Error Queue Elements (EQEs) that occurred during the report period

Updates/sec

The average number of segment updates per second during the report period

First Update

The date and time of the first update to a segment in the report period

Last Update

The date and time of the last update to a segment in the report period

VSO Statistics report

The IMS VSO Statistics report provides detailed statistics on VSO resource usage. This IMS Performance Analyzer report can be used to determine how well VSO is performing by comparing Data Space I/O with Area data set I/O, for SHARELVL 0/1, comparing Coupling Facility I/O with Area data set I/O, for SHARELVL 2/3, by checking the Lookaside hit rate, for SHARELVL 2/3, and by ensuring that Castout frequency and elapsed times are within expectations. The VSO resources include data spaces for SHARELVL 0/1, coupling Facility for SHARELVL 2/3, lookaside Buffers for SHARELVL 2/3, and DEDB Area data set I/O.

Log records: This report is derived from IMS log records 5910, 5912.

Options

To specify the report options, select **VSO Statistics** from the Fast Path Resource Usage Reports in a Log Report Set.

A report interval can be specified. This applies to the reduced data file after the Global (or Run-time) report interval is effected.

The report output is written to the data set specified by the Report Output DDname.

By using Object Lists, you can specify that only certain values be included in or excluded from the report for:

- DEDB database name
- DEDB Area name
- IMS subsystem ID

Content

This is an example of the VSO Statistics report applicable to both local and global (shared EMHQ) transaction processing.

The VSO Statistics report is broken down into two separate reports:

1. SHARELVL 0/1, where VSO uses Data Spaces for single IMS subsystems.
2. SHARELVL 2/3, where VSO uses the Coupling Facility for sharing by multiple IMS subsystems, and optionally Lookaside-pool buffers for local IMS subsystems.

IMS Performance Analyzer												
VSO Activity Summary: SHARELVL 0/1 - IMSA												
From 14Apr2023 8.00.00.01			To 14Apr2023 9.01.02.01			Elapsed= 1 Hrs 1 Mins 0.425.492 Secs						
Database Name	Area Name	--IMS from/to Gets	VSO DS-- Puts	-----VSO DS from/to Gets	-----VSO DS from/to Puts	DASD----- Castouts	I/O Scheduled	I/O Elapsed HH:MM:SS:TH				
STOCK	STOCKA1	4901	8498	547	387	1	12	1.43.11				
	STOCKA2	6462	6743	491	256	1	15	2.13.14				
STOCK	*Total*	11363	15241	1038	643	2	27	3.56.25				
System Totals		344352	492812	67574	38564	78	387	1.12.35.65				

VSO Activity Summary: SHARELVL 2/3 - IMSA												
VSO Activity Summary: SHARELVL 2/3 - IMSA												
From 14Apr2023 8.00.00.01			To 14Apr2023 9.01.02.01			Elapsed= 1 Hrs 1 Mins 0.425.492 Secs						
Database Name	Area Name	---IMS from/to Gets	CF Puts	-----VSO CF from/to Gets	-----VSO CF from/to Puts	DASD----- Castouts	Searches	Lookaside-Pool Buffer Hits Pct Hit Valid Pct				
ORDERS	ORDERA1	4901	8498	547	387	1	134875	75621	53.4	72071	49.9	
	ORDERA2	6462	6743	491	256	1	144470	79621	52.7	73957	49.9	
ORDERS	*Total*	11363	15241	1038	643	2	279345	155242	53.1	146028		
System Totals		344352	492812	67574	38564	78	744470	365432	54.9	345428	49.9	

Figure 112. VSO Statistics report

When processing multi-subsystem log files:

- One report is written for each subsystem, with the subsystem name in the report heading
- A total system wide report is written, with **Total** appearing in the report heading

The report heading contains the reporting period. **From** specifies the date and time of the first transaction to be processed, and **To** specifies the date and time of the last transaction to be processed. **Elapsed** is the reporting period elapsed time, the time between the first and last transactions that were processed.

The following fields appear in the report:

Database Name

DEDB Database name

Area name

DEDB Area data set name

SHARELVL 0/1

IMS from/to VSO DS

The number of VSO Data Space I/O requests, broken down by:

Gets

The total number of CIs read from the data space.

Puts

The total number of CIs written to the data space. This number is the total number of CIs that would have been sent to OTHREAD if the areas were non-VSO.

VSO DS from/to DASD

The number of VSO DASD I/O requests, broken down by:

Gets

The number of CIs read from DASD into a data space.

Puts

The number of CIs written from a data space to DASD.

Castouts

The number of times that Castout was scheduled for this data space.

I/O Scheduled

The total number of times that I/O was scheduled to harden the data space (write VSO updates to DASD).

I/O Elapsed

The total elapsed time (HH.MM.SS.TH) taken to harden the data space (write VSO updates to DASD).

SHARELVL 2/3

IMS from/to CF

The number of VSO Coupling Facility I/O requests, broken down by:

Gets

The total number of CIs read from the coupling facility structure.

Puts

The total number of CIs written to the coupling facility structure.

VSO CF from/to DASD

The number of VSO DASD I/O requests, broken down by:

Gets

The number of CIs read from DASD into the coupling facility.

Puts

The number of CIs written from the coupling facility to DASD.

Castouts

The number of times that Castout was scheduled for this coupling facility.

Lookaside-Pool Buffer

The following fields are presented only when the DEDB Area is using the Lookaside Pool.

Searches

The number of times that the Lookaside Pool was searched.

Hits

The number of times that the CI was successfully found in the Lookaside Pool.

Pct

The percentage of searches that successfully found the CI in the Lookaside Pool.

Hit Valid

The number of times that the CI was found in the Lookaside Pool, and the buffer was valid.

Pct

The percentage of searches that successfully found the CI in the Lookaside Pool, and the buffer was valid.

Note: Searches can be non-zero when Lookaside is not used. This is explained by the way VSO uses its buffers. SVSO private buffer pools can be defined by DBDNAME, AREANAME, or just by BufferSize and the LKASID option. When defined using DBDNAME, all areas in the database share the same buffer pool. VSOSPGET (the number of times the buffer pool was searched) in the 5912 log record is populated from PPDETGET. The PPDE is the control block that represents the buffer pool.

For non-lookaside pools, PPDETGET is the number of times a buffer was obtained (not searched) from the pool. PPDETGET is reset at Castout in module DBFVXOC0, which is when the 5912 record is cut. The first 5912 record cut is usually the last area in collating sequence, since the DMACs are chained off ESCDVSOS in LIFO sequence. This area has the correct VSOSPGET (PPDETGET) value, and this is the number of buffers obtained from the pool since last Castout. PPDETGET is reset before each new area is processed (castout). During this time, applications may obtain some buffers from the pool, and PPDETGET will reflect the number obtained during this (short) period of time. This applies to all areas sharing the same buffer pool.

In summary, the buffer pools can be shared between areas, but the 5912 record is unique per area. Unless each area is defined with its own dedicated buffer pool, then the buffer pool statistics in the 5912 log records do not reflect the buffer usage for that area. Note that the actual CF I/O counts are accurate because they are maintained in a control block that is unique to each area and CF structure.

Chapter 12. ATF Summary reports

This report category provides details and statistics from the OMEGAMON ATF Summary record.

The ATF Summary reports section includes:

- Transit Options
- Extract
- Transaction Analysis
- DLI Call Analysis
- Db2 Call Analysis
- MQ Call Analysis

ATF Summary Extract

The OMEGAMON for IMS ATF Summary Extract creates comma separated values (CSV) file extracts of the OMEGAMON for IMS Application Trace Facility (ATF) summary record written to the IMS log. The CSV extract created by IMS Performance Analyzer contains a HEADER section and optional repeating sections for DATABASE, DLI DB, DLI TM, Db2, MQ, and OTHER.

Options

To specify the extract options, select the ATF Summary **Extract** in the Log Report Set.

The ATF Summary Transit Options specify the 2-digit hexadecimal log record code of the OMEGAMON ATF Summary records written to the IMS log. Those options also specify whether to process exception transactions only.

You can specify a report interval, which applies to the reduced data file after applying the Global (or runtime) report interval.

The extract includes the ATF Summary record fixed part of the record, and optionally, up to six repeating sections. The HEADER section is always included; the six sections are as follows:

- DATABASE
- DLI DB
- DLI TM
- Db2
- MQ
- OTHER

The extract for each section is written to the extract data set name that you specify for that section.

You can choose to include field labels, which is typically useful when you will examine the data in a spreadsheet. If you intend to load the data into a database, be aware that many database systems treat the first row as a row of data rather than a row of field labels. You can also specify the character to use as a field delimiter in the extract.

You can include or exclude records that have a specific transaction, program, database, user ID, or IMS subsystem by specifying an object list.

Content

The IBM OMEGAMON for IMS Application Trace Facility (ATF) summary record consists of a fixed section, also known as the header, and up to six repeating sections. You can extract data from each of these sections into separate CSV files.

The data in an ATF summary record is hierarchical; one transaction can use many databases, and each database might have many calls made against it. Therefore, a single row in the CSV cannot completely represent a single ATF summary record. The facility to output the data in seven separate CSVs enables you to extract the particular data you need. The sections are as follows:

Table 4. Sections of the OMEGAMON for IMS ATF summary record	
Section	Description
HEADER	The start of the log record, containing the log code, subsystem, and time stamp. It also includes: <ul style="list-style-type: none"> • details about the transaction such as who ran it and when, and tokens to uniquely identify the unit-of-work • overall response time and resource usage performance measurements • information about what other sections to expect in the remainder of the record
DATABASE	Databases referenced by the transaction
DLI DB	DLI DB call types, counts, elapsed times, and CPU times
DLI TM	DLI TM call types, counts, elapsed times, and CPU times
Db2	Db2 call types, counts, elapsed times, and CPU times
MQ	MQ call types, counts, elapsed times, and CPU times
OTHER	Other counts, elapsed times, and CPU times

For descriptions of the individual fields, see the information about **Description of Application Trace Facility summary log record** in the IBM OMEGAMON for IMS documentation.

The following figure shows an example of a report which provides a summary of the extract processing.

Extract completed Extract DDname . : ATFHEAD Data Set Name . : ABC.IMSPA.HEAD1.CSV Record Count . : 265	
	IMS Performance Analyzer ATF Summary Extract -----

Figure 113. OMEGAMON for IMS ATF Summary Extract: Summary report

ATF Summary Transaction Analysis report

The OMEGAMON for IMS ATF Summary Transaction Analysis report shows performance by transaction or by database using the OMEGAMON for IMS Application Trace Facility (ATF) summary record written to the IMS log. The report created by IMS Performance Analyzer is available in both List and Summary format.

The List report is available with or without the Database option selected.

List without Database

All transactions are listed with elapsed times and CPU time broken down by dependent region.

List with Database

All databases used by the transaction are listed with DLI Gets and Updates broken down into call counts, elapsed time, and CPU time.

The Summary report is available with or without the Database option selected

Summary without Database

All transactions are summarized by transaction and program with elapsed time and CPU time averaged by dependent region.

Summary with Database

All database usage is summarized with DLI Gets and Updates broken down into call counts, elapsed time, and CPU time.

Options

To specify the report options, select the ATF Summary **Transaction Analysis** report in a Log Report Set.

You can produce the following reports by selecting the List, Summary and Database options:

- List
- List showing performance by database
- Summary
- Summary showing performance by database

You can specify selection criteria for one or more of the following:

- Transaction code
- Program
- Database
- User ID
- IMS subsystem ID

A report interval can be specified. This applies to the reduced data file after the global (or runtime) report interval takes effect.

The report output is written to the data set specified by the Report Output DDnames.

On the **ATF ES Transit Options** panel, the following options are applicable:

- **OMEGAMON ATF ES Log Code**, which specifies the log record code of the OMEGAMON ATF Summary records.
- **Process exception transactions only**, which you select to process only transactions that match defined exception criteria.

Content

These examples show the four possible ATF Summary Transaction Analysis reports.

IMS Performance Analyzer OMEGAMON ATF Transaction List												

Report from 01Feb2018 14:42:37.96												

Time	Trancode	InputQ	Process	Elapsed Time	DLI	Db2	DEP	DLI	Db2	CPU Time	CTL	DLISAS
-----											MQ	Total
14:42:37.965804	CEXSConv	0.002881	5.011627	0.001258	0.003130	0.003970	0.000526	0.001820	0.000000	0.000000	0.000000	0.003970
14:43:52.897459	CEXSConv	0.007209	5.015028	0.002944	0.002780	0.003842	0.000525	0.001709	0.000000	0.000000	0.000000	0.003842
14:45:09.335656	CEXSConv	0.003973	5.011173	0.001779	0.002370	0.003632	0.000563	0.001536	0.000000	0.000000	0.000000	0.003632
14:46:24.258090	CEXSConv	0.007129	5.014297	0.001832	0.002508	0.003434	0.000520	0.001528	0.000000	0.000000	0.000000	0.003434
14:47:38.641717	CEXSConv	0.005422	5.009537	0.002278	0.002468	0.003869	0.000539	0.001645	0.000000	0.000000	0.000000	0.003869

Figure 114. OMEGAMON ATF Transaction List report

Table 5. OMEGAMON ATF Transaction List columns

Field	Field group	Description
Time	N/A	Time when the transaction started
Trancode	N/A	IMS transaction name
InputQ	Elapsed Time	Elapsed time the input message spent on the IMS local or shared queues
Process	Elapsed Time	Elapsed processing time
DLI	Elapsed Time	Elapsed time spent in DL/I calls
Db2	Elapsed Time	Elapsed time spent in Db2 SQL calls
DEP	CPU Time	CPU time spent in the dependent region
DLI	CPU Time	CPU time spent in DL/I calls
Db2	CPU Time	CPU time spent in Db2 SQL calls
MQ	CPU Time	CPU time spent in IBM MQ calls
CTL	CPU Time	CPU time spent in the control region TCB
DLISAS	CPU Time	CPU time spent in the DLISAS TCB
Total	CPU Time	Total CPU time

IMS Performance Analyzer												
OMEGAMON ATF Transaction-Database List												

Report from	01Feb2018 14:42:37.96										Page	1
Time	Trancode	Process	Elap DLI	CPU DLI	Database	Gets	Elap Get	CPU Get	Updates	Elap Upd	CPU Upd	
14:42:37.965804	CEXSCONV	5.011627	0.001258	0.000526	DI21PART	2	0.000300	0.000143	3	0.000265	0.000217	
14:43:52.897459	CEXSCONV	5.015028	0.002944	0.000525	DI21PART	2	0.000295	0.000141	3	0.000226	0.000214	
14:45:09.335656	CEXSCONV	5.011173	0.001779	0.000563	DI21PART	2	0.000505	0.000164	3	0.000214	0.000214	
14:46:24.258090	CEXSCONV	5.014297	0.001832	0.000520	DI21PART	2	0.000472	0.000149	3	0.000213	0.000213	
14:47:38.641717	CEXSCONV	5.009537	0.002278	0.000539	DI21PART	2	0.000283	0.000145	3	0.000226	0.000226	

Figure 115. OMEGAMON ATF Transaction-Database List report

Table 6. OMEGAMON ATF Transaction-Database List columns

Field	Description
Time	The time when the application started
Trancode	IMS transaction name
Process	Processing time
Elap DLI	Elapsed time spent in DL/I calls
CPU DLI	CPU processing time spent in DL/I calls
Database	Database name
Gets	The number of gets from the database
Elap Get	Elapsed time spent performing database gets
CPU Get	CPU processing time spent performing database gets
Updates	The number of updates from the database

Table 6. OMEGAMON ATF Transaction-Database List columns (continued)

Field	Description
Elap Upd	Elapsed time spent performing database updates
CPU Upd	CPU processing time spent performing database updates

```

                                IMS Performance Analyzer
                                OMEGAMON ATF Transaction Summary

Report from 01Feb2018 14:42:37.96 to 01Feb2018 14:47:38.64 -----
Trancode Program      Tran ----- Average Elapsed Time ----- Average CPU Time ----- Page      1
                          Count   InputQ  Process    DLI      Db2      DEP      DLI      Db2      MQ      CTL  DLISAS  Total
CEXSCONV CEXSPGM      ----- 5 0.005322 5.012332 0.002018 0.002651 0.003749 0.000534 0.001647 0.000000 0.000000 0.000000 0.003749
*Total*      ----- 5 0.005322 5.012332 0.002018 0.002651 0.003749 0.000534 0.001647 0.000000 0.000000 0.000000 0.003749

```

Figure 116. OMEGAMON ATF Transaction Summary report

Table 7. OMEGAMON ATF Transaction Summary columns

Field	Field group	Description
Trancode	N/A	IMS transaction name
Program	N/A	Name of the program scheduling block (PSB)
Tran Count	N/A	Transaction count
InputQ	Average Elapsed Time	Average elapsed time the input message spent on the IMS local or shared queues
Process	Average Elapsed Time	Average processing time
DLI	Average Elapsed Time	Average elapsed time spent in DL/I calls
Db2	Average Elapsed Time	Average elapsed time spent in Db2 SQL calls
DEP	Average CPU Time	Average CPU time spent in the dependent region
DLI	Average CPU Time	Average CPU time spent in DL/I calls
Db2	Average CPU Time	Average CPU time spent in Db2 SQL calls
MQ	Average CPU Time	Average CPU time spent in IBM MQ calls
CTL	Average CPU Time	Average CPU time spent in the control region TCB
DLISAS	Average CPU Time	Average CPU time spent in the DLISAS TCB
Total	Average CPU Time	Average CPU time

IMS Performance Analyzer OMEGAMON ATF Database Summary										
Report from 01Feb2018 14:42:37.96 to 01Feb2018 14:47:38.64										
----- Average ----- Total ----- Average ----- Total -----										
Database	Reads	Elapsed	CPU	Elapsed	CPU	Updates	Elapsed	CPU	Elapsed	CPU
DI21PART	10	0.000185	0.000074	0.001855	0.000743	15	0.000076	0.000072	0.001144	0.001083
Total	10	0.000185	0.000074	0.001855	0.000743	15	0.000076	0.000072	0.001144	0.001083

Figure 117. OMEGAMON ATF Database Summary report

Table 8. OMEGAMON ATF Database Summary columns		
Field	Field group	Description
Database	N/A	Database name
Reads	N/A	The number of read operations
Elapsed	Average	Average elapsed time of those reads
CPU	Average	Average CPU time of those reads
Elapsed	Total	Total elapsed time of those reads
CPU	Total	Total CPU time of those reads
Updates	N/A	The number of update operations
Elapsed	Average	Average elapsed time of those updates
CPU	Average	Average CPU time of those updates
Elapsed	Total	Total elapsed time of those updates
CPU	Total	Total CPU time of those updates

ATF Summary DLI Call Analysis report

The OMEGAMON for IMS ATF Summary DLI Call Analysis report shows database activity within transactions using the OMEGAMON for IMS Application Trace Facility (ATF) summary record written to the IMS log. With IMS Performance Analyzer, you can produce a list report that breaks down database activity within each transaction by call type, or a summary report.

List

Within each transaction, DLI activity is reported by database and call type. Whether Database is selected has no effect.

The Summary report is available with or without the Database option selected

Summary without Database

When Database is not selected, DLI activity is summarized by transaction, with DLI call counts, average elapsed time and CPU time.

Summary with Database

When Database is selected, DLI activity is summarized by database, with DLI call counts, average elapsed time and CPU time.

Options

To specify the report options, select the ATF Summary **DLI Call Analysis** report in a Log Report Set.

You can produce the following reports by selecting the List, Summary and Database options:

- List of DLI activity

- Summary showing DLI activity summarized by transaction
- Summary showing DLI activity summarized by database

You can specify selection criteria for one or more of the following:

- Transaction code
- Program
- Database
- User ID
- IMS subsystem ID

A report interval can be specified. This applies to the reduced data file after the global (or runtime) report interval takes effect.

The report output is written to the data set specified by the Report Output DDnames.

On the **ATF ES Transit Options** panel, the following options are applicable:

- **OMEGAMON ATF ES Log Code**, which specifies the log record code of the OMEGAMON ATF Summary records.
- **Process exception transactions only**, which you select to process only transactions that match defined exception criteria.

Content

These examples show the three possible ATF Summary DLI Call Analysis reports.

IMS Performance Analyzer OMEGAMON ATF DLI List											
Report from 02Jan2018 10:04:07.94											
Time	Trancode	Program	Process	Elapsed Time DLI	CPU Time Total	DLI	Database	Type	Count	Summary Elapsed	DLI
10:04:07.944935	IVTNV	DFSIVP2	0.013984	0.006359	0.002561	0.001120	IVPDB2	GU	1	0.000295	0.000128
								STAT	3	0.000064	0.000060
15:22:43.055838	MQATREQ1	MQATPGM	0.802600	0.010961	0.174719	0.002962	DI21PART	GHU	2	0.000439	0.000272
								ISRT	1	0.000140	0.000137
								REPL	1	0.000128	0.000128
								DLET	1	0.000090	0.000090
								STAT	3	0.000043	0.000042
							IVPDB1	GHU	3	0.000302	0.000106
								ISRT	1	0.000334	0.000178
								REPL	1	0.000034	0.000034
								DLET	1	0.000128	0.000128
							IVPDB2	GHU	3	0.000171	0.000082
								ISRT	1	0.000430	0.000070
								REPL	1	0.000026	0.000023
								DLET	1	0.000064	0.000064
15:22:44.862129	MQATREQ1	MQATPGM	0.280577	0.009757	0.011686	0.002275	DI21PART	GHU	2	0.000372	0.000143
								ISRT	1	0.000069	0.000069
								REPL	1	0.000073	0.000073
								DLET	1	0.000072	0.000072
								STAT	3	0.000038	0.000032
							IVPDB1	GHU	3	0.000227	0.000066
								ISRT	1	0.000386	0.000177
								REPL	1	0.000030	0.000026
								DLET	1	0.000128	0.000111
							IVPDB2	GHU	3	0.000179	0.000082
								ISRT	1	0.000146	0.000069
								REPL	1	0.000030	0.000030
								DLET	1	0.000060	0.000060
15:22:47.151796	IVTNO	DFSIVP1	0.006771	0.000431	0.001903	0.000192	IVPDB1	GU	1	0.000397	0.000159
15:22:48.158186	IVTNO	DFSIVP1	0.006664	0.001482	0.001180	0.000323	IVPDB1	ISRT	1	0.000633	0.000286
15:22:49.162697	IVTNO	DFSIVP1	0.004944	0.002099	0.001347	0.000401	IVPDB1	ISRT	1	0.001689	0.000358
15:22:50.169540	IVTNO	DFSIVP1	0.003772	0.001329	0.001197	0.000339	IVPDB1	ISRT	1	0.000855	0.000306
15:22:51.175578	IVTNO	DFSIVP1	0.003459	0.000874	0.000850	0.000186	IVPDB1	GU	1	0.000402	0.000150
15:22:52.184311	IVTNO	DFSIVP1	0.003533	0.000836	0.001023	0.000247	IVPDB1	GHU	1	0.000372	0.000147
								REPL	1	0.000064	0.000064
15:22:53.194390	IVTNO	DFSIVP1	0.003135	0.000781	0.000877	0.000190	IVPDB1	GU	1	0.000364	0.000154
15:22:54.199774	IVTNO	DFSIVP1	0.008117	0.002056	0.001207	0.000378	IVPDB1	GHU	1	0.000440	0.000153
								DLET	1	0.000193	0.000184

Figure 118. OMEGAMON ATF DLI List report

Table 9. OMEGAMON ATF DLI List columns

Field	Field group	Description
Time	N/A	Time when the application started
Trancode	N/A	Name of the transaction that was traced
Program	N/A	Name of the program scheduling block (PSB)
Process	Elapsed Time	Elapsed processing time
DLI	Elapsed Time	Elapsed time spent in DL/I calls
Total	CPU Time	Total CPU time
DLI	CPU Time	CPU time spent in DL/I calls
Database	N/A	Database name
Type	Call Summary	DL/I call type. See the information about DL/I call functions in the IMS documentation for more information about each call type.
Count	Call Summary	DL/I call count
Elapsed	Call Summary	Elapsed time spent for this call type
DLI	Call Summary	Time spent in DL/I calls for this call type

IMS Performance Analyzer
OMEGAMON ATF DLI Summary by Database

Report from 01Feb2018 14:42:37.96 to 01Feb2018 14:47:38.64

Database	Tran Count	Trancode	Type	Call Count	Average Elapsed	CPU Elapsed	Total CPU Elapsed	Calls /Second
DI21PART	5	CEXSConv	GHU	10	0.000185	0.000074	0.001855	0.000743
			ISRT	5	0.000070	0.000070	0.000354	0.000354
			REPL	5	0.000083	0.000074	0.000419	0.000371
			DLET	5	0.000074	0.000071	0.000370	0.000358
Subtotal	5			25	0.000119	0.000073	0.002998	0.001825
Total			GHU	10	0.000185	0.000074	0.001855	0.000743
			ISRT	5	0.000070	0.000070	0.000354	0.000354
			REPL	5	0.000083	0.000074	0.000419	0.000371
			DLET	5	0.000074	0.000071	0.000370	0.000358
	5			25	0.000119	0.000073	0.002998	0.001825

Figure 119. OMEGAMON ATF DLI Summary by Database report

Table 10. OMEGAMON ATF DLI Summary by Database columns

Field	Field group	Description
Database	N/A	Database name
Tran Count	N/A	Transaction count
Trancode	N/A	Name of the transaction that was traced
Type	Call	DL/I call type. See the information about DL/I call functions in the IMS documentation for more information about each call type.
Count	Call	DL/I call count
Elapsed	Average	Average elapsed time for this call type
CPU	Average	Average CPU time for this call type
Elapsed	Total	Total elapsed time for this call type

Table 10. OMEGAMON ATF DLI Summary by Database columns (continued)

Field	Field group	Description
CPU	Total	Total CPU time for this call type
Calls/Second	N/A	Number of calls per second

IMS Performance Analyzer OMEGAMON ATF DLI Summary by Transaction												
Report from 01Feb2018 14:42:37.96 to 01Feb2018 14:47:38.64												
Trancode	Tran Count	Database	Type	Call Count	Average Elapsed	Average CPU	Total Elapsed	Total CPU	Average Process	Elapsed DLI	Average Total	CPU DLI
CEXSConv	5	DI21PART	GHU	10	0.000185	0.000074	0.001855	0.000743				
			ISRT	5	0.000070	0.000070	0.000354	0.000354				
			REPL	5	0.000083	0.000074	0.000419	0.000371				
			DLET	5	0.000074	0.000071	0.000370	0.000358				
Subtotal	5			25	0.000119	0.000073	0.002998	0.001825	5.012332	0.002018	0.003749	0.000534
Total			GHU	10	0.000185	0.000074	0.001855	0.000743				
			ISRT	5	0.000070	0.000070	0.000354	0.000354				
			REPL	5	0.000083	0.000074	0.000419	0.000371				
			DLET	5	0.000074	0.000071	0.000370	0.000358				
	5			25	0.000119	0.000073	0.002998	0.001825	5.012332	0.002018	0.003749	0.000534

Figure 120. OMEGAMON ATF DLI Summary by Transaction report

Table 11. OMEGAMON ATF DLI Summary by Transaction columns

Field	Field group	Description
Trancode	N/A	Name of the transaction that was traced
Tran Count	N/A	Transaction count
Database	N/A	Database name
Type	Call	DL/I call type. See the information about DL/I call functions in the IMS documentation for more information about each call type.
Count	Call	DL/I call count
Elapsed	Average	Average elapsed time for this call type
CPU	Average	Average CPU time for this call type
Elapsed	Total	Total elapsed time for this call type
CPU	Total	Total CPU time for this call type
Process	Average Elapsed	Average elapsed processing time
DLI	Average Elapsed	Average elapsed time spent in DL/I calls
Total	Average CPU	Total average CPU time
DLI	Average CPU	Total average time spent in DL/I calls

ATF Summary Db2 Call Analysis report

The OMEGAMON for IMS ATF Summary Db2 Call Analysis report is useful for showing Db2 SQL call activity within transactions using the OMEGAMON for IMS Application Trace Facility (ATF) summary record written to the IMS log. With IMS Performance Analyzer, you can produce a list report that breaks down Db2 activity within each transaction by call type, or a summary report.

List

The List report shows Db2 activity within transaction by SQL call type, including call count, elapsed time and CPU time.

Summary

The Summary report shows Db2 activity summarized by transaction and SQL call type, including call count, elapsed time, and CPU time.

Options

To specify the report options, select the ATF Summary **Db2 Call Analysis** report in a Log Report Set.

You can produce the following reports by selecting the List and Summary options:

- List of Db2 activity within each transaction
- Summary showing Db2 activity summarized by transaction and SQL call type

You can specify selection criteria for one or more of the following:

- Transaction code
- Program
- User ID
- IMS subsystem ID

A report interval can be specified. This applies to the reduced data file after the global (or runtime) report interval takes effect.

The report output is written to the data set specified by the Report Output DDnames.

On the **ATF ES Transit Options** panel, the following options are applicable:

- **OMEGAMON ATF ES Log Code**, which specifies the log record code of the OMEGAMON ATF Summary records.
- **Process exception transactions only**, which you select to process only transactions that match defined exception criteria.

Content

These examples show the ATF Summary Db2 Call Analysis reports.

IMS Performance Analyzer OMEGAMON ATF Db2 List										

Report from 01Feb2018 14:42:37.96										
Time	Trancode	Program	Elapsed Process	Time Db2	CPU Time Total	Time Db2	Type	Call Count	Summary Elapsed	Page Db2
14:42:37.965804	CEXSCNV	CEXSPGM	5.011627	0.003130	0.003970	0.001820	OTHER	1	0.000030	0.000030
							SELECT	14	0.000767	0.000598
							INSERT	1	0.000132	0.000119
							UPDATE	1	0.000149	0.000149
							DELETE	1	0.000141	0.000141
							OPEN	1	0.000171	0.000171
							TOTAL	19	0.001391	0.001209
14:43:52.897459	CEXSCNV	CEXSPGM	5.015028	0.002780	0.003842	0.001709	OTHER	1	0.000030	0.000030
							SELECT	14	0.000710	0.000624
							INSERT	1	0.000112	0.000112
							UPDATE	1	0.000146	0.000146
							DELETE	1	0.000137	0.000137
							OPEN	1	0.000167	0.000167

Figure 121. OMEGAMON ATF Db2 List report

Table 12. OMEGAMON ATF Db2 List columns

Field	Field group	Description
Time	N/A	Time when the application started
Trancode	N/A	Name of the transaction that was traced
Program	N/A	Name of the program scheduling block (PSB)
Process	Elapsed Time	Elapsed processing time
Db2	Elapsed Time	Elapsed time spent in Db2 SQL calls
Total	CPU Time	Total CPU time
Db2	CPU Time	CPU time spent in Db2 SQL calls
Type	Call Summary	Db2 call type
Count	Call Summary	Db2 call count
Elapsed	Call Summary	Elapsed time spent for this call type
Db2	Call Summary	Time spent in Db2 calls for this call type

IMS Performance Analyzer OMEGAMON ATF Db2 Summary												
Report from 01Feb2018 14:42:37.96 to 01Feb2018 14:47:38.64												
Trancode	Program	Tran Count	Average Process	Elapsed Db2	Average Total	CPU Db2	Call Type	Count	Average Elapsed	CPU	Total Elapsed	CPU
CEXSConv	CEXSPGM	5	5.012332	0.002651	0.003749	0.001647	OTHER	5	0.000027	0.000027	0.000136	0.000136
							SELECT	70	0.000044	0.000038	0.003097	0.002694
							INSERT	5	0.000120	0.000113	0.000603	0.000569
							UPDATE	5	0.000152	0.000144	0.000761	0.000723
							DELETE	5	0.000125	0.000125	0.000625	0.000625
							OPEN	5	0.000165	0.000151	0.000825	0.000756
							TOTAL	95	0.000063	0.000057	0.006048	0.005503
Total		5	5.012332	0.002651	0.003749	0.001647	OTHER	5	0.000027	0.000027	0.000136	0.000136
							SELECT	70	0.000044	0.000038	0.003097	0.002694
							INSERT	5	0.000120	0.000113	0.000603	0.000569
							UPDATE	5	0.000152	0.000144	0.000761	0.000723
							DELETE	5	0.000125	0.000125	0.000625	0.000625
							OPEN	5	0.000165	0.000151	0.000825	0.000756
							TOTAL	95	0.000063	0.000057	0.006048	0.005503

Figure 122. OMEGAMON ATF Db2 Summary report

Table 13. OMEGAMON ATF Db2 Summary columns

Field	Field group	Description
Trancode	N/A	Name of the transaction that was traced
Program	N/A	Name of the program scheduling block (PSB)
Tran Count	N/A	Transaction count
Process	Average Elapsed	Average elapsed processing time
Db2	Average Elapsed	Average elapsed time spent in Db2 calls
Total	Average CPU	Average CPU time
Db2	Average CPU	Average CPU time spent in Db2 SQL calls
Call Type	N/A	Db2 call type
Count	N/A	Number of calls of each call type
Elapsed	Average	Average elapsed time for each call of this type

Table 13. OMEGAMON ATF Db2 Summary columns (continued)		
Field	Field group	Description
CPU	Average	Average CPU time for each call of this type
Elapsed	Total	Total elapsed time for each call of this type
CPU	Total	Total CPU time for each call of this type

ATF Summary MQ Call Analysis report

The OMEGAMON for IMS ATF Summary MQ Call Analysis report is useful for showing MQ activity within transactions using the OMEGAMON for IMS Application Trace Facility (ATF) summary record written to the IMS log. With IMS Performance Analyzer, you can produce a list report that breaks down MQ activity within each transaction by call type, or a summary report.

List

The List report shows MQ activity within transaction by call type, including elapsed time and CPU time.

Summary

The Summary report shows MQ activity summarized by transaction and call type, including call count, average elapsed time, and CPU time.

Options

To specify the report options, select the ATF Summary **MQ Call Analysis** report in a Log Report Set.

You can produce the following reports by selecting the List and Summary options:

- List of MQ activity within each transaction
- Summary showing MQ activity summarized by transaction and call type

You can specify selection criteria for one or more of the following:

- Transaction code
- Program
- User ID
- IMS subsystem ID

A report interval can be specified. This applies to the reduced data file after the global (or runtime) report interval takes effect.

The report output is written to the data set specified by the Report Output DDnames.

On the **ATF ES Transit Options** panel, the following options are applicable:

- **OMEGAMON ATF ES Log Code**, which specifies the log record code of the OMEGAMON ATF Summary records.
- **Process exception transactions only**, which you select to process only transactions that match defined exception criteria.

Content

These examples show the ATF Summary MQ Call Analysis reports.

IMS Performance Analyzer OMEGAMON ATF MQ List										Page	1
Report from 01Feb2018 14:42:02.46											
Time	Trancode	Program	--- Elapsed Time --- Process	MQ	--- CPU Time --- Total	MQ	Type	Call Count	Summary Elapsed	MQ	
14:42:02.465064	MQATREQ1	MQATPGM	0.434473	0.034159	0.032512	0.003342	MQGET	11	0.260438	0.001941	
							MQPUT	1	0.000885	0.000392	
							MQCONN	1	0.036697	0.005178	
							MQOPEN	2	0.000390	0.000350	
							MQCLOS	2	0.000141	0.000141	
							MQDISC	1	0.000141	0.000141	
14:42:03.932546	MQATREQ1	MQATPGM	0.307635	0.003409	0.012675	0.001971	MQGET	2	0.251036	0.000437	
							MQPUT	2	0.001047	0.000415	
							MQCONN	1	0.000009	0.000009	
							MQOPEN	2	0.005076	0.000312	
							MQCLOS	2	0.000115	0.000114	
							MQDISC	1	0.000145	0.000145	
14:42:18.398551	MQATREQ1	MQATPGM	0.298245	0.004505	0.015945	0.003005	MQGET	3	0.252283	0.000760	
							MQPUT	5	0.007035	0.001205	
							MQCONN	1	0.000013	0.000013	

Figure 123. OMEGAMON ATF MQ List report

Table 14. OMEGAMON ATF MQ List columns		
Field	Field group	Description
Time	N/A	Time when the application started
Trancode	N/A	Name of the transaction that was traced
Program	N/A	Name of the program scheduling block (PSB)
Process	Elapsed Time	Elapsed processing time
MQ	Elapsed Time	Elapsed time spent in IBM MQ calls
Total	CPU Time	Total CPU time
MQ	CPU Time	CPU time spent in MQ calls
Type	Call Summary	MQ call type. See the information about IBM MQ function calls in the IBM MQ documentation for more information about each call type.
Count	Call Summary	MQ call count
Elapsed	Call Summary	Elapsed time spent for this call type
MQ	Call Summary	Time spent in MQ calls for this call type

IMS Performance Analyzer OMEGAMON ATF MQ Summary												Page	1
Report from 01Feb2018 14:42:02.46 to 01Feb2018 14:48:05.71													
Trancode	Program	Tran Count	Average Process	Elapsed MQ	Average Total	CPU MQ	Call Type	Count	Average Elapsed	CPU	Total Elapsed	CPU	
MQATREQ1	MQATPGM	40	0.600211	0.005793	0.079770	0.002633	MQPUT	7,390	0.002029	0.000138	14.995819	1.025705	
							MQCONN	8,340	0.000771	0.000146	6.432410	1.223333	
							MQCLOS	40	0.001006	0.000141	0.040257	0.005676	
							MQSUB	80	0.000237	0.000172	0.019028	0.013833	
Total		40	0.600211	0.005793	0.079770	0.002633	MQPUT	7,390	0.002029	0.000138	14.995819	1.025705	
							MQCONN	8,340	0.000771	0.000146	6.432410	1.223333	
							MQCLOS	40	0.001006	0.000141	0.040257	0.005676	
							MQSUB	80	0.000237	0.000172	0.019028	0.013833	

Figure 124. OMEGAMON ATF MQ Summary report

Table 15. OMEGAMON ATF MQ Summary columns

Field	Field group	Description
Trancode	N/A	Name of the transaction that was traced
Program	N/A	Name of the program scheduling block (PSB)
Tran Count	N/A	Transaction count
Process	Average Elapsed	Average elapsed processing time
MQ	Average Elapsed	Average elapsed time spent in MQ calls
Total	Average CPU	Average CPU time
MQ	Average CPU	Average CPU time spent in MQ calls
Call Type	N/A	MQ call type
Count	N/A	Number of calls of each call type
Elapsed	Average	Average elapsed time for each call of this type
CPU	Average	Average CPU time for each call of this type
Elapsed	Total	Total elapsed time for each call of this type
CPU	Total	Total CPU time for each call of this type

Chapter 13. Trace reports

The IMS Performance Analyzer Log Trace reports provide a chronological listing of Log data. Although the Transaction Transit Log and Fast Path Transit Log are also chronological listings, they do not appear here, but rather with their respective Transit report categories because they utilize common Transit Options and report processing.

Remember: Input logs provided to IMS Performance Analyzer may contain sensitive information. Be sure to secure any reports that you generate as you would the input log data itself.

DC Queue Manager Trace report

The IMS DC Queue Manager Trace report shows a time-sequenced list of each TM event, such as input, message enqueue, get unique, output, and free device relative record number (DRRN). This IMS Performance Analyzer report also shows the content of each input message. The DC UOW Tracker report option allows you to trace transaction message flow using the IMS tracking UOW.

The DC Queue Manager Trace report is a formatted printout of selected log records. There is no summarizing analysis.

Log records: This report is derived from IMS log records 01, 03, 07, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 72.

Uses

You should use the DC Queue Manager Trace report only when you can't determine the cause of poor response or inefficient use of resources from the other, more general reports. Probably other reports have helped you focus on certain transactions or time periods, which you can now examine in detail in the DC Queue Manager Trace report.

Options

To specify the report options, select **DC Queue Manager Trace** from the Trace Reports in a Log Report Set.

The report options are:

- Select either to print LTERM instead of VTAM Node names or Line/Terminal values. Whatever the choice, the column heading in the report is shown as **LTERM**.
- You can request to print complete transactions. This ensures that all messages associated with a transaction are reported, regardless of the filtering options in effect. For example, if you specify `INCLUDE (MSGID (TR*))` to only include messages for transactions that start with TR, then IMS PA also reports the output messages for these transactions, even though their Message ID does not match TR*.
- You can request to print the entire message text for 01/03 log records. Otherwise, only the first 64 bytes of each text segment is reported.
- You can request to include the Tracking UOW for each log record in the report. This option changes the format of the report to include additional information. Specify the required format of the UTC time stamp for the DC UOW Tracker report:
 1. Convert the UTC from GMT to local time by applying the local time zone offset. This is the default.
 2. Do not convert the UTC to local time. The UTC is reported as it appears in the log record without the time zone offset applied.
- A report interval can be specified. This applies to the reduced data file after the Global (or Run-time) report interval is effected.
- The report output data set is controlled by specifying the **Report Output DDname**.
- Specify **Selection Criteria** to include or exclude particular values from the report for:

- Lines/Terminals (LINE/PTERM; line and terminal numbers)
- Logical Terminals (LTERM names)
- VTAM Nodes
- Log Record Codes
- Message IDs
- User IDs
- IMS Subsystem IDs

Content: DC Trace

Start 04Jun2023 16.10.15.93						IMS Performance Analyzer DC Queue Manager Trace				Page 1						
Time When	Term	IMS Id	Reason for Entry	DRRN 1st Record	DRRN This	Rec	Data	Data	Data	Data	Data	Data	Data	Data	Data	Data
16101593	NE9N01ZA	IM02	Input(P)	3S	3S		'JDB #1'									
16101596			Msg Enq(P)	3S			/									
			Get Unique	3S			/Reg 2/									
16101593	NE9N01ZA	IM02	Pgm Swi(P)	5S	5S		'TIMULUDU TIMP03AC3'									
16101652			Msg Enq(P)	5S			2Q /Reg 2/QBLOCK Allocated/									
16101593	NE9N01ZA	IM02	Output(P)	6S	6S		'TIMMIDBM *ENT JDB #1 UTDD							TIMP03		IM02'
16101660			Msg Enq(P)	6S	4Q		/Reg 2/Q No 4/QBLOCK Allocated/									
			QBLK Sync	4Q	2Q		/Reg 2/									
			Free DRRNs	6S												
			QBLK Sync				/Reg 2/									
16101593	NE9N01ZA	IM02	Output(R)	6S	6S		'									
16101667			Msg Enq(R)	6S	4Q		/Q No 1/QBLOCK Allocated/									
			Get Unique	6S			/Q No56/									
16101678			Msg Deq	6S	4Q		/Q No 1/QBLOCK Freed/									
			Free DRRNs	6S												
16101679	1 1	IM02	Output(P)	5S	5S		'DFS2500I DATABASE DBCIDLDB SUCCESSFULLY ALLOCATED									
16101680			Msg Enq(P)	5S	2Q		/Q No 3/QBLOCK Allocated/									
16101682			Get Unique	5S			/Q No68/									
			Msg Deq	5S	2Q		/Q No 3/QBLOCK Freed/									
			Free DRRNs	5S												
16101697	1 1	IM03	Output(P)	4S	4S		'DFS2500I DATABASE DBCIDLDB SUCCESSFULLY ALLOCATED									
16101698			Msg Enq(P)	4S	2Q		/Q No 3/QBLOCK Allocated/									
16101701			Get Unique	4S			/Q No68/									
16101702			Msg Deq	4S	2Q		/Q No 3/QBLOCK Freed/									
			Free DRRNs	4S												

Figure 125. DC Queue Manager Trace report

Time When is in the format *hhmmssstth* with no periods.

In the **Term** column, VTAM node names are reported instead of Line/Terminal where appropriate. Question marks appear when the line/terminal information is unavailable.

This is an example of the DC Queue Manager Trace report.

IMS Id shows the IMS Subsystem ID.

Reason for Entry can be suffixed to indicate:

(P)

Message put onto the shared message queue

(R)

Message read from the shared message queue

DRRN is in decimal format and followed by either:

Q

Queue block

S

Short message data set

L

Long message data set

Content: DC UOW Tracker

This is an example of the DC UOW Tracker report. This alternative format of the DC Queue Manager Trace provides additional information to trace transaction message flow using the IMS Tracking UOW.

Start 13Jun2023 16.08.02.29										
IMS Performance Analyzer DC UOW Tracker										
UTC(Local) Msg#/Rel Time+	Reason for Entry	Dest In/Out	Userid/ Terminal	DRRN Msg/Rec	PST/ Data	Orig ID	Orig STCK Token	Tracking UOW Proc ID	Proc STCK Token	Log Seq Number
160802.298.728 Msg # 1	Input 01C18194	LTRM0003 ORDER	JOHN NODE0003	04000004 04000004	----- +0000	IMSP 'ORDER'	B83991AAE59EFFF3 02500031110190086052693850	IMSP B83991AAE59EFFF3	B83991AAE59EFFF3 10-32-33'	000000000007691F
160802.298.728 Rel + 0	Enq SMB 350C84	LTRM0003 ORDER	JOHN NODE0003	04000004		IMSP	B83991AAE59EFFF3	IMSP	B83991AAE59EFFF3	0000000000076920
160802.298.990 Rel + 262	GU DLI 31E00064	LTRM0003 ORDER	JOHN NODE0003	04000004	0004	IMSP	B83991AAE59EFFF3	IMSP	B83991AAE59EFFF3	0000000000076923
160802.298.728 Msg # 2	Input 03C18190	LTRM0003 SECURE	JOHN NODE0003	04000009 04000009	----- +0000	IMSP 'SECURE'	B83991AAE59EFFF3 50	IMSP	B83991AAE83179F1	0000000000076926
160802.309.381 Rel + 10.653	Enq SMB 358C80	LTRM0003 SECURE	JOHN NODE0003	04000009		IMSP	B83991AAE59EFFF3	IMSP	B83991AAE83179F1	0000000000076927
	Free DRRN 33019E	LTRM0003 ORDER	JOHN NODE0003	04000004		IMSP	B83991AAE59EFFF3	IMSP	B83991AAE59EFFF3	0000000000076929
160802.310.081 Rel + 11.353	GU DLI 31E00064	LTRM0003 SECURE	JOHN NODE0003	04000009	0004	IMSP	B83991AAE59EFFF3	IMSP	B83991AAE83179F1	0000000000076930
160802.298.728 Msg # 3	Output 03C18210	LTRM0003 LTRM0003	JOHN NODE0003	04000004 04000004	+0000 +0040	IMSP 'You have authority to proceed with order number ORDR 10-32-330.'	B83991AAE59EFFF3	IMSP	B83991AAF41FA3F1	0000000000076932
160802.358.540 Rel + 59.812	Enq CNT 359C13	LTRM0003 LTRM0003	JOHN NODE0003	04000004	0004	IMSP	B83991AAE59EFFF3	IMSP	B83991AAF41FA3F1	0000000000076933

Figure 126. DC Queue Manager Trace: UOW Tracker report

The report contains the following information:

UTC(Local)

The log record's UTC time-stamp converted to local time by applying the time zone offset. The format of the UTC is *HHMMSS.THM.IJU* and has a precision of microseconds.

UTC(GMT)

The log record's UTC time-stamp as it appears in the Log record without the local time zone offset applied. The format of the UTC is *HHMMSS.THM.IJU* and has a precision of microseconds.

Msg#/Rel Time+

Msg#

Msg# is reported for IMS Message (type 01/03) records. Starting at 1 for the first message of a UOW, this number is incremented by 1 for every subsequent message in the UOW.

Rel Time+

Rel Time+ is reported for all other IMS record types that have a time-stamp (UTC). It represents the elapsed time from the start of the UOW. The format is *+ MM.SS.THM.IJU* and has a precision of microseconds. Time starts from the enqueue (type 35) of the first message in the UOW, not the 01 record.

Reason for Entry

Reason for Entry describes the purpose of the log record.

Reason	Log code (hex)	Explanation
Input	01/03	IMS message with an SMB destination, typically a transaction input message. An 03 Input record usually indicates a program switch.

Reason	Log code (hex)	Explanation
Msg Swi	01	IMS message with a CNT destination, usually a message to a terminal, printer or remote system.
Output	03	IMS message with a CNT destination, typically a transaction output message.
MSC Tx	01	Remote MSC transaction input message.
MSC Swi	03	Remote MSC program switch input message.
MSC Resp	01/03	Remote MSC transaction output response message.
APPC Tx	01/03	APPC transaction input message. Only transactions that use the IMS implicit LU 6.2 API are reported. Explicit CPI-C transactions do not use the IMS message queue.
APPC Resp	01/03	APPC transaction output response message.
OTMA Tx	01/03	OTMA transaction input message.
OTMA Resp	01/03	OTMA transaction output response message.
Cancelled	01/03	IMS message was cancelled.
Continued	01/03	Long IMS message continued onto a second or subsequent log record.
Prefix Add	30	Additional message prefix information (Format-Name).
GU DLI	31	Get Unique (GU) to the message queue to pass an incoming message to the application program.
GU Comms	31	Get Unique (GU) to start an outgoing message to its destination terminal.
Reject	32	Removal of an input message used by a program that abended.
Free DRRN	33	IMS message has been freed.
Msg Cancel	34	IMS message has been cancelled.
Enq SMB	35	Incoming message has been placed on the message queue.
Enq CNT	35	Outgoing message has been placed on the message queue.
Msg Deq	36	IMS message has been dequeued by the QMGR.
Msg Save	36	IMS message has been saved by the QMGR.
Msg Del	36	IMS message has been deleted by the QMGR.
QBLK Sync	37	IMS message transferred by the QMGR at sync point to its permanent destination.
SMB Return	38	Unprocessed input message has been returned to the input SMB after an application has abended.
CNT Releas	39	Output message was freed during cleanup processing of a RELEASE call.

In a shared queues environment, Reason for Entry can be suffixed to indicate:

(P)
Message put onto the shared message queue

(R)
Message read from the shared message queue

Directly beneath the Reason for Entry is the first 2 to 4 bytes of the log record, starting with the log record code. This contains additional message control information.

Dest In/Out

The Input Destination is the input CNT name where the message originated. The Output Destination is the message destination, either an SMB or CNT.

Userid

The Userid for this message.

Terminal

Physical Input Terminal ID (PTERM). Usually this is the VTAM Node name or Line/Terminal number. For APPC messages, this is the Network ID. For OTMA messages, this is the Tpipe name.

DRRN Msg/Rec

The Message DRRN is the DRRN of the current message. It identifies the first log record for this message. The Record DRRN is the DRRN of the current log record. It identifies a continuation of the message to a second or subsequent log record.

PST

The Region PST ID where the message was processed.

Data

For 01/03 message records only, the text data of the message. By default only the first 64 bytes of each message segment is reported. When the TEXTALL option is specified, the entire message text data is reported. The message text is preceded with a hexadecimal offset, prefixed with a + sign.

Tracking UOW

The Tracking Unit of Work (UOW) uniquely identifies each transaction's messages and associated log records events. It consists of:

- Originating-system message ID. The Message ID assigned by the IMS system that originates the message.
 - Originating IMSID
 - Time stamp token
- Processing-system message ID. The Message ID assigned by the IMS system processing the message.
 - Processing IMSID
 - Time stamp token

Because the UOW has IDs for both the system that originates the message and the system (if any) that processes the message, all messages that are associated with an original message can be tied together by the UOW (specifically, the originating-system message ID in the UOW).

Log Seq Number

The sequence number of the log record. This hexadecimal value occupies the last 8 bytes of every log record to identify its sequence in the log file.

Database Trace (Full Function) report

The IMS Database Trace (Full Function) report provides a record of all database changes by application programs as recorded on the IMS log. Backout changes caused by emergency restart are also reported and identified separately, but changes due to the reorganization utilities are not reported. Log records created by pseudo-abends are included in the report. This IMS Performance Analyzer report shows the content of segments, prefix pointers, and free space elements, and shows both the *before* and *after* versions of these as appropriate. The report also identifies the time of the change and the name of the program (PSB) making the change.

Use the report to identify a culprit program and its user for erroneous or unauthorized database changes. You can use it to monitor who is updating any database. You can also use the report to identify the source of specific problems, such as program errors or a mix-up of logs during backout.

Log records: This report is derived from IMS log records 01, 03, 06, 07, 08, 20, 21, 24, 40, 50.

Options

To specify the report options, select **Database Trace** from the Trace Reports in a Log Report Set.

A report interval can be specified. This applies to the reduced data file after the Global (or Runtime) report interval is effected.

The report output data set is controlled by specifying the Report Output DDname.

There are three report options available:

1. Database with transaction-oriented information.
2. Database information only. This produces a report which includes all databases, but excludes all transaction-oriented information.
3. Database open/close only. This produces a report which includes all databases, but excludes all transaction-oriented information. All opens and closes are reported, but update operations are not.

Selection Criteria can be specified to include or exclude particular data from the report:

- For report option 1, you can filter by Transaction Code, Database, Program (PSB), Key, Block ID, and IMS Subsystem ID.
- For report option 2, you can filter by Key, Block ID, and IMS Subsystem ID.
- For report option 3, you can filter by IMS Subsystem ID.

In your Selection Criteria:

- Include a Database Object List to report open, close, and update operations for only those databases.
- Include a Transaction Code Object List so the trace will report inputs, program scheduling, all updates, and program terminations for only those programs invoked by the specified transaction codes. However, all opens and closes will be reported because they are not identified by specific transaction codes.
- Specify a Key Object List to include keyed (KSDS) records. If more than one database is included, the values specified in the Key Object List pertain to all of them.
- Specify a Block ID Object List to include records for which keys are unknown or nonexistent. The values in the Block ID Object List can be RBA, RBN, and so on, as appropriate.

Content

The following figure is an example of a Database Trace report.

Start 04Jun2023 16.10.15.93						IMS Performance Analyzer				Page 1	
D A T A B A S E T R A C E											
Time HHMMSS.TH	IMS Id	PSB Reg	Database Name	D S	DL/I Call	Reason For Entry	Segment Image	Ident	Offset on Blk	Hexadecimal Data Display	Interpreted Data
161015.93						Input					
161015.96	IM02	2	DBIDB			Pgm Sched					
161016.04	IM02	0	PIMMIDBP	DBNAMDB	1 Open						*DSNAMDB*
161015.93						Input					
161016.69	IM02	2	PIMMIDBP	DBIDB		Pgm Term			00000000		
161018.07	IM02	2		DBTASUDU		Pgm Sched					
161015.93						Input					
161018.10	IM02	0	PIMULUDP	DBNAMIA	1 Open						*DSNAMIA*
	IM02	0	PIMULUDP	DBNAMIB	1 Open						*DSNAMIB*
	IM02	0	PIMULUDP	DBNAMIC	1 Open						*DSNAMIC*
	IM02	0	PIMULUDP	DBNAMID	1 Open						*DSNAMID*
161019.28	IM03	27		DBTASUDU		Pgm Sched					
161019.29	IM03	27	PIMULUDP	DBTASUDU		Pgm Term			00000000		
161022.59	IM02	2	PIMULUDP	DBNAMDB	1 REPL		VSAM RBA		00908000		
						Phys REPL Before Data		0001AE	F2		*2*
						Phys REPL After		0001AE	F4		*4*
									Userid:**TIMP03		
161022.39						Input					
161022.15	IM02	0	PIMULUDP	DBCIDLDB	1 Open						*DSXIDLDB*
161022.46	IM03	27		DBIDB		Pgm Sched					
161022.39						Input					
161022.58	IM03	0	PIMMIDBP	DBCTBLDB	1 Open						*DSXTBLDB*
									00000000		
	IM02	0	PIMULUDP	DBNAMIB	1 Open						*DSNAMIB*

D A T A S E T O V E R V I E W							
Database Name	IMS Access Method	Data Set Name	DS No	OS A/M	Block Size	Recrd Size	
DBNAMDB	HDAM	DSNAMDB	1	ESDS	4096	4089	
DBNAMIA	Index Uniq	DSNAMIA	1	KSDS	4096	62	
DBNAMIB	Index Uniq	DSNAMIB	1	KSDS	4096	62	
DBNAMIC	Index Uniq	DSNAMIC	1	KSDS	4096	78	
DBNAMID	Index Uniq	DSNAMID	1	KSDS	4096	62	
DBCIDLDB	HDAM	DSXIDLDB	1	ESDS	4096	4089	
DBCTBLDB	HISAM	DSXTBLDB	1	KSDS	4096	816	
DBPLSACC	HIDAM	DSLPSACC	1	ESDS	4096	4089	
DBPLSACT	HIDAM	DSLPSACT	1	ESDS	8192	8185	
DBPLSCFT	HIDAM	DSPCFT01	1	ESDS	8192	8185	
		DSPCFT02	2	ESDS	8192	8185	
		DSPCFT03	3	ESDS	8192	8185	
		DSPCFT04	4	ESDS	8192	8185	
DBPLSCNT	HISAM	DSLPCCNT	1	KSDS	4096	204	

Figure 127. Database Trace report

The report shows all instances of inserts, replaces, and deletes (physical and logical). Note that for inserts and deletes, changes to free space elements, prefix pointers, and bit maps are also reported. In addition, transaction input, program scheduling, and program termination (with completion code) are reported so that you can trace all database activity for a specific transaction.

The leftmost column **Time** is in the format *hhmmss.th*. For log records with a time stamp, that time is reported. For log records without a time stamp, the most recent log record with a time stamp is used.

The Region is identified by the IMS Subsystem ID **IMS Id** and PST number **Reg**.

DS gives the data set number within the database. On the Data Set Overview (the last page of the report), this number is used to identify the name and characteristics of the data set.

The last line of each update entry has the userid under which the database update was made if the userid is present in the log record.

When using Start or From date and time options, some open records may not be available to the trace program because they occur before the start time of the report. As a result, the record identifiers for updates to these databases cannot be converted to RBA, RBN, and key. In these cases, a question mark (?) appears to the left of the record identifiers (**Ident**) and pointer elements (**Hexadecimal Data Display**). Likewise, **Data Set Name** is reported as ? ? ? ? in the Data Set Overview.

DEDB Update Trace report

The IMS DEDB Update Trace report provides a record of all data entry database (DEDB) changes by application programs as recorded on the IMS log. Use this report to debug DEDB database problems and application program problems, and to diagnose performance problems and tune your applications. For example, you can monitor individual program or user updates to a particular database. This IMS Performance Analyzer report shows all DEDB segment updates (including the relative byte address (RBA) and contents of the modified data), DEDB Area data set Open and Close events, creation of Error Queue Elements (EQEs), and application sync points for all transactions that updated reported DEDBs.

Log records: This report is derived from IMS log records 5921, 5922, 5924, 5937, 5938, 5950.

Options

To specify the report options, select **DEDB Update Trace** from the Trace Reports in a Log Report Set.

The DEDB Update Trace can generate large amounts of output over a very short period of time. To avoid large and unwanted report output, it is recommended that:

- The reporting period is narrowed down by using the From and To times.
- Object Lists are used to filter the databases, programs or users included in the report.
- The desired report option is set to include only the type of DEDB events required.

A report interval can be specified. This applies to the reduced data file after the Global (or Run-time) report interval is effected.

The report output is written to the data set specified by the Report Output DDname.

By using Object Lists, you can specify which databases are to be included in or excluded from the report:

- DEDB Database name
- DEDB Area name

Also, you can restrict the source of the database updates by filtering on the following criteria:

- Program name
- User ID
- IMS Subsystem ID
- IMS Region PST ID

There are three report options available to further restrict the information reported:

1. DEDB information including related sync point entries, which includes:

- DEDB updates
- Application sync points that have some DEDB updates reported
- DEDB open and close events
- DEDB errors

2. DEDB information only

- DEDB updates
- DEDB open and close events
- DEDB errors

3. DEDB Open/Close only

- DEDB open and close events
- DEDB errors

Content

The following figure is an example of the DEDB Update Trace report applicable to both local and global (shared EMHQ) transaction processing.

IMS Performance Analyzer DEDB Update Trace Log 15Apr2023 8.54.43.80										
Time	Database Name	Area Name	--Region- IMID	PST	Program Name	User ID	Type	RBA of 1st byte	Hexadecimal Data Display	Interpreted Data
8:54:43.80	ORDERS	ORDERS	IMSA	46	ORDER	JANE	OPEN			
8:54:43.81	ORDERS	ORDERS	IMSA	46	ORDER	JANE	SDEP	00B14000	02000000 014E08A5 A8CA00B9 99105C00	Order number 001
									8544363C C2C1D7F9 F1F24040 F5000F5C	e***BAP912 5***
	ORDERS	ORDERS	IMSA	46	ORDER	JANE	DDEP	007BC000	01820000 00000000 014E08B1 4BF3	***7180*****#
	PARTS	PARTSA1	IMSA	46	ORDER	JANE	DDEP	195E5000	00000CF7 F1F8F000 331F000C 083C7BDC	P*****21372
									40D70041 599C0000 13185CF2 F1F3F7F2	
8:54:43.81			IMSA	46	ORDER	JANE	SYNC		TranCode=ART012	

Figure 128. DEDB Update Trace report

When processing multi-subsystem log files, DEDB updates from all IMS subsystems are combined into a single report.

All DEDB updates and the sync point record for a single transaction are grouped together, because the DEDB update log records are written immediately prior to the associated sync point log record.

The report heading contains the start of the reporting period. **Log** specifies the date and time of the first transaction to be processed.

The following fields appear in the report:

Time

Time of day.

Database Name

DEDB database name.

Area Name

DEDB Area data set name.

Region

The IFP region identification, broken down into:

IMID

The IMS subsystem ID

PST

The dependent region PST ID

Program Name

The Program (PSB) that affected the DEDB update or the application sync point.

User ID

The userid associated with the DEDB update or application sync point.

Type

Type of report entry which can be:

OPEN

DEDB Area data set open

CLOS

DEDB Area data set close

EQE

Error Queue Element creation

SDEP

SDEP (Sequential Dependent) segment insert

DDEP

Root or DDEP (Direct Dependent) segment update

SYNC

Application sync point

RBA of 1st Byte

For SDEP and DDEP, the RBA of the first byte of the data. For EQE (and OPEN when applicable), the RBA of the CI in error.

Hexadecimal Data Display

For SDEP and DDEP, the hexadecimal representation of the updated CI data. The data display is continued onto the following lines, until all of the data has been written. For OPEN (when applicable), the RBA of up to 9 additional CIs in error. For SYNC, TranCode= identifies the transaction code that has completed its sync point.

Interpreted Data

For SDEP and DDEP, the character representation of the updated CI data.

ESAF Trace report

The External Subsystem Attach Facility (ESAF) Trace report provides a chronological listing of all external subsystem connects and disconnects for the specified time period. Use this IMS Performance Analyzer report to determine when external subsystems were connected.

Log records: This report is derived from IMS log record 56.

Options

To specify the report options, select **ESAF Trace** from the Trace Reports in a Log Report Set.

You can specify that specific external subsystems and IMS subsystems be included in or excluded from the report.

A report interval can be specified. This applies to the reduced data file after the Global (or Run-time) report interval is effected.

The report output data set is controlled by specifying the Report Output DDname.

Content

The ESAF Trace report provides a formatted printout of the selected log records.

Start 04Jun2023 19.25.30.00				IMS Performance Analyzer External Subsystem Trace
Date	Time	Subsystem Id	IMS Id	Event
04Jun2023	19.25.32.60	DB2	IMSJ	External subsystem connected
04Jun2023	20.17.41.33	MQS	IMSK	External subsystem connected
04Jun2023	23.59.11.27	MQS	IMSK	Stop command issued
05Jun2023	01.01.07.14	MQS	IMSJ	External subsystem connected

Figure 129. ESAF Trace report

The sample report shows the following activity:

- At 19.25 external subsystem Db2 was connected.
- At 20.17 external subsystem MQS was connected.
- At 23.59 external subsystem MQS was stopped.
- At 01.01 external subsystem MQS was connected.

Chapter 14. Log Information report

The Log Information report provides a breakdown of the log record types in the input IMS log files. It shows record count, length, rates per second, and volume. Selected record types are broken down further to provide additional information about transaction arrival and processing throughput. You can use this report to get a snapshot of record and message counts by type, to look at the average length of records, the number of records per second, and the number of bytes per second by record type, or to quickly determine the size of log files and which types of records occupy the most space.

Options

A Log Information report is produced automatically whenever an IMS Performance Analyzer Log report set is run. In this case, no additional batch commands are required to produce the report. The LOGINFO operand allows users to produce a stand-alone Log Information report without running a report set. This is a batch-only command and is not generated by an IMS Performance Analyzer ISPF dialog.

The ddname for the Log Information report is LOGINFO.

Content

IMS Performance Analyzer - Log Information										
Log data From 2018-01-16 14:18:09.978417 To 2018-01-16 14:31:58.079308				Duration		13:48.100891				
Code	Count	MCNT	Recs/Sec	Avg Len	Max Len	Byte/Sec	MB	%		
01 IN	332		0	437	535	175	0.1	5.5	IMS Message	
CQS PUT	189		0	467	535	106	0.0	3.3	Put onto shared queue	
CQS RD	143		0	397	414	68	0.0	2.2	Read off shared queue	
02	21		0	78	100	1	0.0	0.1	Condensed Command	
03 IN	30		0	419	450	15	0.0	0.5	IMS Message	
CQS PUT	15		0	434	450	7	0.0	0.2	Put onto shared queue	
CQS RD	15		0	403	414	7	0.0	0.2	Read off shared queue	
03 OUT	555		0	462	930	309	0.2	9.7	IMS Message	
CQS PUT	187		0	536	930	121	0.1	3.8	Put onto shared queue	
CQS RD	188		0	398	414	90	0.0	2.8	Read off shared queue	
MSG SWI	180		0	451	532	98	0.0	3.1	Message switch	
0403	1		0	56	56	0	0.0	0.0	SUBSYS Recovery complete	
06	2		0	84	84	0	0.0	0.0	IMS Accounting	
07	271	204	0	464	464	151	0.1	4.8	Program schedule end	
MPP	146	200	0	464	464	81	0.0	2.6	MPP	
FALSE	121	0	0	464	464	67	0.0	2.1	MPP false schedule	
BMP	2	0	0	464	464	1	0.0	0.0	BMP	
ABEND	2	4	0	464	464	1	0.0	0.0	Abended transaction	
08	271		0	156	156	51	0.0	1.6	Program schedule start	
MPP	269		0	156	156	50	0.0	1.6	MPP	
IFP	2		0	156	156	0	0.0	0.0	Fast Path	
0901	269		0	88	88	28	0.0	0.9	SB summary for PST	
0902	1		0	424	424	0	0.0	0.0	SB detail for each SDSG	
11	10		0	68	68	0	0.0	0.0	Start of conversation	
12	10		0	48	48	0	0.0	0.0	End of conversation	
13	1		0	184	184	0	0.0	0.0	Conversation control block	
16	26		0	80	80	2	0.0	0.1	Sign On/Off	
20	5		0	221	708	1	0.0	0.0	Database open	
27	2		0	99	114	0	0.0	0.0	Database extension	
31	522		0	115	126	72	0.0	2.3	GU from the Message Queue	
DLI	204		0	122	126	30	0.0	0.9	DLI (application input)	
COMMS	318		0	111	120	42	0.0	1.3	Communications (output)	
32	2		0	84	84	0	0.0	0.0	Reject message	
33	850		1	71	84	73	0.0	2.3	Free message	
35	762		0	145	186	133	0.1	4.2	Enqueue or re-enqueue a msg	
36	320		0	149	168	57	0.0	1.8	Dequeue/Save/Delete a msg	
37	404		0	116	124	56	0.0	1.8	Syncpoint message transfer	
3730	202		0	116	124	28	0.0	0.9	Syncpoint End of Phase 1	
38	4		0	98	112	0	0.0	0.0	Release message after abend	
4001	3		0	536	536	1	0.0	0.1	Checkpoint begin	
4003	12		0	3,738	3,840	54	0.0	1.7	Checkpoint CNT	
4004	15		0	2,886	3,960	52	0.0	1.6	Checkpoint SMB	
4005	3		0	1,056	1,056	3	0.0	0.1	Checkpoint CTB	
4006	12		0	694	944	10	0.0	0.3	Checkpoint DDIR	
4007	21		0	824	980	20	0.0	0.7	Checkpoint PDIR	
4008	3		0	128	128	0	0.0	0.0	Checkpoint CLB	
4009	3		0	28	28	0	0.0	0.0	Checkpoint SMUP	
4021	18		0	3,665	3,738	79	0.0	2.5	Checkpoint VTCB	
4022	3		0	32	32	0	0.0	0.0	Checkpoint QAB (LU 6.2)	
4031	3		0	78	92	0	0.0	0.0	Checkpoint SIDX	
4033	3		0	128	128	0	0.0	0.0	Checkpoint OTMA MTE/MCB	
4035	3		0	1,660	1,660	6	0.0	0.2	Checkpoint OTMA descriptors	
4050	3		0	92	92	0	0.0	0.0		
4080	3		0	344	344	1	0.0	0.0	Checkpoint Fast Path begin	
4081	12		0	184	184	2	0.0	0.1	Checkpoint 64-bit FP buffer	
4083	6		0	240	328	1	0.0	0.1	Checkpoint RCTE	
4084	6		0	442	564	3	0.0	0.1	Checkpoint DMCB	
4087	1		0	528	528	0	0.0	0.0	Checkpoint ADSC	
4089	3		0	52	52	0	0.0	0.0	Checkpoint Fast Path end	
4098	3		0	104	104	0	0.0	0.0	Checkpoint end	
42	6		0	600	600	4	0.0	0.1	Log buffer control	
43	8		0	302	302	2	0.0	0.1	Log data set control	
4500	3		0	224	224	0	0.0	0.0	Begin statistics	
4502	3		0	248	248	0	0.0	0.0	Queue pool stats	
4503	3		0	104	104	0	0.0	0.0	Format buffer pool stats	
4504	9		0	144	144	1	0.0	0.0	Database buffer pool stats	
4505	3		0	136	136	0	0.0	0.0	Variable pool stats	
4506	3		0	176	176	0	0.0	0.0	Scheduling stats	
4507	3		0	288	288	1	0.0	0.0	Logger stats	
4508	18		0	136	136	2	0.0	0.1	VSAM subpool stats	
4509	3		0	48	48	0	0.0	0.0	Program isolation stats	
450A	3		0	2,236	2,236	8	0.0	0.3	Latch stats	
450B	3		0	52	52	0	0.0	0.0	CTL TCB dynamic SAP stats	
450C	3		0	4,704	4,704	17	0.0	0.5	DFSCBT00 storage pool stats	
:										

Figure 130. Log Information report

The report provides a breakdown of the log record types in the input IMS log files. The following columns are reported:

Code

Record type. Where applicable, records are broken down further into subtypes.

Count

Count of each type of record.

MCNT

Message count for each type of record.

Recs/Sec

Average number of records processed per second for each type of record.

Ave Len and Max Len

Average length and the maximum length of each type of record.

Byte/Sec

Average number of bytes processed per second for each type of record.

MB

Space occupied for each type of record.

%

Space occupied by each type of record as a percentage of the whole.

Chapter 15. Log report reference tables

The reference tables list the IMS Performance Analyzer log reports and commands with cross-references to the descriptions, sample reports and extracts, expectation sets, averages data sets, distributions, and object lists.

Table 16. IMS Performance Analyzer batch commands and output examples for IMS log reporting

Report	IMSPALOG command	Examples
Transaction Transit reports		
“Form-based Transaction Transit List reports” on page 53	LIST	“Form-based Transaction Transit List reports” on page 53
“Form-based Transaction Transit Summary reports” on page 55	SUMMARY	“Form-based Transaction Transit Summary reports” on page 55
Chapter 15, “Log report reference tables,” on page 261	INDEX	Chapter 15, “Log report reference tables,” on page 261
“Transaction Transit Analysis report” on page 64	ANALYSIS	“Transaction Transit Analysis report” on page 64
“Transaction Transit Statistics report” on page 70	STATS	“Transaction Transit Statistics report” on page 70
“Transaction Transit Log report” on page 71	LOG	“Transaction Transit Log report” on page 71
“Transaction Transit Graphic Summary report” on page 75	GRAPH	
“Transaction Transit Extract by Interval” on page 75	EXTRACT	“Transaction Transit Extract by Interval” on page 75 “Exporting interval data to CSV” on page 76
“Transaction Exception report and extract” on page 79	TRANEXC	Figure 19 on page 82 Figure 21 on page 88
“Transaction History File” on page 89 (extract)	TRANHIST	“Transaction History File” on page 89
Resource Usage and Availability reports		
“Dashboard report” on page 93	DASHBOARD	Figure 24 on page 94 Figure 27 on page 97
“Management Exception report” on page 97	MGREX	Figure 28 on page 100
“Transaction Resource Usage report” on page 105	TRANRESU	“Transaction Resource Usage List report” on page 106
“Resource Availability report” on page 115	AVAIL	“Resource Availability report” on page 115
“CPU Usage report and extract” on page 120	CPUR	“CPU Usage report and extract” on page 120

Table 16. IMS Performance Analyzer batch commands and output examples for IMS log reporting (continued)

Report	IMSPALOG command	Examples
“Internal Resource Usage reports” on page 125	IRUR	Figure 41 on page 127
“MSC Link Statistics report” on page 155	MSCLSTAT	“MSC Link Statistics report” on page 155
“Message Queue Utilization report” on page 157	MSGQ	“Message Queue Utilization report” on page 157
“Database Update Activity report and extract” on page 160	DBUPDATE	“Database Update Activity report and extract” on page 160
“Region Histogram report” on page 166	HISTGRAM	“Region Histogram report” on page 166
“OSAM Sequential Buffering report” on page 166	SB	“OSAM Sequential Buffering report” on page 166
“Deadlock report” on page 170	DEADLOCK	“IMS Deadlock List report” on page 172 “IMS Deadlock Summary report” on page 179
“System Checkpoint report” on page 180	CHECKPOINT	“Checkpoint Database Definitions report” on page 182
“BMP Checkpoint report” on page 187	BMPCHKP	“BMP Checkpoint report” on page 187
“Log Gap Analysis report” on page 191	GAP	“Log Gap Analysis report” on page 191
“Cold Start Analysis report” on page 192	COLDSTART	“Cold Start Analysis report” on page 192
Fast Path Transit reports		
“Fast Path Transit Analysis report” on page 198	FPANALYSIS	“Fast Path Transit Analysis report” on page 198
“Fast Path Transit Log report” on page 201	FPLOG	“Fast Path Transit Log report” on page 201
“Fast Path Transit Extract by Interval” on page 204	FPEXTRACT	“Fast Path Transit Extract by Interval” on page 204 “Exporting interval data to CSV” on page 76
“Fast Path Transaction Exception report and extract” on page 205	FPTRNEX	“Fast Path Transaction Exception Log report” on page 208
Fast Path Resource Usage reports		
“Fast Path Resource Usage and Contention report” on page 217	FPIRUC (RESUSAGE, . . .)	“Fast Path Resource Usage and Contention report” on page 217
“Fast Path Buffer Usage report” on page 220	FPIRUC (BUFFER, . . .)	“Fast Path Buffer Usage report” on page 220
“Fast Path Database Call Statistics report” on page 223	FPDBCALL	“Fast Path Database Call Statistics report” on page 223

Table 16. IMS Performance Analyzer batch commands and output examples for IMS log reporting (continued)

Report	IMSPALOG command	Examples
“IFP Region Occupancy report” on page 225	FPRGNO	“IFP Region Occupancy report” on page 225
“EMH Message Statistics report” on page 226	FPEMHQ	“EMH Message Statistics report” on page 226
“DEDB Update Activity report” on page 227	FPDBUPD	“DEDB Update Activity report” on page 227
“VSO Statistics report” on page 229	FPVSO	“VSO Statistics report” on page 229
ATF Summary reports		
Extract	ATFEXTR	Extract
Transaction Analysis	ATFANALYSIS	Transaction Analysis
DLI Call Analysis	ATFDLICALL	DLI Call Analysis
Db2 Call	ATFDB2CALL	Db2 Call
MQ Call	ATFMQCALL	MQ Call
Trace reports		
“DC Queue Manager Trace report” on page 247	DCTRACE	“DC Queue Manager Trace report” on page 247
“Database Trace (Full Function) report” on page 251	DBTRACE	“Database Trace (Full Function) report” on page 251
“DEDB Update Trace report” on page 254	FPDBTRC	“DEDB Update Trace report” on page 254
“ESAF Trace report” on page 256	ESAF	“ESAF Trace report” on page 256
Log Information reports		
Chapter 14, “Log Information report,” on page 257	LOGINFO	Chapter 14, “Log Information report,” on page 257

1. Extract data sets (delimited text files) for input to external programs such as Db2. These can be created by the following reports:
 - Transaction Exception (MSGQ)
 - Fast Path Transaction Exception
 - CPU Usage
 - Database Update Activity
 - Transaction History File
 - Form-based reports: List and Summary
 - ATF Summary
2. Extract data sets (proprietary format) for input to **Graphing & Export** (option 4.6 **Graphing & Export** on the IMS Performance Analyzer Primary Option Menu). These can be created by the following reports:
 - Transit Extract by Interval (MSGQ)
 - Fast Path Transit Extract by Interval

The IMS transaction index and IMS Connect transaction index are additional, special purpose extracts.

Note that there are two types of extract data sets created by IMS Performance Analyzer log report processing.

This table shows which of the IMS Performance Analyzer log reports use Expectation Sets, Averages Data Sets and Distributions. It also shows the applicable sample Distributions.

Table 17. IMS Performance Analyzer log reports: expectation sets, averages, and distributions

Report	Expectation Sets	Averages Data Sets	Sample Distributions
Transaction Transit Statistics			LOGIN
Transaction Exception	Yes		
Management Exception	Yes	Yes	
CPU Usage			\$IPDIST1, \$IPDIST2
System Checkpoint			SYSCKPT
Fast Path Transaction Exception	Yes		

The following table shows which IMS Performance Analyzer log reports support filtering of log records using Selection Criteria. It also shows the applicable Object List types.

Report	Object List type																							USER ID	USR DEF
	AP GRP	AREA	BLK ID	CLASS	DB	DD	DD GRP	ESS ID	IMS ID	KEY	LINE	LN/ PT	LTERM	MSG ID	NODE	PROG	REC CD	RG JOB	RG PST	RT CDE	TRAN				
Options																									
Log Global	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Transaction (MSGQ) Transit reports																									
Transit Options	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Y	-	-		
Analysis	-	-	-	Y	-	-	-	-	-	Y	-	Y	-	Y	-	-	-	-	-	-	Y ¹	Y	-		
Statistics	-	-	-	Y	-	-	-	-	-	Y	-	Y	-	Y	-	-	-	-	-	-	Y ¹	Y	-		
Log	-	-	-	-	-	-	-	-	-	-	-	-	Y	-	-	-	-	-	-	-	Y ¹	Y	-		
Graphic Summary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Extract by Interval	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Y ¹	-	-		
Transaction Exception	-	-	-	Y	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Y ¹	Y	-		
Transaction History File	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Y	-	-		
Transaction Transit (Form-based) reports																									
Transit Options	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
List	-	-	-	Y	-	-	-	-	-	-	Y	-	Y	-	Y	Y	-	-	-	-	Y	Y	-		
Summary	-	-	-	Y	-	-	-	-	-	-	Y	-	Y	-	Y	Y	-	-	-	-	Y	Y	-		
Transaction Index	-	-	-	Y	-	-	-	-	-	-	Y	-	Y	-	Y	Y	-	-	-	-	Y	Y	-		
Resource Usage and Availability reports																									
Dashboard	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Management Exception	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Y	-	-		
Transaction Resource Usage	-	-	-	-	-	-	-	-	Y	-	-	-	-	-	-	Y	-	Y	Y	-	Y	-	-		
Resource Availability	-	-	-	-	Y	-	-	-	Y	-	Y	-	-	-	Y	Y	-	Y	Y	-	Y	-	-		
CPU Usage	-	-	-	-	-	-	-	-	Y	-	-	-	-	-	-	Y	-	Y	Y	-	Y	-	-		
Internal Resource Usage	-	-	-	-	-	-	-	-	Y	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
MSC Link Statistics	-	-	-	-	-	-	-	-	Y	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Message Queue Utilization	-	-	-	-	-	-	-	-	Y	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Database Update Activity	-	-	-	-	Y	-	-	-	Y	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Region Histogram	-	-	-	-	-	-	-	-	Y	-	-	-	-	-	-	-	-	Y	Y	-	-	-	-		
OSAM Sequential Buffering	-	-	-	-	Y	-	-	-	Y	-	-	-	-	-	-	Y	-	-	-	-	-	-	-		
Deadlock	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
System Checkpoint	-	-	-	-	Y	-	-	-	Y	-	-	Y	Y	-	Y	-	-	-	-	-	Y	-	-		
BMP Checkpoint	-	-	-	-	-	-	-	-	Y	-	-	-	-	-	-	Y	-	-	-	-	Y	-	-		
Gap Analysis	-	-	-	-	-	-	-	-	Y	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Cold Start Analysis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Fast Path (EMH) Transit reports																									
Transit Options	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Y	-	-		
Analysis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Y	Y ²	Y	-		
Log	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Y ²	-	-		
Extract by Interval	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Y ²	-	-		
Transaction Exception	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Y ³	-	-		
Fast Path Resource Usage reports																									
Resource Usage and Contention	-	-	-	-	-	-	-	-	Y	-	-	-	-	-	-	-	-	-	-	-	Y	-	-		
Database Call Statistics	-	-	-	-	-	-	-	-	Y	-	-	-	-	-	-	-	-	-	-	-	Y	-	-		
IFP Region Occupancy	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Y	-	Y	-	-	-	-	-		
EMH Message Statistics	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Y	-	-		
DEDB Update Activity	-	Y	-	-	Y	-	-	-	Y	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
VSO Statistics	-	Y	-	-	Y	-	-	-	Y	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
ATF Summary reports																									
Transit Options	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Extract	-	-	-	-	Y	-	-	-	Y	-	-	-	-	-	-	Y	-	-	-	-	Y	Y	-		
Transaction Analysis	-	-	-	-	Y	-	-	-	Y	-	-	-	-	-	-	Y	-	-	-	-	Y	Y	-		
DLI Call Analysis	-	-	-	-	Y	-	-	-	Y	-	-	-	-	-	-	Y	-	-	-	-	Y	Y	-		
Db2 Call Analysis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Y	-	-	-	-	Y	Y	-		
MQ Call Analysis	-	-	-	-	-	-	-	-	Y	-	-	-	-	-	-	Y	-	-	-	-	Y	Y	-		
Trace reports																									
DC Queue Manager Trace	-	-	-	-	-	-	-	-	Y	-	-	Y	Y	Y	Y	-	Y	-	-	-	-	Y	-		
Database Trace (Full Function)	-	-	-	Y	-	Y	-	-	Y	Y	-	-	-	-	-	Y	-	-	-	-	Y	-	-		
DEDB Update Trace	-	Y	-	-	Y	-	-	-	Y	-	-	-	-	-	-	Y	-	-	Y	-	-	Y	-		
ESAF Trace	-	-	-	-	-	-	-	-	Y	Y	-	-	-	-	-	-	-	-	-	-	-	-	-		
Comments:																									
^{1.} Records can be filtered on Transaction Code, firstly by the Transit Options Selection Criteria, then secondly by the report.																									
^{2.} Records can be filtered on Transaction Code, firstly by the Fast Path Transit Options Selection Criteria, secondly by the report.																									
^{3.} Records can be filtered on Transaction Code by the Fast Path Transit Options Selection Criteria. There is no additional filtering.																									

Comments:
¹. Records can be filtered on Transaction Code, firstly by the Transit Options Selection Criteria, then secondly by the report.
². Records can be filtered on Transaction Code, firstly by the Fast Path Transit Options Selection Criteria, secondly by the report.
³. Records can be filtered on Transaction Code by the Fast Path Transit Options Selection Criteria. There is no additional filtering.

Figure 131. IMS Performance Analyzer log reports: Selection Criteria (Object Lists)

Part 3. IMS Monitor reports

IMS Performance Analyzer monitor reports use IMS Monitor data to produce region activity reports, system analysis reports, resource usage reports, Fast Path analysis reports, and monitor data analysis reports. In this section, most of the discussion assumes the reports are requested using the IMS Performance Analyzer ISPF dialog, the primary mechanism for requesting reports. Alternatively, you can request reports using batch commands.

You can use the Monitor reports provided in IMS Performance Analyzer in the following ways:

Performance management

Use IMS Performance Analyzer monitor reports in conjunction with a regular IMS performance management program.

Performance management requires a dedicated effort, which includes:

- Defining service level objectives or exceptions of response time and throughput
- Establishing application program performance standards
- Monitoring performance to determine whether performance objectives and standards are being met
- Identifying and analyzing performance and capacity problems
- Making tuning changes and problem corrections, as well as verifying the effectiveness of such changes
- Reaching a level of IMS education sufficient to understand your system's behavior (IMS application interrelationships with the operating system, as well as with other applications and subsystems)

IMS PA is not a performance manager. However, IMS PA monitor reports are designed to help with many aspects of IMS performance management.

Performance monitoring and analysis

IMS PA monitor reports are hierarchical in structure. The summary level reports are intended to help with performance monitoring. The Region Summary, particularly, provides many important indications of performance.

By establishing guidelines or thresholds of acceptability for these indicators and then comparing actual values against these thresholds on a regular basis, you can often predict performance problems that develop gradually or immediately identify a performance problem that occurs spontaneously.

IMS PA monitor reports are based solely on data recorded by the IMS and DB Monitors; the reports, therefore, do not provide direct information about operating systems, hardware subsystems, or applications performance. However, IMS PA reports contain information in IMS terms that leads to solutions of IMS problems unique to the installation environment.

Performance threshold values

In the discussions of how to use certain reports, guideline values are occasionally used as a reference for the discussion. Performance threshold values should be established by each installation and the IMS PA reports should be monitored against those thresholds. The threshold values used can be modified as you obtain more experience and knowledge about the system.

Most of the guideline figures mentioned are from the *IMS Performance Guide*. For example, a figure of 30 microseconds for scheduler not-IWAIT time is used to indicate whether the IMS control region is obtaining sufficient CPU resources to do its job.

However, any of the values we provide should be used with care. Each installation must develop knowledge of its own system sufficient to understand what constitutes *normal* performance for that system. The performance figures for one installation can vary dramatically from those for another system due to factors such as the hardware used, the IMS release and maintenance level installed, the application design, and so on.

IMS PA exception reports provide a convenient means of monitoring three key indicators:

- DL/I elapsed time
- IWAIT elapsed time
- Number of IWAITs per call

An exception report entry is printed each time the threshold value for an indicator is exceeded.

Program design standards and documentation

Since application design can have a major impact on apparent IMS performance, each installation should adopt MPP program design standards that must be met before a program is put into production.

In addition to using good programming techniques involving structured design and code, the MPP must be designed to issue as few DL/I calls per transaction as possible; also, those calls should result in a minimum of I/O activity. Specify MOD=SNGL to reduce program isolation enqueue time.

An MPP performance standard can be stated as a maximum number of calls per transaction and a maximum number of IWAITs per call. During acceptability testing for an MPP, IMS PA reports can be used to:

- Verify whether the MPP can be put into production
- Classify the program as an MPP or BMP

The PSB-Transaction Code Analysis and Program Trace reports provide excellent material to help evaluate application performance and to keep as part of the program documentation package.

Report categories

Chapter 22, “Monitor report reference tables,” on page 293 list IMS PA monitor reports by category, and shows the page number on which a sample report begins. The reports are organized by level of detail and area of analysis. Many options exist to let you tailor the reports for your analysis requirements. Distributions can be specified to obtain graphs showing the distribution (spread) of the values of the main performance measures. For example, the Region Summary, Detail and Analysis reports can produce graphs showing the distribution of the values of elapsed time per schedule, elapsed time per call, elapsed time per IWAIT, and IWAITs per call. Chapter 22, “Monitor report reference tables,” on page 293 list the IMS PA monitor reports that use Distributions and the available sample Distributions. For some reports, Selection Criteria can be specified to filter the report data. Object Lists are useful when specifying Selection Criteria. Figure 132 on page 299 lists the IMS PA monitor reports and applicable Object Lists.

Region Activity Summary reports

The Region Activity Summary reports provide a summary and correlation of region, program, transaction, and database activity for the IMS system. These reports give you an overview of IMS system activity and identify problem areas for further investigation using system and program level reports. Use of the summary reports for trend analysis and day-to-day monitoring of the system is facilitated by reporting in terms of rates, ratios, percentages, and elapsed times per event.

The region activity summary reports are:

- **Schedule/Transaction Summary.** A compact summary of total scheduling and transaction counts for all regions for the entire trace period.
- **Region Summary.** A summary analysis of schedule, transaction, call, and IWAIT activity for each active MPP and IFP region, presented for convenient comparison of regions. This report includes average elapsed time per activity, transactions per schedule, calls per transaction, IWAITs per call, analysis of region active and idle time, and elapsed time per schedule distributions.
- **Program (PSB) Summary.** A summary analysis and percentage comparison of schedule, transaction, call, and IWAIT activity for each PSB-transaction code and application group.

- **Database IWAIT Summary.** A summary of the IWAIT activity associated with dependent regions or MPP, IFP, and BMP regions. Activity is reported for each DDname and DDgroup, including the number of IWAITs, average elapsed time per IWAIT, and IWAITs per call.
- **Transactions by Time Period.** For each PSB-transaction code and application group, presents the number or percentage of transactions occurring in specified time periods as well as the overall transaction rate for each time period.

Region Activity Analysis reports

The region activity analysis reports provide information for the detailed analysis of the IMS system. Detail reports are provided for analysis of program activity in each active MPP or IFP region, and for specified application and data set groups. An IWAIT Analysis report is provided for program related IWAIT activity. The Exception Listing report is provided when certain performance monitoring thresholds are exceeded. An Enqueue/Dequeue Trace report (for IMS) identifies program isolation bottlenecks. The Region Histogram report graphically presents the interrelationship of region activity. Distributions are used extensively throughout the reports.

The system analysis reports are:

- **Region Analysis.** Presents the Region Detail, Program Summary, Transactions by Time Period, and Database IWAIT Summary reports for each active region.
- **Region Detail.** An analysis of schedule, transaction, call, and IWAIT activity for each active MPP or IFP region, with all the information for a region presented together. This report includes average elapsed time per activity, transactions per schedule, calls per transaction, IWAITs per call, analysis of region active and idle time, and elapsed time per schedule distributions.
- **Application Detail.** A detailed analysis, comparison of percentages, and summary of the activity of the MPPs and IFPs that comprise user-defined application groups. The following information is reported for each program in the group and summarized for the application group totals:
 - Schedule, transaction, and database activity with appropriate distributions
 - Transactions by time period data

The application group totals also appear as a line item on the appropriate summary and analysis reports.

- **Database IWAIT Analysis.** An analysis of IWAIT activity and elapsed time per IWAIT distributions for each DDname. This report is provided for the total IWAIT activity associated with both processing program activity and each MPP region.
- **DDgroup.** An analysis of the IWAIT activity on the data sets that comprise user-defined DDgroups based on DDname. IWAIT activity, including number of IWAITs, average elapsed time per IWAIT, IWAITs per call, and elapsed time per IWAIT distributions, is reported for each data set in the group and for the DDgroup totals. This report is produced only as an option in the Database IWAIT Analysis report. DDgroup totals can optionally appear as line items on the Database IWAIT Summary report.
- **Performance Exceptions.** These reports incorporate the Exception Listing, and three reports analyzing IMS events that degrade IMS performance, including Intent failures, Pool Space failures, and Deadlock events.
- **Exception Listing.** A listing of performance threshold violations for the key performance factors of number of IWAITs per call, DL/I call elapsed time, and IWAIT elapsed time. Miscellaneous unusual occurrences are also listed, such as:
 - BMP schedule failures
 - Pseudo-schedules created by IMS PA for schedules in progress
 - Transaction backouts inferred by IMS PA
 - Terminations forced by IMS PA due to incomplete schedules
- **Enqueue/Dequeue Trace.** The monitor records enqueue and dequeue events associated with program isolation. IMS PA identifies each IWAIT resulting from a program isolation-related enqueue by reporting the time it occurred, the database enqueued on, the transaction enqueued, and any

other transactions active at enqueue time. The trace is a valuable aid in identifying program isolation bottlenecks.

- **Region Histogram.** A trace of region activity by time interval and a valuable aid in analyzing the interrelationship of program activity in the IMS system. Activity for up to 13 regions is presented in side-by-side format. Periods of region activity and inactivity are graphically portrayed.

System Analysis reports

The System Analysis (Total System IWAIT) reports provide a summary and detailed account of the IWAIT activity of the entire IMS system.

The Total System IWAIT reports are:

- **Total System IWAIT Summary.** A summary of the IWAIT activity for the total IMS system. This report includes system data set, database, block loading, format services, scheduler, and line/node IWAITS, as well as distributions of elapsed time per IWAIT for each reported category.
- **Total System IWAIT Detail.** A detailed breakdown of the system data set, database, block loading, format services, scheduler, and line/node IWAIT activity summarized in the Total System IWAIT Summary report. Elapsed time per IWAIT distributions for each detail line are optionally provided.

Program Analysis reports

The Program Analysis reports provide useful information for investigating performance issues related to application program and database design.

The Program Analysis reports are:

- **Program Activity Detail.** A detailed breakdown of the database activity of each PSB name by PCB name, function code, DDname, and segment name feedback. Alternate report formats present the data organized by PCB name. No sorting of the input data is required to obtain the reports.
- **Program Trace.** A detailed trace of the events associated with a program schedule. A detail line of information is provided for each call and (optionally) each IWAIT occurring in the program schedule or batch program execution. A summary of schedule activity is also provided. Any number of traces can be specified as part of a single IMS PA execution.
- **Batch VSAM Statistics.** A detailed breakdown of VSAM activity for IMS Batch jobs.

Resource Usage reports

The Resource Usage reports provide a detailed analysis of the usage of IMS resources, including Buffer Pools (such as Message Queue, OSAM, VSAM, and Message Formatting), Latches, Communication, MSC, and ESAF.

The resource usage reports are:

- **Buffer Pool and Latch Statistics.** These reports show IMS buffer usage statistics, providing their values when tracing starts and ends, and the difference between these two values. The reports include the Message Queue Pool, Database Buffer Pool, VSAM Buffer Pool, Message Format Buffer Pool, and Latch Statistics Counters.
- **Communication.** These reports show information on lines and nodes. They include the Communication Summary, Communication IWAIT, and Line Functions.
- **MSC.** These reports show the messages sent across systems. They include the MSC Summary, MSC Traffic, and MSC Queuing Summary.
- **ESAF.** A summary of the activity of external subsystems used by IMS programs.
- **Synchronous Callout.** A detailed analysis of sync callout activity in regions and by application programs. Individual subsystem activity is broken down by region and program, with statistics of sync callout activity per transaction.

Fast Path Analysis reports

The Fast Path analysis reports provide an analysis of all Fast Path resources and functions, including Fast Path buffers, BALG and shared EMHQ, OTHREADS, DEDB IWAITS, DEDB resource contention, and VSO. The reports are not available from DB Monitor data.

The Fast Path Analysis reports are:

- **DEDB Resource Contention.** Provides summary information about IWAITs on DEDB locks of various types, including CI, UOW, segment level, area, buffer overflow, MSDB, non-DBRC DB, command and dummy locks.
- **Fast Path Buffer Statistics.** Provides statistical information on activities in the Fast Path buffers, for all regions combined and for each region.
- **BALG/Shared EMHQ.** Provides statistical information on Balancing Group (BALG) activities and the shared Expedited Message Handler queue (EMHQ).
- **OThread Analysis.** A summary analysis of activities in the OTHREAD queue.
- **VSO Summary.** Provides summary information on VSO activity including:
 - VSO preload,
 - VSO I/O activities for the various data base share levels,
 - VSO write IWAITs,
 - VSO area castout operations, and
 - VSO coupling facility I/O wait.

Monitor Trace Record report

This report formats the records in the monitor input file to produce a chronological trace style listing.

Chapter 16. Operation of the Monitors

Monitor output data sets provide the input to the IMS Performance Analyzer monitor reports. The data recorded by the monitors depends on how their operation has been specified, which consequently affects the accuracy and content of the IMS Performance Analyzer reports.

The IMS Performance Analyzer [“Monitor Record Trace report”](#) on [page 425](#) provides a formatted print of monitor data set contents and is a very useful aid to understanding the data and interpreting the reports.

IMS SLOG macro

The basic mechanism used by the monitors for data collection during execution is the SLOG macro.

SLOG macros are used in selected IMS action modules to write to the monitor output data set. In this way, they record the beginning and ending of various events such as DL/I calls, IWAITs, and region scheduling, associating a unique record code with each type.

The time at which each SLOG macro is executed is marked by a Store Clock instruction time stamp. It is the function of the IMS Performance Analyzer batch report processors to match related SLOG calls, collect desired statistics, and produce reports to analyze the internal operation of IMS.

Monitor /TRACE and IMS TM STIMER options

The accuracy and content of the IMS Performance Analyzer reports depends on the data recorded in the monitor output data set.

The accuracy and content of the IMS Performance Analyzer reports depends on the data recorded in the monitor output data set. The data recorded by the monitor depends on a number of factors including:

- The Monitor /TRACE options which control the events to be recorded
- The IMS TM STIMER dependent region option which controls reporting of CPU time

Note: Elapsed time intervals reported by IMS Performance Analyzer account for all system activity, not just the time of the reported IMS activity.

Monitor record patterns

The logic used by the IMS Performance Analyzer monitor batch processor is structured for the usual or standard sequence of monitor records as recorded for typical IMS transactions and events. However, certain IMS execution events may result in monitor record sequences that are unexpected by IMS Performance Analyzer.

For example, when a message region terminates abnormally, a nonstandard sequence of monitor records is produced by IMS. In these cases, the IMS Performance Analyzer report processors may issue a number of diagnostic messages that indicate either an irregular sequence of records in the monitor trace, or an error in the monitor online formatting module. The appearance of these messages does not necessarily indicate an error in either IMS or IMS Performance Analyzer.

Chapter 17. Monitor data collection

Ensure that you run the monitor to collect data appropriate to your reporting requirements.

Monitor data collection and reporting is influenced by the following:

/TRACE command options

Before running IMS PA monitor reports, review the data collection options of the IMS monitor /TRACE command to make sure appropriate options are selected (LA, SCHD, APMQ, or ALL). For example, if the LA option is not selected, then the reports that require Communications Input/Output (CIO) monitor data will contain incomplete data. For a complete set of reports from IMS PA, the ALL option should be specified.

Timing

The time period for data collection by the IMS monitor must be carefully selected to include the events to be analyzed. For some reports, the event must be a complete event. Note the discussion of elapsed time in IMS PA calculations. Also consider the effect of operating system function on Store Clock timing of the measured events. The ideal situation is a non-paging, preloaded, standalone IMS system. This situation produces the most accurate statistics.

The elapsed time of the data collection period must also be planned. The values included in averages, standard deviations, distributions, counts, and so on increase in statistical significance for a longer trace time.

Other relevant information

During data collection, other information should be noted for future reference. Such information might include the IMS log input data, direct-access device layout, system configuration, IMS master console log, and volume of background work.

Chapter 18. Essential terminology for Monitor reporting

The discussion and description of IMS Performance Analyzer monitor reports assumes you have a practical knowledge of IMS and some experience with performance analysis and the IMS monitors. IMS Performance Analyzer monitor reports are based solely on events and values recorded on the monitor output data sets.

In this documentation, the term *monitor* applies to both the IMS Monitor used in the IMS TM (formerly DC) environment and the IMS DB Monitor used in the IMS DB environment. In cases where information applies to only one of the monitors, the term *IMS Monitor* or *DB Monitor* is used.

Monitors collect information during operation of the IMS system. Depending on specified options, the beginnings and endings of various events (such as DL/I calls, IWAITs, and region scheduling) are recorded in the monitor output data set, each identified by a unique record code. This information is in a format suitable for processing by IMS PA to produce reports on the performance of the IMS system.

For the list of monitor records that IMS Performance Analyzer uses for reporting, see [Chapter 39, “Monitor records,”](#) on page 497.

In the report descriptions that follow, values are described, where applicable, in terms of monitor data. The following descriptions and definitions are essential to understanding IMS Performance Analyzer monitor reports. You need to understand them so you can validly interpret the information in the reports.

ESAF Integration

If this option is active, External Subsystem calls are integrated into all Region and Program/Trancode reports.

ESAF call statistics are reported for each subsystem and contribute to the total call and IWAIT counts for regions and program/trancodes. When ESAF Integration is activated, a Call is a DL/I or external subsystem call. DL/I calls to the Message and EMH queues, Full Function and Fast Path database DL/I calls, and external subsystem calls all contribute to the total call count for regions and programs.

For more information, see [“ESAF Integration”](#) on page 285.

Schedule

In terms of application program activity, schedule time is the time required to load, initialize, and execute an application program in a dependent region.

An exception to this is described in *WFI and IFP region activity*.

The term *scheduling* refers to activity in the control region that is required to initiate an application in a dependent region.

Schedule time for a complete schedule is computed as the time elapsed between message scheduling end and message scheduling start (type 11 and 10 records for MPP regions, and type 03 and 02 records for BMP regions). If there is no message scheduling end record (type 11 or 03), as in the case of a schedule in progress, then scheduling time is computed from the first occurrence of a DL/I call (type 60 record).

Schedule start

Normally, schedule start is defined as the time at which processing in the control region ends and control is given to the dependent region controller.

Schedule start is identified by a message scheduling end record (type 03 or 11). In the absence of such a record, IMS Performance Analyzer creates a schedule for the dependent region when it encounters the start of a DL/I call (type 60 record).

Transaction

A transaction is a Get Unique (GU) to the I/O PCB with a blank return code (note that a transaction in progress is counted if a DL/I call is issued following the start of the trace interval).

Dependent region activity in progress

Activity is reported for schedules and transactions in progress during the IMS Performance Analyzer reporting interval, including WFI, IFP, and BMP regions.

Reporting for a dependent region starts from the first occurrence of either a DL/I call in the region or the first occurrence of scheduling activity in the control region on behalf of the dependent region (record types 10, 11, 14, 15 for MPP and 6, 7, 38, 39 for IFP). It is not always possible to determine the PSB name or the transaction code for activity in progress at the start of the IMS Performance Analyzer reporting interval. In this case, they are reported as %PSBnnnn or %TRNnnnn respectively, where nnnn is the region number.

WFI and IFP region activity

Reporting of activity in a WFI or IFP region is a special case.

Based on the preceding definition for *schedule*, the complete execution of an application program in a region is one schedule; however, for analysis purposes, multiple schedules are reported for WFI or IFP region activity. In this case, the following definitions apply:

Schedule end: No messages on the message queue (a GET UNIQUE to the I/O PCB followed by a scheduler IWAIT).

Schedule start: Reinitiation of processing due to arrival of a message on the message queue (scheduler IWAIT end).

Region idle time: The time spent in scheduler IWAIT due to no messages.

All per schedule values are reported accordingly. CPU time is not reported unless the application program terminates during the IMS Performance Analyzer reporting interval. If reported, CPU time is the time for the entire program execution, not the CPU time during the reporting interval. WFI or IFP region activity is not reported on the histogram.

CPU time

Dependent region CPU time is accumulated by the region controller and recorded in the message scheduling start record (type 10) written when the application program terminates.

The value recorded depends on the STIMER dependent region option. CPU time is not available for IFP.

IWAIT time

This is an IMS internal wait state in which processing for a dependent region is suspended pending the completion of an event (for example, an input or output event) for that dependent region. IWAIT time is the duration of this wait state.

Reporting IWAITs: Note that IMS Performance Analyzer reports may show that an application program is interacting with (that is, IWAITing on) a database to which it is not related. This effect is caused by segments from various open databases sharing a common buffer pool. If program A frees space in a buffer pool by writing part of the data for program B to disk, this can cause an unexpected IWAIT to be recorded for program A against the database for program B. Such occurrences are particularly evident in the PSB Details by DDname IWAITed On reports.

Note: When ESAF Integration is activated, External subsystem calls are treated as IWAIT events because they occur outside the control of IMS, causing IMS to wait for their completion. DFSUTR20 also treats external subsystem calls as IWAIT events.

Elapsed time

This is the time from the beginning to the end of an event, including any time spent in unrelated activity resulting from interruptions or wait states.

Region elapsed time

This is the total elapsed time in the trace interval from start to end of region activity.

The start (end) of region activity is determined from the first (last) occurrence of either a DL/I call in the dependent region or the first (last) occurrence of scheduling activity in the control region on behalf of the dependent region.

Trace interval

This is either the total duration of the monitor trace, or a subset of the trace as specified by the **Start** and **Stop** date and time, or the **Report Break Points** option on the Monitor Global Options panel.

Schedule to first DL/I call

This is the elapsed time required to load and initialize an application program in a dependent region.

The beginning of this interval is signaled by a monitor record logged when control region processing is completed for the dependent region. The end of this interval is signaled by a monitor record logged for the beginning of the first DL/I call in the dependent region, usually a GU to the I/O PCB. IMS fetches the first transaction for the application program by issuing a DL/I call from the control region before this interval. Therefore, the total DL/I calls shown by IMS Performance Analyzer for each schedule is one more than the number of DL/I calls issued from the dependent region during that schedule.

Note: When ESAF Integration is activated, Sch-DLI is the elapsed time from end of schedule to the first DL/I or external subsystem call. This time is reserved for application program initialization and housekeeping prior to an initial call (DL/I or an external subsystem) that marks the beginning of control program services. It is a measure of processing that is not repeated when multiple transactions are processed in a single scheduling.

PCB feedback area

A basic source of information in several of the reports produced by IMS Performance Analyzer is the PCB feedback area.

This area is normally not cleared by IMS, but is used to hold information as the call sequences are executed. This means the information collected by the monitor and reported by IMS Performance Analyzer reflects information that remained in the PCB feedback area at the end of the call. For unsuccessful calls, the PCB feedback area contains information down to the successful level. If the call failed at level 0, it is possible that information from a previous call is reported.

Any reports that group information by segment name could, therefore, be misleading; however, the status code for the specific call shows whether the call was successful. When the information in the PCB reports appears confusing, use the Program Trace reports and check for non-blank status codes to determine the actual call.

Overflow values (*)**

Occasionally a data item for the report exceeds the maximum value permitted under a column heading.

When this happens, the magnitude of the value is reduced by a factor of 1000, the result is placed in the report column, and the high-order positions of the column are filled with asterisks.

For example, the [“Region Summary report”](#) on page 302 has 9 bytes to show a Sch-DLI value. Therefore a value of 42,475,367 is reported as ***42,475 and a value of 214,784,123 is reported as **214,784.

Chapter 19. Batch program reports

Although the entire collection of IMS PA monitor reports could be obtained from processing a DB Monitor trace, only a subset of the reports are meaningful for DB analysis. The remaining reports are related to the IMS Transaction Monitor and would provide little or no relevant information about the IMS Database Monitor.

Of the monitor reports, the following subset is available for analysis of DB Monitor data:

- **Region Summary and Detail (Region 1).** Statistics and distributions for database calls and IWAITs. Most of this information is also available with the Program Activity Detail reports, however Calls/sec and IWTs/sec are unique values in this report.
- **Database IWAIT Summary (Region 1).** A summary of IWAIT activity for each data set and specified DDgroup.
- **Database IWAIT Analysis with distributions.** A report of IWAIT activity by DDname. This report can be used in place of, or in addition to, the Total System IWAIT reports.
- **DDgroup with distributions.** A report of IWAIT activity by DDname for each user-defined DDgroup.
- **Exception Listing.** A listing of performance threshold violations. The other reports included in the suite of Performance Exception reports are applicable only to TM.
- **Total System IWAIT Summary and Detail with distributions.** A complete accounting of IWAIT activity by data set type (OSAM, VSAM, DEDB, MSDB) and DDname.
- **Program Activity Detail.** A comprehensive collection of reports for database call analysis, plus a detailed trace of batch program IWAIT and CALL events for analysis of program design problems.
- **Program Trace.** A detailed trace of the events associated with a program schedule.
- **Batch VSAM Statistics.** A detailed breakdown of VSAM activity for IMS batch jobs. This is the only IMS PA report that processes DB Monitor data but not IMS Monitor (TM) data. All other reports can process TM data.
- **Buffer Pool and Latch Statistics.** A report on the access status of IMS buffers and the contents of the IMS latch counters.
- **ESAF.** A summary of the external subsystem activity of IMS programs.
- **Monitor Record Trace.** The monitor input records are formatted and reported chronologically.

You should decide which reports best suit your requirements. The following reports are often the most useful:

- Database IWAIT Analysis and distributions
- DDgroup Detail and distributions
- Program Analysis reports (either PSB Details or PSB-Transaction Code Analysis provide the same information)

Note that CPU time is not collected for the batch monitor so it is always zero (0.000) in Program Analysis reports.

If a program or database problem requires more detail, you can do a separate run to obtain the Program Trace report. Use the From and To date and time report options to control the duration of the Program Trace.

Chapter 20. DBCTL monitor reports

This section describes the DBCTL events that the IMS Monitor collects and the monitor reports that apply to DBCTL users. Monitoring has different meanings for DBCTL and DB/DC.

DC monitoring refers to transaction monitoring. The end user enters the transaction on a terminal. The transaction is processed by IMS and then returns a result to the user. Transaction characteristics that are monitored include total response time and the occurrences of resource contentions (for example, PSB schedule wait time, and database I/Os).

By contrast, **DBCTL** has neither transactions nor terminal end users. It does, however, work on behalf of transactions entered by CCTL terminal users. DBCTL monitoring provides data about the processing that occurs when a CCTL transaction accesses DBCTL databases. The CCTL gains this access using DRA requests.

A typical sequence of these DRA requests would be:

1. A SCHED request to get a PSB scheduled in DBCTL
2. A DL/I request to make database calls
3. A sync point request, COMMTERM, to commit the updates and release the PSB

The DBCTL process that encompasses these requests is called a unit-of-recovery (UOR).

DBCTL provides monitoring data about UORs, such as: total time UOR existed, wait time for PSB schedule, and I/Os during database calls. This information is very similar to IMS transaction monitor data. In a DBCTL-CCTL system, however, the UOR data represents only part of the total processing of a CCTL transaction. Therefore, CCTL monitor data is necessary to get a total view of CCTL transaction performance.

DBCTL does not change the format or usage of the monitor reports. There are reports and fields within reports that are not applicable to DBCTL. Generally, these are in the transaction manager and communication areas. There are some fields that are interpreted differently in a DBCTL environment.

For reports that do not apply to DBCTL, either a report heading without data is shown or a message issued and no report is produced. The term *region* in monitor reports refers to a PST assigned to a specific dependent region that processes specific IMS transactions. In DBCTL monitor reports, the term *region* still applies to a PST. A PST can service one CCTL thread (transaction) at a time. However, CCTL threads change, resulting in one PST servicing many different CCTL transactions. Since multiple CCTLs can connect to DBCTL, the PST can actually service transactions from different CCTLs.

All of the threads built for a CCTL carry the job name of the CCTL. This appears as the same job name for many regions in the Region Analysis reports.

Within a trace interval, a thread can be assigned to multiple CCTLs, but it can only be assigned to one CCTL at any time. Depending on the number of CCTLs attached to DBCTL, the Region Summary reports can show:

- One region with only one job name.
- One region with different job names.
- Multiple regions with different job names. Some regions can have the same job name and some can have different job names.
- Multiple regions with only one job name.

Any monitor report for a region is a summary of all the CCTLs a thread served during the trace interval (for example, the elapsed time for all CCTLs that a thread has been assigned to during the trace interval).

The Monitor reports are the same for BMPs and non-message BMPs.

UOR elapsed times are spent in DBCTL, not in the DRA. The time spent in the DRA is considered part of the CCTL, therefore the DRA time is not reported by any DBCTL statistics.

The Monitor reports that apply to DBCTL are:

- [Chapter 23, “Region Activity Summary reports,” on page 301](#)
- [Chapter 24, “Region Activity Analysis reports,” on page 329](#)
- [Chapter 25, “System Analysis reports,” on page 357](#)
- [“Program Activity Detail reports” on page 365](#)
- [“Program Trace report” on page 376](#)
- [“Buffer Pool and Latch Statistics reports” on page 387](#)
- [Chapter 28, “Fast Path Analysis reports,” on page 407](#)
- [Chapter 29, “Monitor Data Analysis report,” on page 425](#)

Chapter 21. Choosing Monitor reports

You probably won't want to obtain all available reports on a regular basis unless you are trying to learn about your IMS system/application environment.

Normally, the reports are used to help answer performance questions. Therefore, you should have a list of questions in mind to guide report selection and examination. If no particular clue or problem is being investigated, then you should be monitoring performance against a set of installation-derived performance threshold values.

IMS PA monitor reports are hierarchical in organization. The Region Summary report contains important overall performance indicators. From the Region Summary report, you can pursue successively more detailed information as your examination progresses through the hierarchy. For example, a high IWAITs/Call value in the Region Summary report might lead you to the Database IWAIT Summary report. Here one or more DDnames may show an abnormal rate of IWAIT occurrences and elapsed time. Next, the PSB Details reports, collated first by PCB name and then by DL/I function code and segment name, may show a high IWAIT value caused when a specified PSB issues a particular set of calls (for example, a Get Unique **(GU)** to the root followed by a Get Next within Parent **(GNP)**). Finally, a Program Trace of this PSB may identify an inefficient call sequence that can be modified to decrease IWAIT activity.

The following reports are recommended as a standard set to use in performance monitoring:

- [“Schedule/Transaction Summary report” on page 301](#)
- [“Region Summary report” on page 302](#)
- [“Database IWAIT Summary report” on page 323](#)
- [“Performance Exception reports” on page 345](#)
- [“Enqueue/Dequeue Trace report” on page 351](#)
- [“Total System IWAIT Summary report” on page 357](#)
- [“Buffer Pool and Latch Statistics reports” on page 387](#)

The recommended reports normally produce 20-30 pages of output. Greater volumes can be caused by a high number of program isolation enqueues, pool space failures, or abnormal IMS monitor record sequences that result in diagnostics.

If information found in this set of reports indicates further examination is required, you should determine what questions you want answered, modify the Report Set to obtain the necessary additional reports, and rerun. See the individual report descriptions for information regarding use of a specific report.

BMP program reports

BMPs can impact IMS performance. IMS PA includes BMP activity in its reports so that BMP impact can be understood in relation to MPP activity. However, inclusion of BMPs can mask many of the averages you may be interested in examining for MPPs.

To exclude BMPs from monitor reports, specify the global option NOBMP in the batch command. To report only BMPs, specify the global option BMPONLY in the batch command.

Note that removing BMPs from the reports does not remove their impact on certain values such as elapsed times. However, IMS PA reports many values as percentages. Examining percentages of elapsed time, for example, is a valid way of comparing reports with and without BMP reporting.

ESAF Integration

ESAF Integration is a global option that controls whether External Subsystem calls are integrated into the Region and Program/Trancode monitor reports.

The format of the command is:

ESAF Integration is a global option for monitor reporting that allows you to optionally incorporate External Subsystem information into your reports, similar to the IMS Monitor Report Print utility (DFSUTR20). When the ESAF Integration Option is activated, ESAF call statistics are reported for each subsystem and contribute to the total call and IWAIT counts for regions and program/trancodes.

External Subsystem calls are integrated into the following reports:

“Region Summary report” on page 302

Includes an additional report section called "Call data (ESAF)".

“Program Summary report” on page 315

Includes two additional report sections called "Call Analysis (ESAF)" and "PSB Comparison (ESAF)".

External Subsystem calls are divided into five categories:

- **Initialization.** Initialize, Identify, Signon, Create Thread
- **Normal Call.** Normal Call
- **Commit Ph1.** Commit Phase 1
- **Commit Ph2.** Commit Phase 2, Commit Verify
- **Termination.** Signoff, Terminate Identify, Abort, Subsystem Not Operational, Terminate Thread

“Region Analysis report” on page 329

Region Detail includes Region and Program (PSB) ESAF sections.

“Application Detail report” on page 336

The Program Summary includes two additional report sections called "Call Analysis (ESAF)" and "PSB Comparison (ESAF)".

“Performance Exception reports” on page 345

Exception Listing includes ESAF calls that exceed the Call or IWAIT thresholds. For ESAF calls, some fields have different meanings:

- The PCBname field is the External Subsystem name, suffixed with **(E)** to distinguish it from a DL/I PCB name.
- The Function Code field is the ESAF call type, followed by its associated module ID, and then the return code.

“Program Activity Detail reports” on page 365

Includes external subsystem call activity breakdown, incorporated with the DL/I call activity breakdown. For ESAF calls, some fields have different meanings:

- The PCBname field is the External Subsystem name, suffixed with **(E)** to distinguish it from a DL/I PCB name.
- The Function Code field is the ESAF call type. For example Signon, Normal Call, Commit Ph2.
- The Status Code field is the ESAF call return code.

“Program Trace report” on page 376

Includes the individual external subsystem calls in the trace, alongside the DL/I and other trace events. For ESAF calls, some fields have different meanings:

- The PCBname field is the External Subsystem name, suffixed with **(E)** to distinguish it from a DL/I PCB name.
- The PCB Feedback field is the ESAF call type. For example Signon, Normal Call, Commit Ph2.
- The Status Code field is the ESAF call return code.

Note: The “ESAF report” on page 403 is not affected by the ESAF Integration Option. When the ESAF report is requested, it will always be generated regardless of the ESAF Integration Option setting.

Alternate Sequencing

Alternate Sequencing is a global option that applies to some of the summarized monitor reports. The default sequence of resources is ascending alphabetical order by resource name. For example, by region ID, program name, transaction code, or database name. With alternate sequencing, you can request the report in descending duration order by either resource occupancy, calls (DL/I or other types), or delay (IWAIT).

Also, you can limit the number or percentage of resources reported. For example, the 10 worst performing databases or the busiest 10% of regions.

The format of the command is:

```
IMSPAMON      SORT(
                [NAME|OCCupancy|CALLs|DELAY,]
                [LIMit(nnn[%])])          default 100%
```

Alternate Sequencing strives to place the important performance data at the top of the report, saving you the effort of scanning through the entire report output.

Monitor report data is usually presented in Name sequence, for example by the resource name such as Region ID or Transaction Code. But Name sequence does not take into account the performance characteristics of the resources. The items of interest may be scattered throughout the reports. Alternate Sequencing orders resources by their performance characteristics. There are three alternate reporting sequences: Occupancy, Calls and Delay. The alternate sequencing is applied globally to most of the monitor reports where data is summarized.

Occupancy is defined as the elapsed time that a resource is being used. For example, Region Occupancy is the time that the region spends executing programs to process transactions.

Calls refers to the elapsed time that the resource spends processing DL/I (and other) calls. For example, for transactions, Calls is the time that the transaction spends processing all types of DL/I (and optionally ESAF) calls.

Delay is defined as the elapsed time that the resource waits for IWAIT events to complete. Note that IMS PA classifies an ESAF call as an IWAIT event.

Occupancy, Calls and Delay sequencing is always reported in descending sequence. For example, the regions with the highest occupancy or the worst performing databases are located at the top of the report.

For some resources, not all of the alternate sequences are applicable. In these cases, IMS PA will use a sequence that honors the intent of the request. For example, when Occupancy or Call sequencing is requested, the Database IWAIT report will be ordered by Delay.

When Occupancy, Calls or Delay sequencing is requested, you can specify a **Limit** to control the amount of data reported. The Limit can be:

- A percentage. For example, specify 10% to restrict reporting to the top ten percent of resources being reported. A percentage is useful because a different number is applied appropriate to each report type. For example, the top 10 high occupancy regions from a total region count of 100, or the top 100 worst performing databases from a total database count of 1000.

The numbers are rounded up. For example, 10% of 1 record is reported as 1, 35% and 60% of 3 records is reported as 2.

- A value. For example, specify 50 to restrict reporting to the top fifty resource users. A value can be useful to restrict report output to a maximum of one or two pages.

Reports that are truncated by a Limit have an additional report line identified by "Limit" or "Lim". The Limit line is the total for the reported (or limited) data only.

Following the Limit line is usually the actual or Grand Total. This is unaffected by Limiting and is the total of all (100%) of the data.

Warning

Take care when interpreting report output that is ordered by Occupancy, Calls and Delay, especially when Limit is in effect. Alternate sequencing is only applied to one resource per report, usually the primary resource. For example, the Region Summary report has several subreports that breakdown region activity by scheduling, transactions and DL/I calls. When Delay sequencing is requested, IMS PA first orders the regions (primary resource) by their total IWAIT elapsed time, usually a combination of scheduling, database and other IWAIT events. All subreports are then presented in total Region IWAIT elapsed time sequence.

Consider the following scenario:

- Region 1 has low scheduling IWAITs and high database IWAITs totaling 100 seconds,
- Region 2 has average scheduling IWAITs and average database IWAITs totaling 110 seconds,
- Region 3 has high scheduling IWAITs and low database IWAITs totaling 120 seconds.

The Region Summary report, sequenced by Delay with a limit of 66%, will report Regions 3 then 2 only. Region 1 will not appear in any subreports.

The DL/I call report will not show Region 1 at all, even though it has the most database IWAIT activity.

There are two reasons why IMS PA does this:

- All subreports will appear in the same region sequence, just like the reports do in Name sequence. Then you can compare the resources of one subreport with those of the next subreport, knowing they are for the same region.
- The focus of the report is on all Region IWAIT activity, not just database IWAIT activity. You can review the database IWAITs in the Call data subreport and make an assessment as to whether they are a major contributor to the total Region IWAIT time.

For database IWAIT analysis, you should use the Database IWAIT reports. This is where Delay is calculated on database IWAIT activity only.

Report reference tables

Alternate Sequencing is not applicable to all monitor reports. The following table shows which reports can employ Alternate Sequencing, which type of sequencing is applicable to each report (O=Occupancy, C=Calls, D=Delay), and gives a link to an example.

Table 18. Alternate Sequencing: Applicable monitor reports and sequencing options

Report	Sequencing resource	Sequencing option			Example
		O	C	D	
“Region Summary report” on page 302	Region	O	C	D	Figure 137 on page 309
“Program Summary report” on page 315 (PSB)	Program	O	C	D	Figure 142 on page 322
“Database IWAIT Summary report” on page 323	Database	D	D	D	Figure 144 on page 324
“Region Analysis report” on page 329					
Region Analysis: Program Summary	Program	O	C	D	Figure 152 on page 336
Region Analysis: Database IWAIT Summary	Database	D	D	D	
“Database IWAIT Analysis report” on page 340	Database	D	D	D	Figure 158 on page 343
“Enqueue/Dequeue Trace report” on page 351					

Table 18. Alternate Sequencing: Applicable monitor reports and sequencing options (continued)

Report	Sequencing resource	Sequencing option			Example
		O	C	D	
Enqueue/Dequeue Trace: Summary by Database	Database	D	D	D	Figure 167 on page 353
Enqueue/Dequeue Trace: Summary by Transaction Code	Database	D	D	D	Figure 170 on page 354
“Total System IWAIT Summary report” on page 357					
Total System IWAIT: Total System IWAIT Detail: Database IWAITs	Database	D	D	D	Figure 179 on page 364
Total System IWAIT: Total System IWAIT Detail: ACBLIB Block Loading IWAITs	Data Set	D	D	D	
Total System IWAIT: Total System IWAIT Detail: ACBLIB Miscellaneous IWAITs	Data Set	D	D	D	Figure 179 on page 364
Total System IWAIT: Total System IWAIT Detail: MFS Directory I/O	Data Set	D	D	D	
Total System IWAIT: Total System IWAIT Detail: MFS Block Read I/O	Data Set	D	D	D	
Total System IWAIT: Total System IWAIT Detail: Line/Node Interrupts	Line/Node	D	D	D	Figure 179 on page 364
Total System IWAIT: Total System IWAIT Detail: Database IWAITs	Database	D	D	D	Figure 179 on page 364
“Communication reports” on page 391					
Communication: Communication Summary	Communications	O	O	D	Figure 204 on page 393
Communication: Communication IWAIT	Communications	D	D	D	Figure 206 on page 395
Communication: Line Functions	Communications	O	O	O	Figure 208 on page 398
“MSC reports” on page 398					
MSC: MSC Summary	MSC	C	C	C	Figure 210 on page 399
MSC: MSC Traffic	MSC	C	C	C	Figure 212 on page 401
MSC: MSC Queuing Summary	MSC	D	D	D	
“ESAF report” on page 403	ESAF	C	C	C	Figure 214 on page 403
“Synchronous Callout report” on page 405	SYNCCOUT				Figure 218 on page 406
DEDB Resource Contention	DEDB	D	D	D	Figure 220 on page 409
“Fast Path Buffer Statistics report” on page 411	Fast Path Buffers	C	C	D	Figure 223 on page 413

Table 18. Alternate Sequencing: Applicable monitor reports and sequencing options (continued)

Report	Sequencing resource	Sequencing option			Example
		O	C	D	
“VSO Summary report” on page 419					
VSO Summary: I/O Activities (SHARELVL 0/1)	VSO Data Space	C	C	D	
VSO Summary: I/O Activities (SHARELVL 2/3)	VSO CF	C	C	D	Figure 227 on page 421
VSO Summary: DEDB Write IWAIT	DEDB	D	D	D	Figure 227 on page 421
VSO Summary: CF I/O Wait	VSO CF Read/Write	D	D	D	Figure 227 on page 421

Let's look at three examples from the above table:

- The **Region Summary** report can be sequenced by Occupancy (O), Calls (C), or Delay (D). The table shows this with an O, C, and D in their respective columns.
- The **Database IWAIT Summary** report can only be sequenced by Delay (D). Consequently, if you request this report with sequencing by Occupancy (O) or Calls (C), IMS Performance Analyzer will instead sequence the report by the next best option, Delay (D). That is, O and C are translated to D. The table shows this by a D in the D column but also in the O and C columns.
- The **Communication Summary** report can be sequenced by Occupancy (O) or Delay (D). If you request this report with sequencing by Calls (C), IMS Performance Analyzer will instead sequence the report by the next best option, Occupancy (O). That is, C is translated to O. The table shows this by a D in the D column, an O in the O column but also in the C column.

Sequencing resource reference table

The interpretation of Occupancy, Calls and Delay differs according to the resource to which it applies. The following table summarizes the differences.

Table 19. Alternate Sequencing: What the reports are sequenced on

Sequencing Resource	Occupancy (O)	Calls (C)	Delay (D)
Region	Total Scheduled Elapsed Time	Total Call Elapsed Time for Region	Total IWAIT Elapsed Time for Region
Program	Total Scheduled Elapsed Time	Total Call Elapsed Time for Program	Total IWAIT Elapsed Time for Program
Database			Total IWAIT Elapsed Time for Database
Data Set			Total IWAIT Elapsed Time for Data Set
DEDB			Total IWAIT Elapsed Time for DEDB
Line/Node	Total Elapsed Time		Total IWAIT Elapsed Time for Line/Node
Communications	Dispatch Elapsed Time		Dispatch IWAIT Elapsed Time
MSC		Total Enqueue Count	Total IWAIT Elapsed Time

Table 19. Alternate Sequencing: What the reports are sequenced on (continued)

Sequencing Resource	Occupancy (O)	Calls (C)	Delay (D)
ESAF		Total Call Elapsed Time	
Fast Path Buffers		Total Buffer Requests	Total Buffer Steals
VSO Data Space		Total VSO Read+Write Counts	Total DASD Read+Write Counts
VSO CF		Total VSO Read+Write Counts	Total DASD Read+Write Counts
VSO CF Read/Write			Total Read+Write IWAIT Elapsed Time

Chapter 22. Monitor report reference tables

The reference tables list the IMS Performance Analyzer monitor reports and batch commands with cross-references to sample reports, distributions, and object lists.

For examples of using the batch commands, refer to "Monitor batch interface" in the *IMS Performance Analyzer for z/OS: User's Guide*.

Table 20. Monitor reports: Batch commands and output examples

Report	IMSPAMON command	Examples
Region Activity Summary reports		
“Schedule/Transaction Summary report” on page 301	SCHEDTRAN	“Schedule/Transaction Summary report” on page 301
“Region Summary report” on page 302	REGSUM	Figure 134 on page 307
“Program Summary report” on page 315	PROGSUM	“Program Summary report” on page 315
“Database IWAIT Summary report” on page 323	DBIWAITSUM	“Database IWAIT Summary report” on page 323
“Database IWAIT Summary report” on page 323: DDgroup	DDGRP (DBIWAITSUM)	“Database IWAIT Summary report” on page 323
“Transactions by Time Period report” on page 326	TIMEREPORT	“Transactions by Time Period report” on page 326
Region Activity Analysis reports		
“Region Analysis report” on page 329	REGANAL (. . .)	
Region Analysis: Region Detail	REGANAL (REGDETL)	“Region Analysis report” on page 329
Region Analysis: Program Summary	REGANAL (PROGSUM)	“Region Analysis report” on page 329
Region Analysis: Database IWAIT Summary	REGANAL (DBIWAITSUM)	“Region Analysis report” on page 329
Region Analysis: Transactions by Time Period	REGANAL (TIMEREPORT)	“Region Analysis report” on page 329
“Application Detail report” on page 336	APPLGRP (. . .)	
Application Detail: Program Summary	APPLGRP (PROGSUM)	“Application Detail report” on page 336
Application Detail: Transactions by Time Period	APPLGRP (TIMEREPORT)	“Application Detail report” on page 336
Application Detail: showing distributions		“Application Detail report” on page 336

Table 20. Monitor reports: Batch commands and output examples (continued)

Report	IMSPAMON command	Examples
“Database IWAIT Analysis report” on page 340	DBIWAITANAL (. . .)	
Database IWAIT Analysis: (with distributions)	DBIWAITANAL (DISTRIBUTIONS)	“Database IWAIT Analysis report” on page 340
“DDgroup report” on page 343	DDGRP (. . .)	
DDgroup: Database IWAIT Analysis (with distributions)	DDGRP (DBIWAITANAL (DISTRIBUTIONS))	“DDgroup report” on page 343
“Performance Exception reports” on page 345	EXCEPTION (. . .)	
Performance Exceptions: Exception Listing	EXCEPTION (LISTING)	Figure 161 on page 346
Performance Exceptions: Intent Failure Summary	EXCEPTION (INTENT)	Figure 163 on page 350
Performance Exceptions: Pool Space Failure Summary	EXCEPTION (POOL)	Figure 164 on page 350
Performance Exceptions: Deadlock Event Summary	EXCEPTION (DEADLOCK)	Figure 165 on page 351
“Enqueue/Dequeue Trace report” on page 351	ENQTRACE (. . .)	
Enqueue/Dequeue Trace: Detailed Trace	ENQTRACE (TRACE)	Figure 166 on page 352
Enqueue/Dequeue Trace: Summary by Database	ENQTRACE (SUMMDB)	Figure 167 on page 353
Enqueue/Dequeue Trace: Summary by Transaction Code	ENQTRACE (SUMMTC)	Figure 169 on page 353
“Region Histogram report” on page 354	HISTOGRAM	“Region Histogram report” on page 354
System Analysis reports		
“Total System IWAIT Summary report” on page 357 (with distributions)	TSIWAIT (SUMMARY)	“Total System IWAIT Summary report” on page 357
“Total System IWAIT Detail report” on page 361	TSIWAIT (DETAIL)	“Total System IWAIT Detail report” on page 361
Total System IWAIT Detail: Database IWAITs		Figure 174 on page 362
Total System IWAIT Detail: ACBLIB Block Loading IWAITs		Figure 175 on page 363
Total System IWAIT Detail: ACBLIB Miscellaneous IWAITs		Figure 175 on page 363
Total System IWAIT Detail: MFS Directory I/O		Figure 176 on page 363
Total System IWAIT Detail: MFS Block Read I/O		Figure 176 on page 363
Total System IWAIT Detail: Line/Node Interrupts		Figure 177 on page 363
Total System IWAIT Detail: showing distributions		Figure 178 on page 364

Table 20. Monitor reports: Batch commands and output examples (continued)

Report	IMSPAMON command	Examples
Program Analysis reports		
“Program Activity Detail reports” on page 365	PSBREPORTS (. . .)	
Program Activity Detail: “PSB Details reports” on page 365	PSBREPORTS (BYREPORT , . . .)	
Program Activity Detail: PSB Details-PCB Totals	always produced	Figure 180 on page 368
Program Activity Detail: PSB Details by Function Code	PSBREPORTS (BYREPORT , FUNCTION)	Figure 181 on page 368
Program Activity Detail: PSB Details by Function Code-Segment Name	PSBREPORTS (BYREPORT , FUNCTION-SEGNAME)	Figure 182 on page 369
Program Activity Detail: PSB Details by Segment Name Feedback	PSBREPORTS (BYREPORT , SEGNAME)	Figure 183 on page 369
Program Activity Detail: PSB Details-PCB Totals (DD)	PSBREPORTS (BYREPORT , DDNAME)	Figure 184 on page 370
Program Activity Detail: PSB Details by DDname IWAITed On	PSBREPORTS (BYREPORT , DDNAME)	Figure 185 on page 370
Program Activity Detail: PSB Details by Function Code (DD)	PSBREPORTS (BYREPORT , FUNCTION-DDNAME)	Figure 186 on page 371
Program Activity Detail: PSB Details by Function Code DDname	PSBREPORTS (BYREPORT , FUNCTION-DDNAME)	Figure 187 on page 371
Program Activity Detail: “PSB-Transaction Code Analysis report” on page 372	PSBREPORTS (BYPSB , . . .)	Figure 189 on page 374
Program Activity Detail: “DDname by PSB-Transaction Code report” on page 375	PSBREPORTS (DDNAME - PSB)	Figure 192 on page 376
“Program Trace report” on page 376	TRACE (. . .)	
Program Trace: Short	TRACE (SHORT)	Figure 193 on page 378
Program Trace: Long	TRACE (LONG)	Figure 194 on page 379
Program Trace: Summary	TRACE (SUMMARY)	Figure 195 on page 379
“Batch VSAM Statistics report” on page 382	VSAMSTAT	“Batch VSAM Statistics report” on page 382
Resource Usage reports		
“Buffer Pool and Latch Statistics reports” on page 387	STATIS	Figure 198 on page 388
“Communication reports” on page 391	COMMS (. . .)	
Communication: Communication Summary (with distributions)	COMMS (SUMMARY)	Figure 203 on page 392
Communication: Communication IWAIT (with distributions)	COMMS (IWAIT)	Figure 205 on page 394
Communication: Line Functions (with distributions)	COMMS (LINEFUNC)	Figure 207 on page 396
“MSC reports” on page 398	MSC (. . .)	

Table 20. Monitor reports: Batch commands and output examples (continued)

Report	IMSPAMON command	Examples
MSC: MSC Summary	MSC (SUMMARY)	Figure 209 on page 399
MSC: MSC Traffic	MSC (TRAFFIC)	Figure 211 on page 400
MSC: MSC Queuing Summary (with distributions)	MSC (QUEUING)	Figure 213 on page 401
“ESAF report” on page 403	ESAF	“ESAF report” on page 403
“Synchronous Callout report” on page 405	SYNCCOUT	Figure 218 on page 406
Fast Path Analysis reports		
“DEDB Resource Contention report” on page 407 (summary with distributions)	FPRSCONT	Figure 219 on page 408
“Fast Path Buffer Statistics report” on page 411 (with distributions)	FPBUFFER	Figure 222 on page 412
“BALG/Shared EMHQ Analysis report” on page 414 (with distributions)	FPBALG	Figure 224 on page 415
“OThread Analysis report” on page 416 (with distributions)	FPOTHRD	Figure 225 on page 417
“VSO Summary report” on page 419	FPVSOSUM	Figure 226 on page 420
Monitor Data Analysis report		
“Monitor Record Trace report” on page 425	SLOGTRC	“Monitor Record Trace report” on page 425

The following tables show which of the IMS PA monitor reports use Distributions. They also show the applicable sample Distributions.

Table 21. Monitor global options: Distributions

Report Set Global Option	Sample Distributions
Monitor Global	
Monitor Global: Distributions Options	ELAPSCH, ELAPCAL, ELAPIWT, IWTSCAL
Transactions by Time Period	
Application Grouping	
DDname Grouping	
“ESAF Integration” on page 285	
“Alternate Sequencing” on page 287	

Table 22. Monitor reports: Distributions

Report	Sample Distributions
Region Activity Summary reports	
“Schedule/Transaction Summary report” on page 301	

Table 22. Monitor reports: Distributions (continued)

Report	Sample Distributions
“Region Summary report” on page 302	
“Region Summary report” on page 302 (PSB)	
“Database IWAIT Summary report” on page 323	
“Transactions by Time Period report” on page 326	
Region Activity Analysis reports	
“Region Analysis report” on page 329	
Region Analysis: Region Detail	
Region Analysis: Program Summary	
Region Analysis: Database IWAIT Summary	
Region Analysis: Transactions by Time Period	
“Application Detail report” on page 336	Global Options: ELAPSCH, ELAPCAL, ELAPIWT, IWTSCAL
Application Detail: Program Summary	
Application Detail: Transactions by Time Period	
“Database IWAIT Analysis report” on page 340	DDIWELAP
“Performance Exception reports” on page 345	
Performance Exceptions: Exception Listing	Global Options: ELAPCAL, ELAPIWT, IWTSCAL (upper limits only)
Performance Exceptions: Intent Failure Summary	
Performance Exceptions: Pool Space Failure Summary	
Performance Exceptions: Deadlock Event Summary	
“Enqueue/Dequeue Trace report” on page 351	
“Region Histogram report” on page 354	
System Analysis reports	
“Total System IWAIT Summary report” on page 357	IWTSUMMY
“Total System IWAIT Detail report” on page 361	IWTSUMMY
Program Analysis reports	

Table 22. Monitor reports: Distributions (continued)

Report	Sample Distributions
“Program Activity Detail reports” on page 365	
Program Activity Detail: “PSB Details reports” on page 365	
Program Activity Detail: “PSB-Transaction Code Analysis report” on page 372	Global Options: ELAPSCH, ELAPCAL, ELAPIWT, IWTSCAL
Program Activity Detail: “DDname by PSB-Transaction Code report” on page 375	
“Program Trace report” on page 376	
Program Trace: Short	
Program Trace: Long	
Program Trace: Summary	Global Options: ELAPCAL, ELAPIWT, IWTSCAL
“Batch VSAM Statistics report” on page 382	
Resource Usage reports	
“Buffer Pool and Latch Statistics reports” on page 387	
“Communication reports” on page 391	
Communication: Communication Summary	COMMELP
Communication: Communication IWAIT	COMMIWE
Communication: Line Functions	COMMLFT, COMMLFR
“MSC reports” on page 398	
MSC: MSC Summary	
MSC: MSC Traffic	
MSC: MSC Queuing Summary	MSCQLEN, MSCQELP
“ESAF report” on page 403	
“Synchronous Callout report” on page 405	
Fast Path Analysis reports	
“DEDB Resource Contention report” on page 407 (summary with distributions)	FPRCLIW
“Fast Path Buffer Statistics report” on page 411	FPBSCNT
“BALG/Shared EMHQ Analysis report” on page 414	FPBGQLN, FPBGELP
“OTHREAD Analysis report” on page 416	FPOTACT, FPOTWTA, FPOTBOQ
“VSO Summary report” on page 419	
Monitor Data Analysis report	

Table 22. Monitor reports: Distributions (continued)

Report

Sample Distributions

“Monitor Record Trace report” on page 425

The following table shows which IMS PA monitor reports support filtering of monitor records using Selection Criteria. It also shows the applicable Object List types.

Report	Object List Type																							
	AP GRP	AREA	BLK ID	CLASS	DB	DD	DD GRP	ESS ID	IMS ID	KEY	LINE	LN/ PT	LTERM	MSG ID	NODE	PROG	REC CD	RG JOB	RG PST	RT CDE	TRAN	USER ID	USR DEF	
Options																								
Monitor Global	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Y	-	-	-	-	-	-	-	
Transactions by Time Period	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Application Grouping	Y	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Y	-	-	-	-	-	-	-	
DDname Grouping	-	-	-	-	-	Y	Y	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
ESAF Integration	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Alternate Sequencing	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Region Activity Summary reports																								
Schedule/Transaction Summary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Y ¹	-	-	-	-	-	-	-	
Region Summary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Y ¹	-	-	-	-	-	-	-	
Program (PSB) Summary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Y ¹	-	-	-	-	-	-	-	
Database IWAIT Summary	-	-	-	-	-	Y ²	Y ²	-	-	-	-	-	-	-	-	Y ¹	-	-	-	-	-	-	-	
Transactions by Time Period	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Y ¹	-	-	-	-	-	-	-	
Region Activity Analysis reports																								
Region Analysis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Y ¹	-	-	-	-	-	-	-	
Application Detail	Y ³	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Y ¹	-	-	-	-	-	-	-	
Database IWAIT Analysis	-	-	-	-	-	Y ²	Y ²	-	-	-	-	-	-	-	-	Y ¹	-	-	-	-	-	-	-	
Performance Exceptions	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Y ¹	-	-	-	-	-	-	-	
Exception Listing	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Y ¹	-	-	-	-	-	-	-	
Intent Failure Summary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Pool Space Failure Summary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Deadlock Event Summary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Enqueue/Dequeue Trace	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Y	-	-	-	-	
Region Histogram	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
System Analysis reports																								
Total System IWAIT Summary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Total System IWAIT Detail	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Program Analysis reports																								
Program Activity Detail	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Y ¹	-	-	-	-	-	-	-	
Program Trace	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Y ¹	-	-	-	-	-	-	-	
Batch VSAM Statistics	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Resource Usage reports																								
Buffer Pool and Latch Statistics	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Communication	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
MSC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
ESAF	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Y ¹	-	-	-	-	-	-	-	
Synchronous Callout	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Fast Path Analysis reports																								
DEDB Resource Contention Summary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
FP Buffer Statistics	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
BALG/Shared EMHQ Analysis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
OTHRD Analysis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
VSO Summary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Monitor Data Analysis report																								
Monitor Record Trace	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Comments:																								
¹ . Records can be filtered on Program Name (PSB) using the Monitor Global Options Selection Criteria.																								
² . The report uses DDname Groups specified in the DDname Grouping Options.																								
³ . The report uses Application Groups specified in the Application Grouping Options.																								

Figure 132. Monitor reports: Selection Criteria (Object Lists)

Chapter 23. Region Activity Summary reports

These reports summarize the activity of all dependent regions.

They provide a system-wide overview of the following:

- Region occupancy
- Program scheduling, including IWAITs
- Transaction throughput and response time
- DL/I call activity
- Database IWAITs

Each summary report summarizes the activity of all dependent regions into a single "total system" report. The same information is produced separately for each region by the "Region Analysis report" on page 329. The Schedule/Transaction Summary report is an exception; it presents total system activity only and cannot be requested for a specific region.

Schedule/Transaction Summary report

The IMS Schedule/Transaction Summary report presents a compact summary of total schedulings and transaction counts over all regions for the entire trace period.

Monitor records: This report is derived from monitor records 02-29, 38-39, 47, 56-65.

Options

To obtain the Schedule/Transaction Summary report, activate the **Schedule/Transaction** summary report in a Monitor Report Set. There are no report-specific options for this report, but monitor global options apply.

Report output is sent to the DDname specified in Summary Report Output DDname on the Monitor Global Options panel.

Content

Report from 17Feb2020 13:28:37:11		IMS Performance Analyzer Schedule/Transaction Summary				Report to 17Feb2020 13:40:00:87	

Schedules completed	164	Transacts=	166	Trans/Schd	1.01		
Schedules generated	105	Transacts=	105	Trans/Schd	1.00		
Schedules incomplete	0	Transacts=	0	Trans/Schd	.00		
WFI-made schedules	123	Transacts=	156	Trans/Schd	1.27		
Term Rec Tran count	217						
Estimated Backouts =	7						

Figure 133. IMS Performance Analyzer Schedule/Transaction Summary report

The Schedule/Transaction Summary report contains the following information:

Schedules completed

Number of application program schedulings for which complete IMS monitor information was read from the input data set.

Schedules generated

Number of application programs already executing at the beginning of the trace period. At most, there can be one such event per region.

Schedules incomplete

Number of application programs executing at the end of the trace period. At most, there can be one such event per region. This value includes all BMPs that do not access the message queue. It also includes both the number of schedules in progress and those where no GU is issued to the I/O PCB. For each such occurrence, an entry is printed in the exception report.

WFI-made schedules

Number of times a WFI or IFP dependent region was reactivated after being in IWAIT state for a no-message condition.

For each of the preceding four items, two additional values are given:

Transacts

Associated transaction counts as determined by IMS Performance Analyzer processing logic.

Trans/Schd

Quotient of the number of transactions divided by the number of schedules.

The final two lines of the Schedule/Transaction Summary report are as follows:

Term Rec Tran count

Total number of transactions dequeued from the message queue for scheduling as reported in the IMS monitor termination records.

Estimated Backouts

Number of inferred transaction backouts based on the difference between IMS Performance Analyzer computed transaction dequeue counts and IMS Monitor termination record dequeue counts for individual program schedulings.

Region Summary report

The IMS Region Summary report is an analysis of schedule, transaction, call, and IWAIT activity as well as an analysis of region idle time for each active MPP region. Summary distribution graphs of activity can also be provided. The report contains the same details as the Region Detail report (part of the Region Analysis report). The Region Summary report groups data by type (for example, schedule data for all regions) to provide convenient comparison of one measure across all regions. The Region Detail report groups data by region, to allow all the measures for a region to be viewed together.

Note: The Region Summary report is not produced from DB Monitor data since control region scheduler records are not available. However, a Region Detail report for region 1 can be produced. See [“Region Analysis report”](#) on page 329.

Monitor records: This report is derived from monitor records 02-29, 38-39, 47-49, 56-65.

Uses

The Region Summary report provides a wealth of useful performance information. It is the primary IMS Performance Analyzer report for generally monitoring and assessing overall IMS performance.

If you have a good understanding of your own system, the IMS monitor, and IMS Performance Analyzer, the Region Summary report can help you assess such factors as:

- IMS scheduling pool allocation problems
- I/O data set contention possibilities
- Database organization and design deficiencies
- Application design deficiencies
- Dependent region CPU availability
- CPU loading
- Workload distribution problems

Familiarity with the IMS system in use and regular experience using IMS Performance Analyzer will determine which information is of interest to your installation. This subsection describes items in the

Region Summary report as an introduction to new users of IMS monitor data. Specific indicators usually cannot be interpreted outside the context of other values or of the historical perspective of a specific system. Performance indicators can also be distorted or masked by other interacting factors.

Usually, the main consideration when monitoring IMS TM performance is end-user response time. Availability of resources and efficient use of resources by IMS directly affect response time. Efficiency of resource use is significantly affected by MPP and database design, together with user definitions of various IMS system parameters.

To the experienced user, the Region Summary report provides general indications of resource availability, overall workload and its distribution among the regions, efficiency of resource use, and program/database design efficiency.

Performance indicators

Region Summary values are discussed in the following categories:

- Resource utilization indicators for CPU, I/O, and storage
- Database and application efficiency indicators
- Scheduling efficiency and workload indicators

The following discussion describes many but not all of the values in the Region Summary report. Some sample interpretations of the values are offered, together with suggestions for proceeding to related reports. Guideline performance values mentioned are for a single environment and are given for the sake of example only; they must be either adjusted or ignored for a particular installation because of the many variables affecting the guidelines. The intent is to encourage you to develop a systematic approach to analysis and to tailor it to your environment, based on your own unique performance objectives. See the *IMS Performance Guide* for a complete discussion of performance.

CPU Resource Utilization Indicators

You can use the Region Summary report to ask questions and draw inferences about CPU availability and utilization.

For example: Does the IMS control region have sufficient CPU resource to service its dependent regions in a timely manner? If the average amount of not-IWAIT time (Sched NotIWT) is excessive, then sufficient CPU resources may not be available. Excessive paging or a low dispatching priority may be responsible. The Sched NotIWT value acts as a barometer of system performance. A reasonable value varies with the installation, especially for different CPUs. Probably the best way to determine a good value is to use a run made under low system utilization conditions.

Dependent region controller time is included in the interval from schedule end until the first DL/I call (Sch-DLI). If the value is excessive, one or more of the following could be responsible: swapping, program library activity and location, dispatching priority, and/or paging. Since this interval includes program fetch activities, library search order and module distributions on direct-access devices also influence the time.

I/O Resource Utilization Indicators

The **Elapsed/IWAIT** distributions at the bottom of the Region Summary report are key indicators of the effectiveness of dependent region I/O activity. The distributions account for both message queue and database IWAITs.

An excessive **average IWAIT time** may indicate database design problems or, more generally, I/O path contention or inefficient seek patterns that could be relieved by better data set placement both within and across the volumes.

An excessive **maximum IWAIT elapsed time** may reflect situations such as OPEN activity for DMBs, shared direct-access lockouts by another system, or a spontaneous operational problem. The report sample value of 15.4 milliseconds for the average elapsed IWAIT falls within normal limits. The maximum IWAIT value bears monitoring to see if a consistent pattern exists. See the Database IWAIT Summary report for detailed IWAIT data for each DDname.

Storage Resource Utilization Indicators

Misallocation of scheduling pools (DMB, PSB, PSBW) can reduce throughput and increase response times. The most serious effects are caused by pool space failures, which prevent scheduling of transactions.

Pool space failures are identified by a type 82 monitor record. IMS Performance Analyzer prints a separate diagnostic message for each failure, which could result in many pages of output. Pool space failures are a serious problem that must be corrected. A summary of pool space failures can be obtained from the Pool Space Failure report which is one of the Performance Exception reports. After eliminating pool space failures, your next concern should be to balance ACBLIB I/O activity against paging that can result from large pools.

The Region Summary report's **Blk Ldr Busy** column includes both IWAIT time for ACBLIB I/Os requested by the IMS block loader module and non-I/O IWAITs by the scheduler waiting to use the block loader service. These factors are separately identified in the System IWAIT Summary report. The number of non-I/O IWAITs should be very small or a serious scheduling bottleneck may exist. The nominal target for a maximum acceptable number of ACBLIB IWAITs is one per schedule. [Figure 134 on page 307](#) shows 29 Blk Ldr Busy IWAITs versus 24 schedules, and looks satisfactory. Refer to the Total System IWAIT Summary report to see IWAITs per ACBLIB block type and the Total System IWAIT Analysis reports for IWAIT activity by individual DMB, PSB, and intent list name. An even better indication of the effect of block loading is presented under the **Bldr** portion of the **Percents of Region Idle Time** part of the Region Summary report.

Database buffer pool allocations that are significantly insufficient may be reflected in the **IWTs/Call** value under **DATABASE CALLS** ([Figure 134 on page 307](#)). If this value seems excessive, either of two reports may help verify whether the database buffer pool size is contributing to the IWTs/Call excess: DDname by PSB-Transaction Code or PSB-Transaction Code Analysis. Either report may show IWAITs for DDnames not used by the specified PSB resulting from buffer wash activity. An optional exception report entry is available each time a DL/I call results in more IWAITs than the maximum limit value of the **IWAITs/Call** distribution at the bottom of the report. In this case, an exception entry is generated if the number of IWAITs for a call exceeds 8, or the IWAITs per Call maximum is specified when selecting the performance exception; if no such calls occurred, no exception entry is generated.

Database and Application Efficiency Indicators

The two prime indicators of database and application efficiency appear below **DATABASE CALLS** in the **Calls/Tran** and **IWTs/Call** columns. Database and application design objectives should minimize the number of DL/I calls per transaction and the number of IWAITs per DL/I call.

The two prime indicators of database and application efficiency appear below **DATABASE CALLS** in the **Calls/Tran** and **IWTs/Call** columns. Database and application design objectives should minimize the number of DL/I calls per transaction and the number of IWAITs per DL/I call. Inefficient database design leads to both an excessive number of I/Os per call and contention between applications for database records. Applications should be sensitive to their influence on response time and avoid issuing redundant or inefficient call patterns. A high number of DL/I calls per transaction increases response time and indicate inappropriate call patterns for a response-time sensitive environment. Either the application should be a BMP and scheduled as such, or the application should be examined as a candidate for redesign. See the Program Summary report to identify applications that issue many DL/I calls; then see the PSB Details or PSB-Transaction Code Analysis reports for CALL activity for specific databases.

A high number of **IWAITs per DL/I call** also increases response time and indicates several possibilities. First, whatever the acceptable guideline for an installation, IWAITs per call should remain fairly constant with time. This value should be monitored regularly to detect an increasing rate of IWAITs per call, which indicates that:

- Twin chains are developing, signalling the need for reorganization
- The HDAM randomizer algorithm may no longer be effective

DBT can be useful in analyzing these conditions.

A high number of IWAITs per call may also indicate heavy use of logical relationships and/or secondary indexing. Review the PSB Details-PCB Totals report to assess these possibilities.

Applications may be responsible for the IWAITs per call rate based on their DL/I call patterns. Look at the Program Summary report for PSBs with high IWAITs per call and then the PSB-Transaction Code Analysis and/or Program Trace reports. Significant performance improvements have been realized through application redesign that eliminates unnecessarily complex or redundant calls.

Figure 134 on page 307 shows 0.32 IWAITs per call, which is below the guideline figure of 0.5. The Database IWAIT Summary can be examined to identify specific violations of the low IWAITs per call objectives. However, the most convenient way to monitor IWAITs per call violations is to set the maximum value for the IWAITs per call distributions to the installation performance objective; then the Exception Listing report can pinpoint the violations. Refer to the PSB Details reports to examine IWAITs per call data for each PCB/PSB combination.

Scheduling Efficiency and Workload Indicators

Several values serve as indicators of both workload level and workload distribution. For example: Call/sec, IWTs/sec, Idle time, Elap/Sched, Sch-DLI, PI enqueues.

Call/sec and IWTs/sec

The **Call/sec** and **IWTs/sec** columns in the **Schedule data** section can be used to estimate if the call and I/O load can be handled by the system. If the Call/sec rate is high for the particular installation call mix, then the system may be taxed to capacity regardless of other contradictory factors, such as a low transaction processing rate. This might occur during heavy BMP processing. A given system with a constant average call path length has a maximum Call/sec limit it can handle. Running BMPs, for example, increases the call rate, active time, and response time, and decreases transaction throughput and idle time. Likewise, a given CPU/channel configuration will reach a limit value of IWTs/sec. The danger or saturation level values for Call/sec and IWTs/sec must be derived for a specific installation either from experience or reasonable estimates.

Figure 134 on page 307 shows a Call/sec value of 7.57. An intuitive estimate for the limit of this system based on experience is 60 to 70 Call/sec. Therefore, the system is only at 12% of the limit.

Another possible use for Call/sec is to get an idea of the average type of database processing. Sequential processing should show a higher call rate than random processing.

Idle time

An analysis of Idle time and related values can help assess whether the transaction load is being efficiently handled and whether either insufficient or excessive message processing regions (MPRs) have been assigned. An MPR is analogous to a single server queue, whose response time decreases rapidly as service time increases from 60%. Therefore, if the **Idle** column for an MPR shows much less than 35% to 40%, then response time is probably slow. In this case, response time may improve by using an additional MPR to distribute the transaction load (assuming other bottlenecks do not exist). Conversely, if the Idle time is high, such as 80% to 90%, there are probably more regions than necessary.

When Idle time is very low, the MPR is processing close to its limits and, therefore, transaction queues are probably growing in length. Queue growth is not necessarily proportional to message arrival rate, but can also occur as a result of program-to-program message switching. Program switching should be reserved for special situations because of the additional overhead incurred. Program switching activity is detectable in the PSB Detail by DDname IWAITd On report when a transaction code appears in the **PCBname** column and **QBLKS**, **LGMSG**, or **SHMSG** appears in the **DDname** column.

Elap/Sched and Sch-DLI

If the **Elap/Sched** and **Sch-DLI** times increase significantly from region to region, then there may be insufficient CPU resource available to the MPRs to warrant additional regions. Reallocation of dispatching priorities relative to non-IMS applications is a possible solution. See the RMF reports to verify whether this would be appropriate.

Figure 134 on page 307 shows moderate activity in all regions (**Idle** varies from 0.10% to 77.92%). The **Trans/Schd** column reports 1.17 indicating that, on the average, 0.17 additional transactions are processed during each schedule.

Another aspect of Idle time is how its components are distributed. Ideally, Idle time should be a result of control region scheduler IWAITS due to the absence of transactions to schedule. Check the **Percents of Region Idle Time** section of the Region Summary report. This section shows how the Idle time is spent. Generally, when the dependent regions are not busy, it is because there are no messages to be processed. Now look at the **No Messages** section, which shows how many scheduler IWAITS occurred and the average elapsed time for IWAITS due to no messages. From these values, you can derive overall indications of the message arrival pattern. If the frequency of IWAITS is high and the average elapsed time is low, then the arrival rate is probably fairly even. Conversely, if the IWAIT frequency is low but the times are high, then messages may be arriving in bursts. Periods of activity/inactivity can be seen in the Region Histogram report or, more generally, in the Transactions by Time Period report. Graphic distribution of these IWAIT times is optionally available with the Total System IWAIT Summary report (see [“Total System IWAIT Summary report”](#) on page 357). If **Override 'IWAIT for no-message'** is selected on the Monitor Global Options panel, wait-for-input events are not included in the schedule count. WFI, pseudo-WFI, and IFP scheduling is reported in the same way as other scheduling is reported, and the time waiting for no messages is reported as zero. The wait time is, however, included in the transaction elapsed time. All calculations based on the number of schedules or the elapsed time are adjusted accordingly.

Program Isolation and Enqueue/Dequeue

Parallel scheduling efficiency may be reduced by the requirement for simultaneous access to database records. Program isolation (PI) enqueues serialize the accesses and extend the DL/I call elapsed times. In IMS, PI enqueues are specifically identified by the IMS monitor. See both the Total System IWAIT and the Enqueue/Dequeue Trace reports to analyze the effect of these PI enqueues.

Options

To obtain the Region Summary report, activate the **Region** summary report in a Monitor Report Set. There are no report-specific options for this report, but monitor global options apply.

Report output is sent to the DDname specified in Summary Report Output DDname on the Monitor Global Options panel.

The **ESAF Integration** and **Alternate Sequencing** Options are applicable to this report.

Optionally, to add distribution graphs to the report, on the **Distribution Options** subpanel of Monitor Global Options, specify one or more of the following Distributions:

- **Elapsed Time per Schedule**
- **Elapsed Time per Call**
- **Elapsed Time per IWAIT**
- **IWAITS per Call**

Omission of a Distribution required by a report results in a statistical summary line only. For example: Specifying Distributions for Elapsed Time per Call, Elapsed Time per IWAIT, and IWAITS per Call result in graphical representations of Elapsed/Call, Elapsed/IWAIT, and IWAITS/Call ratios together with a statistical summary line for each; since a Distribution is not supplied for Elapsed Time per Schedule, only a statistical summary line is produced for Elapsed/Schedule.

Report content

The Region Summary report is an analysis of schedule, transaction, call, and IWAIT activity as well as an analysis of region idle time for each active MPP region. Summary distribution graphs of activity can also be provided.

Report from 08Jun2023 17.24.39.87			IMS 15.4.0			IMS Performance Analyzer 4.5			Report to 08Jun2023 17.29.20.92								
REGION SUMMARY																	
** Region and Jobname **																	
Reg No.	Job Name	Type	Reg No.	Job Name	Type	Reg No.	Job Name	Type	Reg No.	Job Name	Type						
1	IFPI1X3	IFP	2	BMPI1X1	BMP	3	BMPH1X2	BMP	4	IFPI1X2	IFP						
5	BMPU21A1	BMP	5	MPPIX3	MPP	6	BMPU21A3	BMP	7	BMPU21A6	BMP						
8	BMPU21A7	BMP	9	BMPU21A8	BMP												
** Transaction data **																	
Rgn No.	Elapsed Secs.Mil	Scheds	Trans	Trans /Schd	Elap/Sched Sc.Mil.Mic	%ages of Regn elapsed		Sch-DLI	Elap/Tran Sc.Mil.Mic	CPU/Trn Mil.Mic	%ages of Tran Elapsed						
						Sc-DLI	Active	Idle			CPU						
1	70.987	14	14	1.00	1.120.025	1.99%	20.09%	77.92%	101.139	1.018.886	.00%						
2	55.917	3	3	1.00	15.609.644	83.55%	.20%	16.25%	15.573	36.382	.00%						
3	212.524	1	1	1.00	212.305.464	.52%	99.38%	.10%	1107.893	211.197.571	.00%						
4	55.396	1	3	3.00	52.504.911	1.46%	93.32%	5.22%	807.470	17.232.480	.00%						
5	59.068	1	3	3.00	56.462.127	1.09%	94.50%	4.41%	643.297	18.606.277	.00%						
Totl	281.051	24	28	1.17	34.893.763	.00%	.00%	100.00%	2303.949	27.934.127	1.788						
											.01%						
											15.53%						
											1.42%						
** Schedule data **																	
Rgn No.	Trans /sec	Call /sec	IWTs /sec	Schd On Q	Percents of Region Idle Time					No Messages		Blk Ldr Busy		Sched NotIWT		Synch DB IWTs	
					NoMsg	Bldr	I/CK	DBAS	NtIW	No.	Avg Elap	No.	Avg Elap	No.	Avg Elap	No.	Avg Elap
1	0.20	0.21	0.00	0.00	.0%	.0%	.0%	.0%	.0%	14	3.949.342	0		14	876	0	
2	0.05	0.00	0.00	0.00	14.8%	.9%	.0%	.0%	84.3%	2	671.793	8	10.042	3	2.554.858	0	
3	0.00	0.12	0.00	0.00	.0%	14.8%	.0%	.0%	85.2%	0		5	6.694	1	192.945	0	
4	0.05	4.57	0.79	0.00	.0%	4.2%	.0%	.0%	95.8%	0		5	24.241	1	2.770.720	0	
5	0.05	4.57	0.47	0.00	.0%	.0%	.0%	.0%	.0%	0		0		1	2.606.577	0	
Totl	0.10	7.57	2.44	0.00	46.2%	.3%	.0%	.0%	53.5%	16	3.539.648	29	11.977	24	2.732.456	0	
** Call data **																	
Rgn No.	Calls /Tran	IWTs /Tran	IWTs /Call	Calls /Tran	M E S S A G E IWTs /Tran	Q U E U E IWTs /Call	C A L L S			Calls /Tran	IWTs /Tran	IWTs /Call	D A T A B A S E			Calls /Tran	IWTs /Tran
					/Call	Sc.Mil.Mic	Elap/Call	Pct of Call	Elap				Elap/Call	Pct of Call	Elap		
							CPY	DLA	IWT				Sc.Mil.Mic	CPY	DLA	IWT	
1	1.1	0.0	0.00	1.1	0.0	0.00	4.294	1.6%	98.4%	.0%	0.0	0.0	0.00	0.000	.0%	.0%	.0%
3	26.0	0.0	0.00	5.0	0.0	0.00	2.492	20.4%	79.6%	.0%	21.0	0.0	0.00	0.937	94.7%	5.3%	.0%
4	84.3	14.7	0.17	55.0	4.7	0.08	1.647	2.5%	97.5%	37.0%	29.3	10.0	0.34	564.016	.0%	.0%	10.0%
5	90.0	9.3	0.10	59.3	3.7	0.06	0.554	9.0%	91.0%	10.0%	30.7	5.7	0.18	311.740	.1%	99.9%	.7%
Totl	76.0	24.5	0.32	13.8	1.0	0.08	1.742	4.3%	95.7%	30.1%	62.2	23.5	0.38	69.334	.6%	99.4%	9.0%
** Call data (FP) **																	
Rgn No.	Calls /Tran	IWTs /Call	E M H		C a l l s		D E D B		C a l l s		M S D B		C a l l s		I W A I T		
			Calls /Tran	IWTs /Call	Elap/Call	Pct of IWAIT	Calls /Tran	IWTs /Call	Elap/Call	Pct of IWAIT	Calls /Tran	IWTs /Call	Elap/Call	Pct of IWAIT	Calls /Tran	IWTs /Call	
					Sc.Mil.Mic				Sc.Mil.Mic				Sc.Mil.Mic				
1	9.4	0.13	0.0	0.00	0.000	.0%	9.4	0.34	104.309	2.3%	0.0	0.00	0.000	.0%			
2	12.7	0.12	1.7	0.00	0.200	.0%	11.0	0.33	0.320	27.9%	0.0	0.00	0.000	.0%			
3	3.0	2.00	0.0	0.00	0.000	.0%	0.0	0.00	0.000	.0%	3.0	0.00	0.156	.0%			
Totl	6.1	0.33	0.2	0.00	0.200	.0%	5.9	0.34	83.384	2.3%	0.1	0.00	0.156	.0%			

Figure 134. Region Summary report

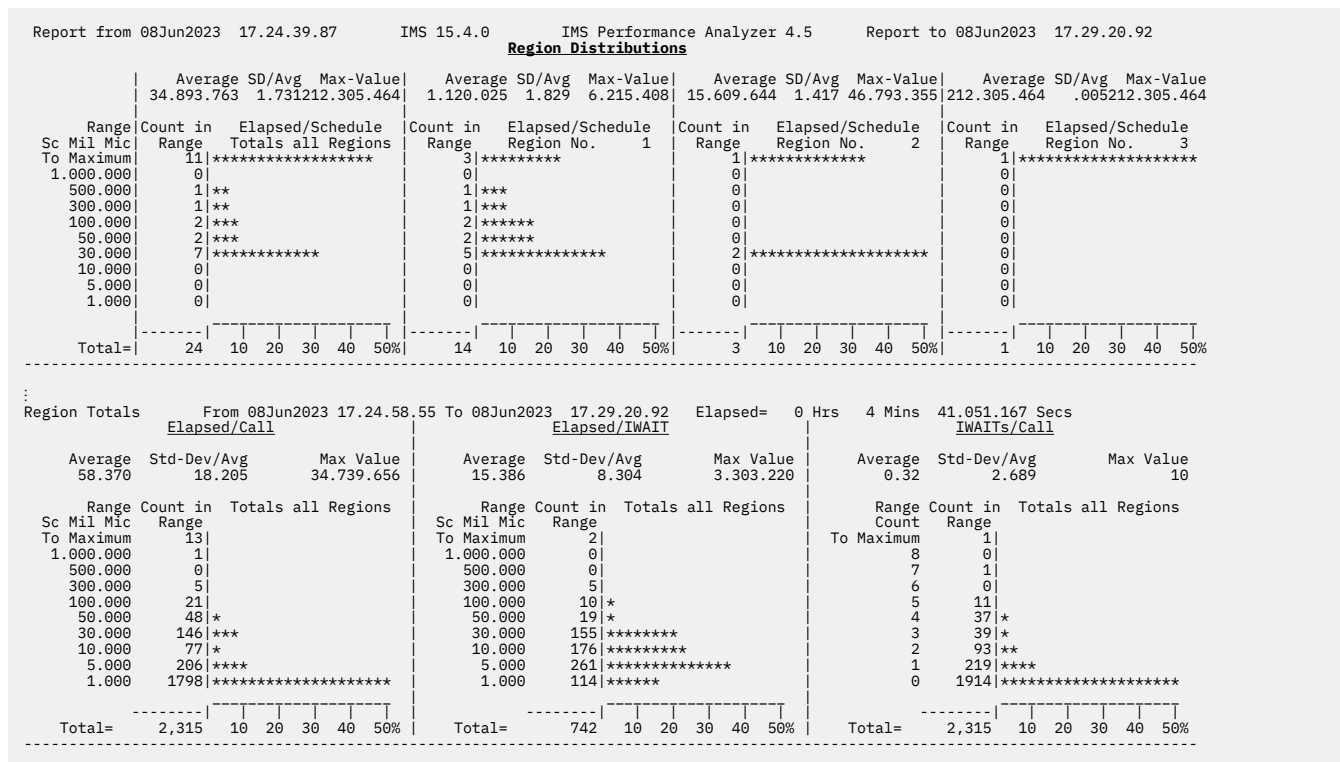


Figure 135. Region Summary report: Region Distributions

Report from 25Jun2023 14.45.00.04 IMS 15.4.0 IMS Performance Analyzer 4.5 Report to 25Jun2023 14.54.59.99

REGION SUMMARY

** Call data (ESAF) ** (Sorted by Total IWAIT Elapsed time; LIMIT 2)					--- Commit Ph1 ---					--- Termination ---		
Rgn No.	Calls /Tran	ESAF SSID	Initializaton - Calls /Tran	Elap/Call Sc.Mil.Mic	Normal Call - Calls /Tran	Elap/Call Sc.Mil.Mic	Commit Ph1 - Calls /Tran	Elap/Call Sc.Mil.Mic	Commit Ph2 - Calls /Tran	Elap/Call Sc.Mil.Mic	Termination - Calls /Tran	Elap/Call Sc.Mil.Mic
23	3.2	P2I1	1.2	0.304	0.8	25.469	0.8	0.207	0.4	1.109	0.0	0.000
22	2.7	P2I1	1.0	0.330	0.7	26.587	0.7	0.198	0.3	0.905	0.0	0.000
Lim	1.4	P2I1	0.5	0.316	0.4	25.985	0.4	0.203	0.2	1.026	0.0	0.000
Tot	1.4	P2I1	0.5	0.361	0.4	25.196	0.4	0.203	0.2	0.992	0.0	0.063

Figure 136. Region Summary report with ESAF Integration: Sequenced by Delay (with Limit)

Report from 25Jun2023 14.45.00.04			IMS 15.4.0			IMS Performance Analyzer 4.5			Report to 25Jun2023 14.54.59.99					
R E G I O N S U M M A R Y														
** Transaction data **		(Sorted by Total Scheduled Elapsed time)												
Rgn No.	Elapsed Secs.Mil	Scheds	Trans	Trans /Sched	Elap/Sched Sc.Mil.Mic	%ages of Regn Sc-DLI	elapsed Active	Idle	Sch-DLI Mil.Mic	Elap/Tran Sc.Mil.Mic	CPU/Trn Mil.Mic	%ages of CPU	Tran Call	Elapsed IWAIT
40	581.613	1	1	1.00	581.613.438	21.32%	78.68%	.00%**123,987	457.626.869	0.000	.000	.00%	.01%	.00%
34	582.235	9	9	1.00	43.997.861	52.39%	15.62%	31.99%**33,894	10.103.650	10.010	.100	.10%	.74%	.60%
22	599.689	571	1,268	2.22	464.681	4.72%	39.52%	55.76%	49.604	186.915	28.512	15.25%	36.76%	26.09%
23	599.921	667	1,310	1.96	364.519	1.75%	38.78%	59.47%	15.747	177.580	12.889	7.26%	35.89%	27.09%
35	599.947	2,361	2,804	1.19	78.762	.02%	30.97%	69.01%	0.059	66.269	4.521	6.82%	99.82%	72.95%
31	596.815	504	742	1.47	319.896	2.87%	24.15%	72.98%	33.964	194.218	23.285	11.99%	28.04%	20.77%
33	599.848	983	1,265	1.29	146.376	1.95%	22.04%	76.01%	11.891	104.505	9.566	9.15%	66.08%	49.43%
30	587.741	88	137	1.56	551.474	2.29%	5.97%	91.74%	152.968	255.974	98.561	38.50%	27.22%	11.81%
37	413.259	30	30	1.00	1.039.166	5.22%	2.33%	92.45%	718.839	320.326	9.676	3.02%	27.49%	22.47%
39	0.232	1	1	1.00	223.202	64.89%	31.03%	4.08%	150.989	72.213	10.010	13.86%	47.54%	26.03%

Tot	599.947	5,215	7,567	1.45	394.451	.00%	.00%	100.00%	102.010	201.543	14.403	7.15%	32.57%	23.77%

Figure 137. Region Summary report: Sequenced by Occupancy

The Region Summary report reflects the activity in all regions. The report has up to seven sections:

1. Region and Jobname
2. Transaction data
3. Schedule data
4. Call data
5. Call data (FP): included only if there was Fast Path activity during the report period
6. Call data (ESAF): included only if there was External Subsystem activity during the report period and the ESAF Integration option is activated
7. Region Distributions: partial or full distribution graphs show program and database activity

For each of the middle sections 2 through 6:

- A line for each region is printed preceded by the region number.
- A **Tot** line is printed for the total of all (100%) of the data.
- If **Alternate Sequencing** is requested:
 - The section header is suffixed by one of the following:

Sorted by Total Scheduled Elapsed time

If the requested sequence is Occupancy.

When selecting any alternate sequencing, the result is always reported in descending order. When you choose **Occupancy** as an alternate reporting sequence, the report displays by **Total Scheduled Elapsed time** in descending order. IMS Performance Analyzer uses the following calculation to display the order by **Total Scheduled Elapsed time**:

$\text{Scheds} * \text{Elap/Sched Sc.Mil.Mic} = \text{Total Scheduled Elapsed time}$

For example, in the sample preceding report (Region Summary report: Sequenced by Occupancy);

$1 * 581.613438 (581 + 0.613 + 0.000438) \text{ Seconds} = 581.613438 \text{ Seconds.}$

Similarly, $9 * 43.997861 (43 + 0.997 + 0.000861) \text{ Seconds} = 395.980749 \text{ Seconds}$ and so on.

Note: The unit of measurement for the **Elap/Sched** value is converted from seconds, milliseconds, and microseconds to seconds for a better understanding of the calculation.

Sorted by Total Call Elapsed time

If the requested sequence is Calls

Sorted by Total IWAIT Elapsed time

If the requested sequence is Delay

- If a number or percentage (less than 100%) Limit is specified:
 - The section header is also suffixed by **LIMIT nn** or **LIMIT nn%**
 - A **Lim** line is printed for the total of the reported (limited) data only.

Section 1. Region and Jobname

The following items are shown (four across the page) for the regions processed within the reporting period:

Reg No.

The number of the region traced.

Job Name

The region job name.

Type

The type of region, either IFP, BMP, or MPP.

Section 2. Transaction data

The following column headings appear in this section:

Rgn No.

Number of the region being summarized. Also, a total entry (**Totl**) defines the total line for all regions.

Elapsed Secs.Mil

Total elapsed time from the start until the end of region activity. The start (end) of region activity is determined from the first (last) occurrence of either a DL/I call in the region or the first (last) occurrence of a scheduling activity (record types 10, 11, 14, 15) in the control region on behalf of the dependent region. The **Totl** line gives the elapsed time from the earliest to the latest activity for the reporting interval as a whole. Maximum value: 2778 hours (115 days)

Scheds

Number of times an application program was scheduled into the region, including those active at the start and end of the reporting interval and those backed out by IMS due to abends for deadlocks. Maximum value: 10,000,000

Trans

Number of transactions processed, including those in progress at the start and end of the reporting interval. Maximum value: 10,000,000

Trans/Schd

Average number of transactions processed per application program execution. Maximum value: 999.99

Elap/Sched Sc.Mil.Mic

Sum of active time plus Sch-DLI time divided by the number of program schedules. Maximum value: 1000 seconds

%ages of Regn elapsed

Breakdown of region elapsed time. The values for the following three subheadings total 100%:

Sc-DLI

Percentage of elapsed time from the start of a schedule in the region (message scheduling end is type 11 record) to the first DL/I call (DL/I start is type 60 record). (See [Chapter 18, "Essential terminology for Monitor reporting,"](#) on page 277.)

Active

Percentage of time from the first DL/I call (type 60...61 record sequence) until application program termination (message scheduling start is type 10 record).

Idle

Percentage of all time in the region not between the start and end of an application program execution.

Sch-DLI Mil.Mic

Average elapsed time per schedule from schedule start until the first DL/I call. Maximum value: 10 seconds

Elap/Tran Sc.Mil.Mic

Average active time per transaction. This is the total elapsed time from the first DL/I call to the end of the schedule for all of the schedules, divided by the number of transactions.

(Elap/Sched minus Sch-DLI) divided by Trans/Schd. Maximum value: 1000 seconds

CPU/Trn Mil.Mic

CPU time per IMS transaction. This value is calculated from the CPU time reported in the message scheduling start type 10 record. The dependent region CPU time is accumulated by the region controller as a function of the STIMER option for each dependent region. This value is reported in the monitor record written when the application program terminates. Maximum value: 10 seconds

%ages of Tran Elapsed

Breakdown of transaction active time (Elap/Tran).

CPU

Percent of IMS transaction elapsed time recorded as CPU time. (CPU/Trn divided by Elap/Tran)

Call

Percent of transaction elapsed time spent in the DL/I call, including IWAIT time. You might expect the percentages given for CPU and Call to total 100%. However, since CPU time is not computed but simply recorded by the IMS monitor, the two values do not usually total 100%.

IWAIT

Percentage of transaction elapsed time spent in IWAIT state.

The most common mistake made when interpreting "%ages of Tran Elapsed" is that it is supposed to add up to 100%. But it should not be viewed this way because, in total, it does not represent a breakdown of the entire elapsed time.

Each of the three subheadings (CPU, Call and IWT) percentages must be viewed in isolation. Here are three things to consider when analyzing these percentages:

- CPU% indicates the ratio of CPU time to Elapsed time. The higher the percentage, the more CPU service IMS received to process this transaction. CPU% cannot be viewed as a component of total elapsed time. Note that sometimes IMS records a CPU time of 10.010 in the monitor and IMS PA reports this. This indicates that CPU recording was not in effect for this region.
 - MPP regions: CPU is recorded depending on the STIMER setting
 - FP regions: do not record CPU time
- Call% indicates the time the transaction spent processing DLI calls. This allows you to make a judgment on whether the transaction is spending too much or not enough time processing DLI calls, depending on its characteristics.

The DLI Call elapsed time is calculated as Call End time subtract Call Start time, regardless of whether the call had IWAIT activity. That is, there may be some IWAIT time included in the Call time.

- IWT% indicates the time the transaction spent waiting for IWAIT events to complete. IWAIT events commonly occur inside DLI calls, and in this case, the Call% will include this IWAIT time.

Therefore, if the transaction is very DLI call intensive with a lot of IWAITs, it is possible that Call% +IWT% can be greater than 100%. But their combined contribution to the total transaction elapsed time is probably only Call%, which emphasizes that these two percentages must be viewed in context/isolation. A high IWAIT percentage is a good indicator of possible performance degradation and a starting point for further investigation.

Totl

Totals of all regions. Descriptions are given only for those columns whose total is not the actual sum of all entries in the column.

Elapsed

Elapsed time from the earliest start of activity for any dependent region until the latest end of activity for any dependent region.

%ages of Regn elapsed

These values are based on the total of all regions elapsed time in order to represent an average weighting for each region by its elapsed time.

Section 3. Schedule data

The following column headings appear in this section:

Rgn No.

Number of the region being summarized. Also, a total entry (**Totl**) defines the total line for all regions.

Trans/sec

Transactions per second of region elapsed time (transactions divided by elapsed time). Maximum value: 1000

Call/sec

Total number of DL/I calls issued by all transactions in this region per second of region elapsed time. Maximum value: 1000

IWTs/sec

Total number of IMS IWAITs encountered by all transactions in this region per second of region elapsed time. Maximum value: 1000

Schd On Q

The data value is the average number of transactions enqueued at the start of dependent region schedule. This average value excludes primed messages, since they are dequeued before dependent region schedule start. Maximum value: 1000

Percents of Region Idle Time

Breakdown of time not assigned to a program schedule. The **Idle** subfield of **%ages of Regn elapsed** is broken down into the following categories, which total 100%:

NoMsg

Waiting for a transaction to schedule into the free region

Bldr

IMS I/O IWAIT time loading blocks (intent list, PSB, or DMB) and non-I/O IWAIT time waiting for the block loader service

I/CK

Unable to schedule because of INTENT conflict or CHECKPOINT

DBAS

Database IWAITs by the scheduler sync point

NtIW

Scheduler processing in the control region

No Messages

Waiting for an IMS transaction to schedule into the free region.

For each of the following headings, the number of occurrences (**No.**) and the average elapsed time (**Avg Elap**) in Sec.Mil.Mic are given for the events occurring during region idle time. Maximum values: 100,000 for No., and 10 seconds for Avg Elap

Blk Ldr Busy

IMS I/O IWAIT time loading blocks (intent list, PSB, or DMB) and non-I/O IWAIT time waiting for the block loader service. These combined times are reported separately in the Total System IWAIT Summary report.

Sched NotIWT

Scheduler processing intervals in the control region.

Synch DB IWTs

IWAIT intervals associated with database I/O initiated by sync point processing. These are for IWAITS detected immediately after a message schedule start (type 10 record) and, therefore, are no longer attributable to the specific dependent region with which they are logically connected. If the IWAITS are detected before the message schedule start record, they are reported as dependent region IWAITS associated with the I/O PCB.

Section 4. Call data

The following column headings appear in this section:

Rgn No.

Number of the region being summarized. Also, a total entry (**Totl**) defines the total line for all regions.

Calls/Tran

The average number of message queue and database DL/I calls issued in this region per transaction.
Maximum value: 10,000

IWTs/Tran

The average number of IMS IWAITS encountered in this region per transaction. Maximum value: 10,000

IWTs/Call

Ratio of total IWAITS to total calls (IWTs/Tran divided by Calls/Tran). Maximum value: 1000

The following headings appear for **MESSAGE QUEUE CALLS** (those calls issued against the I/O PCB or any other terminal PCB) and are repeated for **DATABASE CALLS** (those calls issued against a database PCB).

Calls/Tran

Number of calls per transaction. Maximum value: 10,000

IWTs/Tran

Number of IWAITS occurring in calls of this type (database or message queue) per transaction.
Maximum value: 10,000

Note that not all IWAITS in message queue calls are IWAITS on the queue data sets (LGMSG, SHMSG, QBLKS); certain message queue calls may cause database IWAITS, for example, a GU forcing a sync point.

IWTs/Call

Ratio of IWAITS to DL/I calls. Maximum value: 1000

Elap/Call Sc.Mil.Mic

Average elapsed time per call of this type. Maximum value: 1000 seconds.

Pct of Call Elap

Breakdown of call elapsed time (**Elap/Call**). The values for **CPY** and **DLA** total 100%.

CPY

Percentage of IMS call time spent in the COPY routine of DL/I as a result of an interregion copy requirement. For queue calls, this number should be greater than DLA time.

DLA

Percentage of call time spent in the DLA routines of DL/I. This includes all IWAIT time and time spent in the control region (if any). For database calls, this number should be larger than COPY time.

IWT

Percentage of call time spent in IMS IWAIT.

Section 5. Call data (FP)

The following column headings appear in this section, but only if there was FP activity during the reporting period.

Rgn No.

The number of the region being summarized.

Calls/Tran

The average number of EMH, DEDB, and MSDB calls issued in this region per transaction.

IWTs/Call

The average number of EMH and DEDB IWAITs per DL/I call.

The following headings appear for each of the categories **EMH Calls**, **DEDB Calls**, and **MSDB Calls** and have the same meaning as those described for **Call data**:

Calls/Tran

The number of calls per transaction.

IWTs/Call

The ratio of IWAITs to DL/I calls.

Elap/Call Sc.Mil.Mic

The average elapsed time per call of this type.

Pct of IWAIT

The percentage of total time required for IWAITs to total time required for DL/I calls in the region.

Section 6. Call data (ESAF)

This section is reported only if there was External Subsystem activity during the reporting period and the ESAF Integration option is activated. Field descriptions follow:

Rgn No.

The number of the region being summarized.

Calls/Tran

The number of calls per transaction. When ESAF Integration is activated, a Call is a DL/I or external subsystem call.

DL/I calls to the Message and EMH queues, Full Function and Fast Path database DL/I calls, and external subsystem calls all contribute to the total call count.

ESAF SSID

The external subsystem ID.

The report breaks down external subsystem calls into five categories:

Initialization

Initialize, Identify, Signon, Create Thread

Normal Call

Normal Call

Commit Ph1

Commit Phase 1

Commit Ph2

Commit Phase 2, Commit Verify

Termination

Signoff, Terminate Identify, Abort, Subsystem Not Operational, Terminate Thread

Within each category, the following data is reported:

Calls/Tran

The number of calls per transaction.

Elap/Call Sc.Mil.Mic

The average elapsed time per call of this type.

Section 7. Distributions

Elapsed time per schedule distributions are provided for each region and for the system total. Elapsed time per call, elapsed time per IWAIT, and IWAITs per call distributions for the system totals are also provided. They may appear on the same page as the region summary or on a separate page. If the associated Distributions are specified, they are used to produce the graphs. If not, only the summary statistics line (**Average**, **SD/Avg**, and **Max-Value**) is shown.

Program Summary report

The IMS Program Summary report is an analysis of schedule, transaction, and call activity for each PSB-transaction code and each specified application group. A percentage comparison of the activities for each PSB-transaction code is also provided.

Note: The Program Summary report is not produced from DB Monitor traces.

Monitor records: This report is derived from monitor records 02–29, 38–39, 47–49, 56–65.

Uses

The basic intent of the Program Summary report is to identify programs and related activities for which further investigation might be fruitful. It provides a quick look at a number of performance related factors at the PSB level. Such factors are the time from schedule to first DL/I call, the number of IWAITs per call, the number of calls per transaction, and database and message queue call components.

You should have a good working knowledge of your applications to evaluate whether the values indicate good or bad application and database performance. Given this knowledge, you can scan the report and quickly identify the most active programs and potential problems for investigation.

Suspicious performance values can be observed in the **Program Analysis**, **Call Analysis**, **Call Analysis (FP)** and **Call Analysis (ESAF)** sections, while the **PSB Comparison**, **PSB Comparison (FP)** and **PSB Comparison (ESAF)** sections identify what percent of overall activity is represented by each PSB. If a PSB has a bad performance profile but also has a very low activity percentage, further investigation might not be worthwhile. Conversely, better performing but very active PSBs might bear further investigation.

Another use of the Program Summary report is to compare the performance and activity levels of PSB groups. If **Application Groups** is activated on the Monitor Report Set panel, a separate Program Summary is presented for each specified application group, wherein each section of the report contains a summary line for each group. For further discussion of groups, see [“Application Detail report” on page 336](#).

Options: Program Analysis, Call Analysis, and PSB Comparison

To obtain the Program Summary report, activate the **Program** summary report in a Monitor Report Set. There are no report-specific options for this report, but monitor global options apply.

To produce separate line items and reports for specified application groups, activate **Application Grouping** Options and specify an **Application Groups** or **Program** Object List that defines the groups to be included in the report. For further discussion of groups, see [“Application Detail report” on page 336](#).

Content

The Program Summary report is an analysis of schedule, transaction, and call activity for each PSB-transaction code and each specified application group. The Program Summary report has up to seven sections:

1. Program Analysis
2. Call Analysis

3. Call Analysis (FP)
4. Call Analysis (ESAF)
5. PSB Comparison
6. PSB Comparison (FP)
7. PSB Comparison (ESAF)

Note: Call Analysis (FP) and PSB Comparison (FP) are included only if there is FP activity in the report period. Call Analysis (ESAF) and PSB Comparison (ESAF) are included only if there is External Subsystem activity in the report period and the ESAF Integration Option is activated.

Within each section:

- A detail line for each PSB-Transaction code is printed.
- A detail line is also printed for each Application Group defined by the Application Grouping Options.
- A ****Grand* *TOTALS*** line is printed for the total of all (100%) of the data.
- If Alternate Sequencing is requested:
 - The section header is suffixed by one of the following:

Sorted by Total Scheduled Elapsed time

If the requested sequence is Occupancy.

When selecting any alternate sequencing, the result is always reported in descending order. When you choose **Occupancy** as an alternate reporting sequence, the report displays by **Total Scheduled Elapsed time** in descending order. IMS Performance Analyzer uses the following calculation to display the order by **Total Scheduled Elapsed time**:

$\text{Scheds} * \text{Elap/Sched Sc.Mil.Mic} = \text{Total Scheduled Elapsed time}$

For example, in the sample preceding report (Region Summary report: Sequenced by Occupancy);

$1 * 581.613438 (581 + 0.613 + 0.000438) \text{ Seconds} = 581.613438 \text{ Seconds.}$

Similarly, $9 * 43.997861 (43 + 0.997 + 0.000861) \text{ Seconds} = 395.980749 \text{ Seconds}$ and so on.

Note: The unit of measurement for the **Elap/Sched** value is converted from seconds, milliseconds, and microseconds to seconds for a better understanding of the calculation.

Sorted by Total Call Elapsed time

If the requested sequence is Calls

Sorted by Total IWAIT Elapsed time

If the requested sequence is Delay

- If a number or percentage (less than 100%) Limit is specified:
 - The section header is also suffixed by **LIMIT nn** or **LIMIT nn%**
 - A ****Limit*** line is printed for the total of the reported (limited) data only.

The heading appears on the top of each page of the Program Summary report and contains the following:

Region Totals or Region No. *nn*

Region Totals

Designates that the report is a summary of system activity.

Region No. *nn*

Designates that the report is a summary of region activity for region *nn*.

From

Start time of region activity in the reporting period.

To

End time of region activity in the reporting period.

Elapsed

Elapsed time from start until end of region activity in the reporting period.

Program Analysis

Program Analysis provides a schedule summary which provides information in two categories: per schedule and per transaction.

Report from 08Jun2023 13.06.12.71		IMS 15.4.0		IMS Performance Analyzer 4.5				Report to 08Jun2023 13.10.39.26						
PROGRAM SUMMARY														
Region Totals		From 08Jun2023 13.06.21.86 To 08Jun2023 13.09.52.04		Elapsed=		0 Hrs 4 Mins 26.545.110 Secs								
** Program Analysis **		----- Per Schedule -----		----- P e r T r a n s a c t i o n -----										
PSBname	TranCode	Scheds	Trans	Trans /Schd	Scd-DLI Mil.Mic	DLI-Term Sc.Mil.Mic on Q	Calls	IWTs	Elapsed Sc.Mil.Mic	CPUtime Mil.Mic	Pct of CPU	Tran	Elap IWT	
BMPFPE05	TXCDDL00	1	1	1.00	103.895	5.210.432	.0	18.0	.0	5.210.432	10.010	.2%	.0%	.0%
BMPFPE06	TXCDDL01	3	3	1.00	75.383	9.488.192	.0	21.7	.0	9.488.192	10.010	.1%	9.1%	.0%
BMPFPE07	TXCDDL02	1	4	4.00	20.176	6.660.503	.0	6.5	.0	1.665.126	2.503	.2%	.0%	.0%
BMP255		1	1	1.00	327.885	1.936.357	.0	292.0	.0	1.936.357	10.010	.5%	.2%	.0%
DDLTD001	TXCDDS01	4	12	3.00	10.170	5.747.907	.0	5.8	.0	1.915.969	0.000	.0%	5.0%	.0%
DDLTFPE3	TXCDDS03	1	1	1.00	428.989	10.364.899	.0	182.0	.0	10.364.899	10.010	.1%	.0%	.0%
DDLTFPE4	TXCDDS04	6	6	1.00	15.158	2.433	.0	1.0	.0	2.433	10.010	411%	1.8%	.0%
DDLTLN20	TXCDLM20	1	4	4.00	5247.285	5.657.413	2.0	9.3	.5	1.414.353	2.503	.2%	8.8%	.3%
DDLTRN14	TXCDRN14	2	5	2.50	10.095	12.928.862	.0	5.4	.0	5.171.545	0.000	.0%	.0%	.0%
DDLTRN24	TXCDRN24	1	3	3.00	20.318	5.142.431	.0	3.3	.0	1.714.144	0.000	.0%	.0%	.0%
**Grand*	*TOTALS*	22	41	1.86	9029.407	5.104.575	.1	17.9	.0	2.739.040	3.662	.1%	3.8%	.0%
**Group	BMP	6	9	1.50	3472.329	7.045.311	.0	44.6	.0	4.696.874	6.673	.1%	6.1%	.0%
Group	DDL	15	31	2.07	*11,854	4.668.580	.1	10.7	.1	2.258.990	2.583	.1%	2.4%	.0%

Figure 138. Program Summary report: Program Analysis

The column headings are as follows:

PSBname

Name of the PSB whose activity is being summarized. Any PSB schedules in progress at the start of the reporting period are assigned names in the format %PSB0nnn, where nnn is the region number.

TranCode

Transaction code whose activity is being summarized.

Scheds

Number of schedules processed for this PSB-transaction code, including those active at the start and end of the trace interval and those backed out by IMS due to abends or deadlocks. Maximum value: 10,000,000

Trans

Number of transactions processed, including those in progress at the start and end of the trace interval and those backed out by IMS due to abends or deadlocks. Maximum value: 10,000,000

The following information is presented on a **Per Schedule** basis:

Trans/Schd

Number of transactions per schedule. Maximum value: 999.99

Scd-DLI Mil.Mic

Average elapsed time per schedule from the start of a schedule in a region (message scheduling end is type 11 record) to the first DL/I call (DL/I start is type 60 record). This value is normally referred to as the program load and initialization time (see [Chapter 18, "Essential terminology for Monitor reporting,"](#) on page 277). Maximum value: 10 seconds

DLI-Term Sc.Mil.Mic

Average elapsed time per schedule from the first DL/I call until program termination (message scheduling start is type 10 record).

Schd on Q

Average number of transactions on the queue at the beginning of the schedule, excluding primed messages. Maximum value: 1000

The following information is presented on a **Per Transaction** basis:

Calls

Average number of calls per transaction. This includes database, message queue, and buffer prime calls. Maximum value: 10,000

IWTs

Average number of IWAITs per transaction. Maximum value: 10,000

Elapsed Sc.Mil.Mic

Average active time per transaction. This is the total elapsed time from the first DL/I call to the end of the schedule for all schedules for this PSB-transaction code, divided by the number of transactions. Maximum value: 1000 seconds

CPUtime Mil.Mic

Average CPU time per transaction. This value is the CPU time as reported in the message scheduling start type 10 record. The CPU time is not available for IFP regions. Maximum value: 10 seconds

Pct of Tran Elap

Breakdown of transaction active time (elapsed) as follows:

CPU

Percentage of transaction elapsed time recorded as CPU time (CPUtime divided by Elapsed)

CALL

Percentage of transaction elapsed time spent in the DL/I call

IWT

Percentage of transaction elapsed time spent in IMS IWAIT

Call Analysis

The Call Analysis section provides information in two areas: message queue calls and database calls. A Fast Path call summary, which provides information on EMH, MSDB, and DEDB calls, is shown only if there is Fast Path activity in the report period. The ESAF Integration section of the report is present only if there is External Subsystem activity during the reporting period and the ESAF Integration option is activated.

** Call Analysis **		Message Queue Calls										Database Calls									
PSBname	TranCode	Calls /Tran	IWTs /Tran	IWTs /Call	CPY Mil.Mic	Elp Mil.Mic	DLA Elp	Elp/IWT	Calls /Tran	IWTs /Tran	IWTs /Call	CPY Mil.Mic	Elp Mil.Mic	DLA Elp	Elp/IWT	Pct DB	CPY	DLA	Call	Elap	IWT
BMPFPE05	TXCDDL00	2.0	.0	.00	0.007	0.140	0.000	0.000	13.0	.0	.00	0.014	0.019	0.000	0.000	41.7%	58.3%	.0%			
BMPFPE06	TXCDDL01	2.3	.0	.00	0.007	7.347	0.000	0.000	14.0	.0	.00	0.054	60.443	0.000	.1%	99.9%	.0%				
BMPFPE07	TXCDDL02	2.5	.0	.00	0.012	0.177	0.000	0.000	3.3	.0	.00	0.013	0.021	0.000	37.0%	63.0%	.0%				
BMP255		18.0	.0	.00	0.010	0.164	0.000	0.000	13.0	.0	.00	0.014	0.017	0.000	45.7%	54.3%	.0%				
DLTDS01	TXCDD001	.3	.0	.00	0.020	0.062	0.000	0.000	2.3	.0	.00	0.020	42.514	0.000	.0%	.0%	.0%				
DLTLFPE3	TXCDD003	21.0	.0	.00	0.008	0.133	0.000	.0													
DLTLFPE4	TXCDD004	1.0	.0	.00	0.002	0.043	0.000	.0													
DLTLN20	TXCDLM20	2.8	.3	.09	0.014	0.598	0.055	5.5	.3	.05	0.017	22.280	14.541	.1%	99.9%	3.0%					
DLLTRN14	TXCDRN14	.4	.0	.00	0.029	0.077	0.000	2.6	.0	.00	0.011	0.015	0.000	42.7%	57.3%	.0%					
DLLTRN24	TXCDRN24	2.3	.0	.00	0.019	0.140	0.000	.0													
**Grand*	*TOTALS*	2.1	.0	.01	0.011	0.766	0.055	3.5	.0	.01	0.027	29.214	14.541	.1%	99.9%	.3%					
**Group	BMP	4.1	.0	.00	0.010	1.525	0.000	9.0	.0	.00	0.034	31.350	0.000	.1%	99.9%	.0%					
**Group	DDL	1.6	.0	.02	0.012	0.216	0.055	2.0	.0	.02	0.017	26.423	14.541	.1%	99.9%	.9%					

** Call Analysis (FP) **		E M H C a l l s				D E D B C a l l s				M S D B C a l l s				P c t of							
PSBname	TranCode	Calls /Tran	IWTs /Call	Elap/Call	Sc.Mil.Mic	Pct of IWAIT	Calls /Tran	IWTs /Tran	Elap/Call	Sc.Mil.Mic	Pct of IWAIT	Calls /Tran	IWTs /Tran	Elap/Call	Sc.Mil.Mic	Pct of IWAIT	Calls /Tran	IWTs /Tran	Elap/Call	Sc.Mil.Mic	Pct of IWAIT
BMPFPE05	TXCDDL00	0.0					3.0	1.00	4.562	10.3%	0.0	0.0					0.0				
BMPFPE06	TXCDDL01	0.0					3.0	1.00	3.365	76.4%	2.3	0.00			0.994	.0%	0.0				
BMPFPE07	TXCDDL02	0.0					0.8	0.67	502.423	.8%	0.0	0.0					0.0				
BMP255		0.0					261.0	0.09	6.867	5.6%	0.0	0.0					0.0				
DLTDS01	TXCDD001	1.8	0.00		1.309	.0%	1.1	1.00	852.937	.4%	0.3	0.00			1.454	.0%	0.0				
DLTLFPE3	TXCDD003	0.0					161.0	0.45	63.809	1.3%	0.0	0.0					0.0				
DLTLFPE4	TXCDD004	0.0					0.0				0.0	0.0					0.0				
DLTLN20	TXCDLM20	0.0					1.0	0.25	3.956	.8%	0.0	0.0					0.0				
DLLTRN14	TXCDRN14	1.8	0.00		0.067	.0%	0.6	1.00	237.539	1.8%	0.0	0.0					0.0				
DLLTRN24	TXCDRN24	0.0					1.0	1.00	4.962	86.7%	0.0	0.0					0.0				
**Grand*	*TOTALS*	0.8	0.00		0.949	.0%	11.2	0.28	55.322	1.3%	0.2	0.00			1.132	.0%	0.0				
**Group	BMP	0.0					30.7	0.13	12.114	4.1%	0.8	0.00			0.994	.0%	0.0				
**Group	DDL	1.0	0.00		0.949	.0%	5.9	0.50	120.134	.9%	0.1	0.00			1.454	.0%	0.0				

Figure 139. Program Summary report: Call Analysis

The column headings are as follows:

PSBname

Name of the PSB whose activity is being summarized.

TranCode

Transaction code whose activity is being summarized.

The following information is presented for **Message Queue Calls**:

Calls/Tran

Number of message queue calls per transaction, including buffer primes. Maximum value: 10,000

IWTs/Tran

Number of IWAITs occurring in message queue calls per transaction. Maximum value: 10,000

Note: Not all IWAITs in message queue calls are IWAITs on the queue data sets (LGMSG, SHMSG, QBLKS). Certain message queue calls may cause database IWAITs, for example, a Get Unique that forces a sync point.

IWTs/Call

Ratio of IWAITs occurring in message queue calls to message queue calls. Maximum value: 1000

CPY Elp Mil.Mic

Average elapsed time per message queue call spent in the IMS interregion COPY routines of DL/I. Maximum value: 10 seconds

DLA Elp Mil.Mic

Average elapsed time per message queue call spent in the DLA routines of DL/I. This includes all IWAIT time and time spent in the control region (if any). Maximum value: 10 seconds

Elp/IWT Mil.Mic

Average elapsed time per IWAIT occurring in message queue calls.

The following information is presented for **Database Calls**:

Calls/Tran

Number of database calls per transaction, including buffer primes. Maximum value: 10,000

IWTs/Tran

Number of IWAITs occurring in database calls per transaction. Maximum value: 10,000

IWTs/Call

Ratio of IWAITs occurring in database calls to database calls. Maximum value: 1000

CPY Elp Mil.Mic

Average elapsed time per IMS database call spent in the interregion COPY routines of DL/I. Maximum value: 10 seconds

DLA Elp Mil.Mic

Average elapsed time per database call spent in the DLA routines of DL/I. This includes all IWAIT time and time spent in the control region (if any). Maximum value: 10 seconds

Elp/IWT Mil.Mic

Average elapsed time per IWAIT occurring in database calls.

Pct DB Call Elap

Breakdown of database call elapsed time as follows:

CPY

Percentage of elapsed time spent in IMS interregion COPY routines of DL/I

DLA

Percent of elapsed time spent in DLA routines of DL/I

IWT

Percent of elapsed time spent in IMS IWAIT

For **Fast Path**, the following information is presented:

PSBname

The name of the PSB whose activity is being summarized.

TranCode

The transaction code whose activity is being summarized. This is a CICS transaction code, if, in the DBCTL environment, a DL/I call is issued against the DEDB in a CICS application program.

Details of DL/I calls against EMH, DEDB, and MSDB are presented. The following information is shown for **EMH Calls**, **DEDB Calls**, and **MSDB Calls**:

Calls/Tran

The number of calls per transaction.

IWTs/Call

The ratio of IWAITs occurring for calls of this type to total number of calls of this type.

Elap/Call Sc.Mil.Mic

The average elapsed time per call.

Pct of IWAIT

The percentage of call elapsed time spent on IWAITs.

For **ESAF Integration** the following information is presented:

** Call Analysis (ESAF) ** (Sorted by Total Scheduled Elapsed time; LIMIT 30%)											
		- Initialization -		-- Normal Call --		--- Commit Ph1 ---		--- Commit Ph2 ---		--- Termination ---	
PSBname	TranCode	ESAF SSID	Calls /Tran	Elap/Call Sc.Mil.Mic	Calls /Tran	Elap/Call Sc.Mil.Mic	Calls /Tran	Elap/Call Sc.Mil.Mic	Calls /Tran	Elap/Call Sc.Mil.Mic	Calls /Tran
RMZIOIS1	RMZITIS1	P2I1	1.3	0.324	0.9	26.357	0.9	0.203	0.4	0.980	
RMZIOIR1	RMZITIR1	P2I1	1.5	0.265	0.9	22.529	0.9	0.205	0.6	1.010	
**Limit*		P2I1	0.6	0.304	0.4	25.196	0.4	0.203	0.2	0.992	
**Grand* *TOTALS*		P2I1	0.5	0.361	0.4	25.196	0.4	0.203	0.2	0.992	0.0 0.063

Figure 140. Program Summary report with ESAF Integration: Sequenced by Occupancy (with Limit)

Field descriptions follow:

PSBname

The name of the PSB whose activity is being summarized.

TranCode

The transaction code whose activity is being summarized.

ESAF SSID

The external subsystem ID.

The report breaks down external subsystem calls into five categories:

Initialization

Initialize, Identify, Signon, Create Thread

Normal

Normal Call

Commit Ph1

Commit Phase 1

Commit Ph2

Commit Phase 2, Commit Verify

Termination

Signoff, Terminate Identify, Abort, Subsystem Not Operational, Terminate Thread

Within each category, the following data is reported:

Calls/Tran

The number of calls per transaction.

Elap/Call Sc.Mil.Mic

The average elapsed time per call of this type.

PSB Comparison

The fifth part of the Program Summary report provides a comparison of each PSB-transaction code by listing the percentage of total reported activity for several variables for each PSB-transaction code. If there is Fast Path activity in the report period, the report will also contain a section that shows the percentage of each PSB to the total of all PSBs for Fast Path. If there is External Subsystem activity during the reporting period and the ESAF Integration option is activated, ESAF information is also presented.

Report from 08Jun2023 13.06.12.71		IMS 15.4.0		IMS Performance Analyzer 4.5		Report to 08Jun2023 13.10.39.26									
PROGRAM SUMMARY															
Region Totals		From 08Jun2023 13.06.21.86 To 08Jun2023 13.09.52.04		Elapsed= 0 Hrs 4 Mins 26.545.110 Secs											
** PSB Comparison **		*** All values are percents of total ***													
PSBname	TranCode	Schds	Trans	Sc-Dl	Dl-Tm	CPUtm	Calls	CPYEI	DLAEI	IWTs	IWEItp	Calls	ClEItp	IWTs	IWEItp
BMPFPE05	TXCDDL00	4.55%	2.44%	.05%	4.64%	6.67%	9.09%	4.58%	.01%	.00%	.00%	2.27%	.43%	.00%	.00%
BMPFPE06	TXCDDL01	13.64%	7.32%	.11%	25.35%	20.00%	29.37%	58.86%	60.77%	.00%	.00%	7.95%	75.25%	.00%	.00%
BMPFPE07	TXCDDL02	4.55%	9.76%	10.16%	5.93%	6.67%	9.09%	4.24%	.01%	.00%	.00%	11.36%	2.76%	.00%	.00%
BMP255		4.55%	2.44%	.17%	1.72%	6.67%	9.09%	4.87%	.01%	.00%	.00%	20.45%	4.57%	.00%	.00%
DDLTD01	TXCDDS01	18.18%	29.27%	20.48%	20.47%	.00%	18.88%	13.95%	27.48%	.00%	.00%	4.55%	.48%	.00%	.00%
DDLTFPE3	TXCDDS03	4.55%	2.44%	.22%	9.23%	6.67%	.00%	.00%	.00%	.00%	.00%	23.86%	4.34%	.00%	.00%
DDLTFPE4	TXCDDS04	27.27%	14.63%	45.78%	.01%	40.00%	.00%	.00%	.00%	.00%	.00%	6.82%	.39%	.00%	.00%
DDLTLN20	TXCDLM20	4.55%	9.76%	2.64%	5.04%	6.67%	15.38%	9.82%	11.73%	100.00%	100.00%	12.50%	9.85%	100.00%	100.00%
DDLTRN14	TXCDRN14	9.09%	12.20%	10.16%	23.03%	.00%	9.09%	3.67%	.00%	.00%	.00%	2.27%	.31%	.00%	.00%
DDLTRN24	TXCDRN24	4.55%	7.32%	10.23%	4.58%	.00%	.00%	.00%	.00%	.00%	.00%	7.95%	1.63%	.00%	.00%
**Grand*	*TOTALS*	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
**Group	BMP	27.27%	21.95%	10.49%	37.64%	40.00%	56.64%	72.56%	60.79%	.00%	.00%	42.05%	83.00%	.00%	.00%
**Group	DDL	68.18%	75.61%	89.51%	62.36%	53.33%	43.36%	27.44%	39.21%	100.00%	100.00%	57.95%	17.00%	100.00%	100.00%
** PSB Comparison (FP)		***** All values are percents of total ***													
		----- E M H C a l l s -----				----- D E D B C a l l s -----				----- M S D B C a l l s -----					
PSBname	TranCode	Calls	ClEItp	IWTs	IWEItp	Calls	ClEItp	IWTs	IWEItp	Calls	ClEItp	IWTs	IWEItp		
BMPFPE05	TXCDDL00	.00%	.00%	.00%	.00%	.65%	.05%	2.33%	.41%	.00%	.00%	.00%	.00%		
BMPFPE06	TXCDDL01	.00%	.00%	.00%	.00%	1.96%	.12%	6.98%	6.80%	70.00%	61.47%	.00%	.00%		
BMPFPE07	TXCDDL02	.00%	.00%	.00%	.00%	.65%	5.92%	1.55%	3.34%	.00%	.00%	.00%	.00%		
BMP255		.00%	.00%	.00%	.00%	56.74%	7.04%	17.83%	29.72%	.00%	.00%	.00%	.00%		
DDLTD01	TXCDDS01	70.97%	97.94%	.00%	.00%	2.83%	43.57%	10.08%	13.77%	30.00%	38.53%	.00%	.00%		
DDLTFPE3	TXCDDS03	.00%	.00%	.00%	.00%	35.00%	40.37%	55.81%	38.32%	.00%	.00%	.00%	.00%		
DDLTFPE4	TXCDDS04	.00%	.00%	.00%	.00%	.00%	.00%	.00%	.00%	.00%	.00%	.00%	.00%		
DDLTLN20	TXCDLM20	.00%	.00%	.00%	.00%	.87%	.06%	.78%	.04%	.00%	.00%	.00%	.00%		
DDLTRN14	TXCDRN14	29.03%	2.06%	.00%	.00%	.65%	2.80%	2.33%	3.81%	.00%	.00%	.00%	.00%		
DDLTRN24	TXCDRN24	.00%	.00%	.00%	.00%	.65%	.06%	2.33%	3.79%	.00%	.00%	.00%	.00%		
**Grand*	*TOTALS*	100.00%	100.00%	.00%	.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	.00%	.00%		
**Group	BMP	.00%	.00%	.00%	.00%	60.00%	13.14%	28.68%	40.27%	70.00%	61.47%	.00%	.00%		
**Group	DDL	100.00%	100.00%	.00%	.00%	40.00%	86.86%	71.32%	59.73%	30.00%	38.53%	.00%	.00%		

Figure 141. Program Summary report: PSB Comparison

The following data is reported:

PSBName

Name of the PSB whose activity is being summarized.

TranCode

Transaction code whose activity is being summarized.

Schds

Number of schedules.

Trans

Number of transactions.

Sc-Dl

Elapsed time from schedule start to first DL/I call.

DL-Tm

Elapsed time from first DL/I call to schedule end.

CPUtm

CPU time.

The following percentages are provided for **Database Calls**:

Calls

Number of database calls.

CPYEI

Elapsed time of IMS database calls in interregion COPY routines of DL/I.

DLAEI

Elapsed time of database calls in DLA routines of DL/I.

IWTs

Number of IWAITs occurring in database calls.

IWElp

Elapsed time of IWAITs occurring in database calls.

The following percentages are provided for **Msg Que Calls**:

Calls

Number of message queue calls, including buffer primes.

CIElp

Elapsed time for message queue calls.

IWTs

Number of IWAITs occurring in message queue calls.

IWElp

Elapsed time for IWAITs occurring in message queue calls.

For **Fast Path**, the following information is available:

PSBname

Name of the PSB whose activity is being summarized.

TranCode

Transaction code whose activity is being summarized.

Under the headings of **EMH Calls**, **DEDB Calls**, and **MSDB Calls**, the number of calls against EMH, DEDB, and MSDB in each PSB are presented as a percentage of the total number of calls of these types:

Calls

The number of calls of this type.

CIElp

The average elapsed time of calls of this type.

IWTs

The number of IWAITs occurring in calls of this type.

IWTElp

The elapsed time of IWAITs occurring in calls of this type.

For **ESAF Integration**, the following information is available:

** PSB Comparison (ESAF) **													
*** All values are percents of total ***													
(Sorted by Total Scheduled Elapsed time; LIMIT 30%)													
PSBname	TranCode	SSID	Total	Init	Normal	Commit 1	Commit 2	Term	Call	Elaps	Call	Elaps	Term
RMZIOIS1	RMZITIS1	P2I1	65.99%	64.60%	57.98%	69.69%	72.90%	69.70%	69.43%	57.93%	57.19%	.00%	.00%
RMZIOIR1	RMZITIR1	P2I1	32.77%	33.52%	24.66%	30.31%	27.10%	30.30%	30.57%	42.07%	42.81%	.00%	.00%
**Limit*		P2I1	98.76%	98.12%	82.64%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	.00%	.00%
**Grand*	*TOTALS*	P2I1	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Figure 142. Program Summary report with ESAF Integration: Sequenced by Occupancy (with Limit)

PSBname

The name of the PSB whose activity is being summarized.

TranCode

The transaction code whose activity is being summarized.

SSID

The external subsystem ID.

Total Calls

The total number of calls. When ESAF Integration is activated, a Call is a DL/I or external subsystem call.

DL/I calls to the Message and EMH queues, Full Function and Fast Path database DL/I calls, and external subsystem calls all contribute to the total call count.

The report breaks down external subsystem calls into five categories:

Init

Initialize, Identify, Signon, Create Thread

Normal

Normal Call

Commit 1

Commit Phase 1

Commit 2

Commit Phase 2, Commit Verify

Term

Signoff, Terminate Identify, Abort, Subsystem Not Operational, Terminate Thread

Within each category, the following data is reported:

Calls

The number of calls of this type.

Elaps

The average elapsed time per call of this type.

Database IWAIT Summary report

The IMS Database IWAIT Summary report is a summary of IWAIT activity for each data set and specified DDgroup. The report includes number of IWAITs, average elapsed time per IWAIT, and IWAITs per call. Only database and message queue IWAITs directly associated with dependent region activity are included in this report; the Total System IWAIT Summary report includes all IWAITs.

Note: The Database IWAIT Summary report is not produced from DB Monitor traces. However, a Database IWAIT Summary report for region 1 can be produced.

Monitor records: This report is derived from monitor records 20–29, 56–61.

Uses

The Database IWAIT Summary report presents the key IWAIT performance indicators:

- Number of IWAITs per call
- IWAIT elapsed times for each DDname

It also presents percentage breakdowns to help assess both potential IWAIT-related performance problems (contention, seek patterns, chains, and so on) and their total effect on performance. The report helps you quickly select data sets for further analysis. High values on IWAITs/call may indicate long twin chains, which may require reorganization or redesign of the database.

In addition, a summary line is printed for each DDgroup specified. This helps you assess the effect of such variables as data set placement and database access method.

Another consideration for I/O performance analysis is the impact of multiple regions that access one or more of the same databases. The Database IWAIT Summaries for each region help you assess the effect of such interrelationships. For further details, see [“Region Analysis report” on page 329](#).

You can get additional detail on each DDname and DDgroup by examining their individual distributions. See [“Database IWAIT Analysis report” on page 340](#) for more information.

Other reports that can be useful, along with the Database IWAIT Summary report, are the various PSB Details reports that include DDname information. See [“PSB Details reports” on page 365](#).

Options

To obtain the Database IWAIT Summary report, activate the **Database IWAIT** summary report in a Monitor Report Set.

There are no report-specific options for this report, but monitor global options apply.

Report output is sent to the DDname specified in Summary Report Output DDname on the Monitor Global Options panel.

To also produce a detail line for specified data set groups, activate **DDname Grouping** Options and specify a **DDname** or **DDname Groups** Object List, defining the data set groups to include in the report.

This is an example of the Database IWAIT Summary report.

Figure 143. Database IWAIT Summary report

Figure 144. Database IWAIT Summary report: Sequenced by Delay (with Limit)

- A detail line for each data set for which there is IWAIT activity.
- A ****Grand* *Tot** line for the total of all (100%) activity.
- The report header is suffixed by **Sorted by Total IWAIT Elapsed time** if the requested sequence was Occupancy, Calls or Delay, since only Delay is relevant to this report.
- If a number or percentage (less than 100%) Limit is specified:
 - The report header is also suffixed by **Limit nn** or **Limit nn%**
 - A ****Limit*** line is printed for the total of the reported (limited) data only.

Reporting of VSAM IWAITs is controlled by **Min VSAM IWAIT** specified on the Monitor Global Options panel. Any VSAM IWAIT whose elapsed time is less than the specified minimum VSAM IWAIT value is considered a non-I/O IWAIT and is excluded from the Database IWAIT Summary report. These excluded non-I/O IWAITs are accounted for in the Total System IWAIT Summary report.

The following heading appears at the beginning of the Database IWAIT Summary report:

Region Totals or Region No. *nn*

Region Totals

The report is a summary of all dependent region activity.

Region No. *nn*

The report is a summary of activity for the specific dependent region *nn*.

From

Start time of region activity in the reporting period.

To

End time of region activity in the reporting period.

Elapsed

Elapsed time from start until end of region activity.

The following column headings appear in the IWAIT Summary report:

DDname

DDname of data sets that have IWAIT activity reported.

Type

Database access method for the data set. This is either OSAM, VSAM, HSAM, QUE (message queue), DEDB, or MSDB.

IWAITs

Number of IWAITs against the data set. Maximum value: 10,000,000

Elap/IWAIT Sc.Mil.Mic

Average elapsed time per IWAIT. Maximum value: 1000 seconds

StdDev X Avg

The standard deviation of the elapsed IWAIT time expressed as a multiple of the average IWAIT elapsed time.

To obtain the standard deviation in units of the mean, multiply the **Elap/IWAIT** value by the **StdDev** value.

Max IWAIT Sc.Mil.Mic

Maximum elapsed time of all the IWAITs on this data set. Maximum value: 1000 seconds

Calls Waiting

The number of calls that resulted in reported IWAITs.

The total of this column is the sum of the detail lines. This may be greater than the actual number of calls that resulted in IWAITs, since a call may result in IWAITs on more than one DDname.

IWAITs/Call

Average number of IWAITs per call for those calls that issued the reported IWAITs (**IWAITs** divided by **Calls Waiting**). Notice the difference between the IWTs/Call value on the Region Summary and Program Summary reports; the latter report includes calls not resulting in IWAITs.

Pct Tot Calls

The number of calls resulting in IWAITs as a percentage of the total number of calls.

The next three columns are blank in the Total System IWAIT Summary report, and appear only in the reports by region:

Pct Rgn IWAITs

The number of IWAITs on this data set as a percent of the total number of IWAITs reported for this region.

Pct Rgn IWTElp

The elapsed time for IWAITs on this data set as a percentage of the total elapsed time for the IWAITs reported for this region.

Pct Rgn DLAEIp

The elapsed time of IWAITs on this data set as a percentage of the total time spent in the DLA routines of DL/I for this region.

Pct Tot IWAITs

The IWAITs on this data set as a percentage of all reported IWAITs.

Pct Tot IWTElp

The elapsed time of IWAITs on this data set as a percentage of the total elapsed time for the reported IWAITs.

Pct Tot DLAEIp

The elapsed time of IWAITs on this data set as a percentage of the total time spent in the DLA routines of DL/I.

Transactions by Time Period report

The IMS Transactions by Time Period report presents for each PSB-transaction code (or application-transaction code if application groupings are active) the number or percentage of transactions occurring in the specified time periods. The overall transaction rate for each time period is also reported.

Note: The Transactions by Time Period report is not produced from DB Monitor traces.

Monitor records: This report is derived from monitor records 02–29, 38–39, 47, 56–65.

Uses

The Transactions by Time Period report identifies peak transaction processing periods. For long IMS monitor traces, it can show peak periods during the processing day. Occasionally, you may want to know the “peak of the peak”. In this case, the time slots reported can be selected for fine grain peak identification.

The transaction processing rate is reported and does not necessarily reflect the message arrival rate during the same time period. If it does not, it could signal other performance problems or factors to be investigated. For example, if the processing rate is significantly lower than the arrival rate for the same time period, then transaction queueing and resulting response time problems may have to be investigated. Conversely, if the processing rate seems higher than the arrival rate for the corresponding time period, then there could be either a lot of program switching, or late starting regions could be catching up.

In general, the Transactions by Time Period report identifies those time periods to be selected as trace periods on a regular basis so that peak period activity can be identified and, thereafter, monitored for analysis. This report can also be used to monitor operation workload balancing for the application grouping feature. If applications must be scheduled to run during certain time periods only, this report can verify whether operations rules are being followed.

Options

The Transactions by Time Period report is optionally produced with the Application Detail report and the Region Detail (Region Analysis) report.

To request the Transactions by Time Period report, activate the **Transactions by Time Period** global option in a Monitor Report Set and specify the time periods and associated report options. Then to request the report by region, select the Transactions by Time Period option in the “[Region Analysis report](#)” on page 329, or to request the report by application, select the Transactions by Time Period option in the “[Application Detail report](#)” on page 336.

The Transactions by Time Period report options are:

- The report period

- COUNT or PERCENT: Show a count of transactions or show the number in each time period as a percentage of the total in the report period
- Up to 14 successive time periods on the 24-hour clock within which transaction activity is to be reported

Normally the report shows counts for each PSB-trancode combination. To show counts for each application-trancode combination, activate the **Application Grouping** Option and specify an **Application Groups** or **Program** Object List which defines the application groups to use.

```
[IMSPAMON DDNAME(ddname1),] default SUMMRPT
IMSPAMON DETAILDDNAME(ddname2),] default DETLRPT
COUNT, or PERCENT
TIMES(00:00,07:00,08:00,09:00,
10:00,11:00,12:00,13:00,14:00,
15:00,16:00,17:00,18:00,23:59:59))
IMSPAMON REGANAL(
IMSPAMON TIMEREPORT)
IMSPAMON APPLGRP(
IMSPAMON TIMEREPORT)
IMSPAMON EXECUTE
```

Content

The Transactions by Time Period report contains one detail line for each PSB-transaction code. The report shows transaction activity for up to 14 time periods during the day for each transaction code within PSB name.

The report columns are the PSB name, the transaction code, and the requested time periods. The report shows the number of transactions within each time period for each PSB-transaction code. Alternatively, you can request that the count instead be shown as a percentage of the total number of transactions. The last lines of the report show, for each time period, the total number of transactions and the number of transactions per second.

Date=14May2023 Time=09.23.41.31		IMS 15.4.0		IMS Performance Analyzer				Report from 14May2023 09.23.41.31							
Transactions by Time Period															
Region Totals		From 14May2023 9.24.33.25		To 14May2023 15.07.01.37		Elapsed=		5 Hrs 43 Mins		20.063.048 Secs					
		Midnite	07.00	08.00	09.00	10.00	11.00	12.00	13.00	14.00	15.00	16.00	17.00	18.00	
PSBNAME	Trancode	-07.00	-08.00	-09.00	-10.00	-11.00	-12.00	-13.00	-14.00	-15.00	-16.00	-17.00	-18.00	-19.00	
%PSB0001	%Tran	0	0	0	22	21	7	14	11	1	0	0	0	0	
%PSB0003	%Tran	0	0	0	1	0	0	0	0	0	0	0	0	0	
DRC@CTL0	DRC@TR01	0	0	0	2	1	1	0	0	0	0	0	0	0	
DRC@CTL0	DRC@TR02	0	0	0	0	3	3	1	0	0	0	0	0	0	
DRC@CTL0	DRC@TR03	0	0	0	4	6	2	0	0	0	0	0	0	0	
DRC@CTL0	DRC@TR04	0	0	0	4	4	1	0	1	0	0	0	0	0	
DRC@CTL0	DRC@TR1D	0	0	0	2	1	1	0	0	0	0	0	0	0	
DRC@CTL0	DRC@TR1E	0	0	0	2	1	1	0	0	0	0	0	0	0	
DRC@CTL0	DRC@TR1F	0	0	0	0	2	0	0	0	0	0	0	0	0	
DRC@CTL0	DRC@TR20	0	0	0	2	0	1	0	0	0	0	0	0	0	
RCLBDBK	CLBDBK	0	0	0	1	0	0	0	0	0	0	0	0	0	
RCLBDDS	CLBDDS	0	0	0	5	0	0	0	0	0	0	0	0	0	
RCLBDDS	ZRCLBFDS	0	0	0	6	6	2	0	0	0	0	0	0	0	
RCLBDEN	CLBDEN	0	0	0	13	1	4	0	0	0	0	0	0	0	
RCLBDEN	CLDC	0	0	0	15	7	4	0	0	0	0	0	0	0	
RCLBDEN	ZRCLBFEN	0	0	0	6	40	2	0	0	0	0	0	0	0	
RCLBDFN	CLBDFN	0	0	0	10	1	2	0	0	0	0	0	0	0	
:	:														
ZRPRW01	ZRPRW01	0	0	0	2	4	2	0	0	0	0	0	0	0	
ZRPRW01	ZRPRW02	0	0	0	2	2	1	0	0	0	0	0	0	0	
ZRSCQCS	RSCQCS	0	0	0	2	0	0	0	0	0	0	0	0	0	
ZRSCXDR	RSCXDR	0	0	0	2	0	0	0	0	0	0	0	0	0	
ZRSC2DR	ZRSC2DR	0	0	0	4	0	0	0	0	0	0	0	0	0	
ZRTDD	ZRTDD	0	0	0	10	0	0	0	0	0	0	0	0	0	
ZRWAD	ZRWAD	0	0	0	10	2	4	0	0	0	0	0	0	0	
ZSUTIL10	ZSUTIL10	0	0	0	0	0	0	0	0	0	1	0	0	0	
**Grand*	*TOTALS*	0	0	0	990	364	167	17	12	1	1	0	0	0	
**Grand*	*TOTALS*/Sec	.00	.00	.00	.28	.10	.05	.00	.00	.00	.00	.00	.00	.00	

Figure 145. Transactions by Time Period report

Chapter 24. Region Activity Analysis reports

The Region Activity Analysis reports provide a detailed analysis of all dependent regions.

These reports provide a dependent region analysis of the following:

- Region occupancy
- Program scheduling, including IWAITs
- Transaction throughput and response time
- DL/I call activity
- Database IWAITs

Region Analysis report

The Region Analysis reports are a set of reports (Region Detail, Program Summary, Transactions by Time Period, Database IWAIT Summary) for each dependent region. These IMS Performance Analyzer reports are in the same format as the corresponding Summary reports described in the Region Activity Summary reports, except that they apply to each dependent region. The Summary reports group data by type to provide convenient comparison of one measure across all regions; for example, schedule data for the total system. The Region Analysis reports group data by region, to allow all the characteristics of a region to be viewed together.

From **DB Monitor** data, the Region Detail report cannot be produced for all regions since control region scheduler records are not available; however, it can be produced for region 1. If requested, the Program Summary and Database IWAIT Summary reports can be produced for region 1; however, the Program Summary is of no value. The Transactions by Time Period report is not produced from DB Monitor data.

Monitor records: This report is derived from monitor records 02–29, 38–39, 47–49, 56–65.

Uses

The various Region Analysis reports have the same basic use as the corresponding Summary reports. In addition, they allow analysis of the effect of multiregion activity. The effects of region dispatching priority and relative CPU availability can be inferred from successively increasing elapsed times for the same PSB-transaction code or DDname activities as the region decreases in priority.

The regional Program Summary report, in conjunction with the Region Histogram, Exception Listing, and Enqueue/Dequeue Trace, are a good source of information for analyzing the effectiveness of various scheduling options. Such options are transaction class and priority, number of regions, parallel scheduling of transactions, program preload, and so on.

Options

To obtain the Region Analysis reports, activate the **Region Analysis** report in a Monitor Report Set and select one or more of the options to produce the corresponding report by region: **Region Detail, Program Summary, Database IWAIT Summary, Transactions by Time Period**.

For the Region Detail report, distribution graphs can optionally be included. From the Monitor Global Options panel, select **Include Distributions in Reports** and specify one or more of the following Distributions to produce the corresponding Region Detail graph:

- **Elapsed Time per Schedule**
- **Elapsed Time per Call**
- **Elapsed Time per IWAIT**
- **IWAITs per Call**

For the Transactions by Time Period report, also activate the **Transactions by Time Period** global option and specify the time periods in which to report transaction activity.

If no reports are selected, the default is Region Detail, Program Summary and Database IWAIT Summary reports.

Optionally, the Program Summary and the Transactions by Time Period reports can include application grouping. Activate the **Application Grouping** Option in the Monitor Report Set and specify an **Application Groups** or **Program** Object List which defines the application groups to include in the report.

Report output is sent to the DDname specified in Detail Report Output DDname on the Monitor Global Options panel.

The **ESAF Integration** and **Alternate Sequencing** Options are applicable to this report.

Content

The Region Detail report has two sections for each active MPP region, one showing an analysis of schedule, transaction, call, and IWAIT activity, as well as region idle time, and the second, if requested, showing distribution graphs of activity in the region.

The format of the Region Analysis reports for each region is the same as that described for the corresponding Summary reports. For further details of these reports, refer to the following descriptions:

- [“Region Summary report” on page 302](#)
- [“Program Summary report” on page 315](#)
- [“Database IWAIT Summary report” on page 323](#)
- [“Transactions by Time Period report” on page 326](#)

If ESAF Integration is requested:

- The Region Detail report includes a **Call data (ESAF)** section.
- The Program Summary report includes **Call Analysis (ESAF)** and **PSB Comparison (ESAF)** sections.

If Alternate Sequencing is requested:

- The Program Summary report includes:
 - The section headers suffixed by one of the following:

Sorted by Total Scheduled Elapsed time

If the requested sequence is Occupancy.

When selecting any alternate sequencing, the result is always reported in descending order. When you choose **Occupancy** as an alternate reporting sequence, the report displays by **Total Scheduled Elapsed time** in descending order. IMS Performance Analyzer uses the following calculation to display the order by **Total Scheduled Elapsed time**:

$\text{Scheds} * \text{Elap/Sched Sc.Mil.Mic} = \text{Total Scheduled Elapsed time}$

For example, in the sample preceding report (Region Summary report: Sequenced by Occupancy);

$1 * 581.613438 (581 + 0.613 + 0.000438) \text{ Seconds} = 581.613438 \text{ Seconds.}$

Similarly, $9 * 43.997861 (43 + 0.997 + 0.000861) \text{ Seconds} = 395.980749 \text{ Seconds}$ and so on.

Note: The unit of measurement for the **Elap/Sched** value is converted from seconds, milliseconds, and microseconds to seconds for a better understanding of the calculation.

Sorted by Total Call Elapsed time

If the requested sequence is Calls

Sorted by Total IWAIT Elapsed time

If the requested sequence is Delay

- If a number or percentage (less than 100%) Limit is specified:

- The section headers are also suffixed by **LIMIT nn** or **LIMIT nn%**
- A ***LIMIT *** line is printed for the total of the reported (limited) data only.
- The Database IWAIT Summary report includes:
 - The report header suffixed by **Sorted by Total IWAIT Elapsed time** if the requested sequence is Occupancy, Calls or Delay, since only Delay is relevant to this report.
 - If a number or percentage (less than 100%) Limit is specified:
 - The report header is also suffixed by **LIMIT nn** or **LIMIT nn%**
 - A ***Limit *** line is printed for the total of the reported (limited) data only.

Report from 08Jun2023 13.06.12.71				IMS 15.4.0		IMS Performance Analyzer 4.5				Report to 08Jun2023 13.10.39.26							
REGION DETAIL																	
Region No. 1 From 08Jun2023 13.06.21.86 To 08Jun2023 13.09.52.04 Elapsed= 0 Hrs 3 Mins 30.174.694 Secs																	
** Transaction data **																	
Rgn No.	Elapsed Secs.Mil	Scheds	Trans	Trans /Schd	Elap/Sched Sc.Mil.Mic	%ages of Regn elapsed		Sch-DLI	Elap/Tran	CPU/Trn	%ages of Tran Elapsed						
						Sc-DLI	Active	Idle	Mil.Mic	Sc.Mil.Mic	Mil.Mic	CPU	Call	IWAIT			
1	210.174	12	26	2.17	12.847.101	39.08%	34.27%	26.65%	6845.365	2.770.032	2.310	.08%	2.30%	.02%			
** Schedule data **																	
Rgn No.	Trans /sec	Call /sec	IWTs /sec	Schd On Q	Percents of Region		Idle Time		No Messages		Blk Ldr Busy		Sched NotIWT		Synch DB IWTs		
					NoMsg	Blldr	I/CK	DBAS	NtiW	No.	Avg Elap	No.	Avg Elap	No.	Avg Elap		
1	0.12	0.70	0.01	0.17	43.5%	.2%	.0%	.0%	1.3%	5 3.900.353	19 5.360	12 47.374	0				
** Call data **																	
Rgn No.	Calls /Tran	IWTs /Tran	IWTs /Call	MESSAGE		QUEUE		CALLS		DATABASE		CALLS					
				Calls /Tran	IWTs /Tran	IWTs /Call	Elap/Call Sc.Mil.Mic	Pct of Call Elap		Calls /Tran	IWTs /Tran	IWTs /Call	Elap/Call Sc.Mil.Mic	Pct of Call Elap			
								CPY	DLA	IWT				CPY	DLA	IWT	
1	5.7	0.1	0.01	2.3	0.0	0.02	0.232	4.7%	95.3%	.4%	3.4	0.0	0.01	18.638	.1%	99.9%	.9%
** Call data (FP) **																	
Rgn No.	Calls /Tran	IWTs /Call	EMH		Calls		DEDB		Calls		MSDB		Calls				
			Calls /Tran	IWTs /Call	Elap/Call Sc.Mil.Mic	Pct of IWAIT	Calls /Tran	IWTs /Call	Elap/Call Sc.Mil.Mic	Pct of IWAIT	Calls /Tran	IWTs /Call	Elap/Call Sc.Mil.Mic	Pct of IWAIT			
1	18.4	0.24	1.2	0.00	0.949	.0%	17.1	0.26	53.698	1.2%	0.1	0.00	1.454	.0%			

Figure 146. Region Analysis report: transactions, schedules, calls, FP calls

Report from 08Jun2023 13.06.12.71			IMS 15.4.0			IMS Performance Analyzer 4.5			Report to 08Jun2023 13.10.39.26		
REGION DETAIL											
Region No.		1		From 08Jun2023 13.06.21.86 To 08Jun2023 13.09.52.04				Elapsed=		0 Hrs 3 Mins 30.174.694 Secs	
Elapsed/Schedule											
Average			Std-Dev/Avg			Max Value					
12.847.101			1.171			46.027.278					
Range			Count in								
Sc Mil Mic			Range								
To Maximum			8			*****					
1.000.000			0								
500.000			0								
300.000			0								
100.000			0								
50.000			0								
30.000			3			*****					
10.000			0								
5.000			0								
1.000			1			***					
Total=			12			10 20 30 40 50%					

Elapsed/Call											
Average			Std-Dev/Avg			Max Value					
40.803			8.254			4.988.810					
Range			Count in								
Sc Mil Mic			Range								
To Maximum			14			*					
100.000			1								
50.000			1								
25.000			4								
20.000			4								
15.000			10			*					
10.000			19			*					
5.000			7								
2.000			2								
1.000			565			*****					
Total=			627			10 20 30 40 50%					

Elapsed/IWAIT											
Average			Std-Dev/Avg			Max Value					
2.628			1.791			19.950					
Range			Count in								
Sc Mil Mic			Range								
To Maximum			0								
100.000			0								
50.000			0								
25.000			0								
20.000			1								
15.000			12			****					
10.000			15			*****					
5.000			0								
2.000			0								
1.000			89			*****					
Total=			117			10 20 30 40 50%					

IWAITs/Call											
Average			Std-Dev/Avg			Max Value					
0.19			2.488			4					
Range			Count in								
Sc Mil Mic			Range								
To Maximum			0								
100.000			8			0					
50.000			7			0					
25.000			6			0					
20.000			5			0					
15.000			4			1					
10.000			3			1					
5.000			2			11			*		
2.000			1			88			*****		
1.000			0			526			*****		
Total=			627			10 20 30 40 50%					

Figure 147. Region Analysis report: distributions

Report from 08Jun2023 13.06.12.71			IMS 15.4.0		IMS Performance Analyzer 4.5					Report to 08Jun2023 13.10.39.26							
PROGRAM SUMMARY																	
Region No. 1		From 08Jun2023 13.06.21.86		To 08Jun2023 13.09.52.04		Elapsed=		0 Hrs 3 Mins 30.174.694 Secs									
** Program Analysis **																	
PSBname	TranCode	Scheds	Trans	Trans /Schd	Scd-DLI Mil.Mic	DLI-Term Schd Sc.Mil.Mic	on Q	Calls	IWTs	Sc.Mil.Mic	Elapsed CPUtime	Mil.Mic	Pct of Tran	Call Elap	IWT		
BMPFPE05		1	1	1.00	103.895	5.210.432	.0	18.0	.0	5.210.432	10.010	.2%	.0%	.0%			
BMP255		1	1	1.00	327.885	1.936.357	.0	292.0	.0	1.936.357	10.010	.5%	.2%	.0%			
DDLTD01	TXCDD01	4	12	3.00	***10,170	5.747.907	.0	5.8	.0	1.915.969	0.000	.0%	5.0%	.0%			
DDLTFPE3	TXCTFPE3	1	1	1.00	428.989	10.364.899	.0	182.0	.0	10.364.899	10.010	.1%	.0%	.0%			
DDLTFPE4	TXCTFPE4	1	1	1.00	***15,164	2.293	.0	1.0	.0	2.293	10.010	437%	2.1%	.0%			
DDLTLM20	TXCDLM20	1	4	4.00	5247.285	5.657.413	2.0	9.3	.5	1.414.353	2.503	.2%	8.8%	.3%			
DDLTRN14	TXCDRN14	2	5	2.50	***10,095	12.928.862	.0	5.4	.0	5.171.545	0.000	.0%	.0%	.0%			
PSBDUMMY		1	1	1.00	0.000	0.086	.0	.0	.0	0.086	10.010	640%	.0%	.0%			
Rgn	1 *TOTALS*	12	26	2.17	6845.365	6.001.736	.2	24.1	.1	2.770.032	2.310	.1%	2.3%	.0%			
**Group	BMP	2	2	1.00	215.890	3.573.395	.0	155.0	.0	3.573.395	10.010	.3%	.1%	.0%			
**Group	TFP	2	2	1.00	7796.713	5.183.596	.0	91.5	.0	5.183.596	10.010	.2%	.0%	.0%			
**Group	PSB	1	1	1.00	0.000	0.086	.0	.0	.0	0.086	10.010	640%	.0%	.0%			
**Group	DDL	9	23	2.56	9079.178	7.208.217	.2	13.7	.1	2.820.607	1.306	.0%	2.5%	.0%			
** Call Analysis **																	
Message Queue Calls																	
PSBname	TranCode	Calls /Tran	IWTs /Tran	IWTs /Call	CPY Mil.Mic	Elp Mil.Mic	Elp/IWT Mil.Mic	Calls /Tran	IWTs /Tran	IWTs /Call	CPY Mil.Mic	Elp Mil.Mic	Elp/IWT Mil.Mic	Pct DB CPY	Call DLA	Elap IWT	
BMPFPE05		2.0	.0	.00	0.007	0.140	0.000	13.0	.0	.00	0.014	0.019	0.000	41.7%	58.3%	.0%	
BMP255		18.0	.0	.00	0.010	0.164	0.000	13.0	.0	.00	0.014	0.017	0.000	45.7%	54.3%	.0%	
DDLTD01	TXCDD01	.3	.0	.00	0.020	0.062	0.000	2.3	.0	.00	0.020	42.514	0.000	.0%	.0%	.0%	
DDLTFPE3	TXCTFPE3	21.0	.0	.00	0.008	0.133	0.000	.0	.0	.00	0.017	22.280	14.541	.1%	99.9%	3.0%	
DDLTFPE4	TXCTFPE4	1.0	.0	.00	0.001	0.047	0.000	.0	.0	.00	0.011	0.015	0.000	42.7%	57.3%	.0%	
DDLTLM20	TXCDLM20	2.8	.3	.09	0.014	0.598	0.055	5.5	.3	.05	0.017	22.280	14.541	.1%	99.9%	3.0%	
DDLTRN14	TXCDRN14	.4	.0	.00	0.029	0.077	0.000	2.6	.0	.00	0.011	0.015	0.000	42.7%	57.3%	.0%	
PSBDUMMY		.0	.0	.00	0.000	0.000	0.000	.0	.0	.00	0.011	0.015	0.000	42.7%	57.3%	.0%	
Rgn	1 *TOTALS*	2.3	.0	.02	0.011	0.221	0.055	3.4	.0	.01	0.016	18.622	14.541	.1%	99.9%	.9%	
**Group	BMP	10.0	.0	.00	0.009	0.162	0.000	13.0	.0	.00	0.014	0.018	0.000	43.7%	56.3%	.0%	
**Group	TFP	11.0	.0	.00	0.008	0.129	0.000	.0	.0	.00	0.014	0.018	0.000	43.7%	56.3%	.0%	
**Group	PSB	.0	.0	.00	0.000	0.000	0.000	.0	.0	.00	0.014	0.018	0.000	43.7%	56.3%	.0%	
**Group	DDL	1.7	.0	.03	0.012	0.252	0.055	2.7	.0	.02	0.017	26.423	14.541	.1%	99.9%	.9%	
** Call Analysis (FP) **																	
E M H C a l l s																	
PSBname	TranCode	Calls /Tran	IWTs /Tran	Elap/Call Sc.Mil.Mic	Pct of IWAIT	Calls /Tran	IWTs /Tran	Elap/Call Sc.Mil.Mic	Pct of IWAIT	Calls /Tran	IWTs /Tran	Elap/Call Sc.Mil.Mic	Pct of IWAIT	Calls /Tran	IWTs /Tran	Elap/Call Sc.Mil.Mic	Pct of IWAIT
BMPFPE05		0.0	.0	.00	.0%	3.0	1.00	4.562	10.3%	0.0	.0	.00	.0%	0.0	.0	.00	.0%
BMP255		0.0	.0	.00	.0%	261.0	0.09	6.867	5.6%	0.0	.0	.00	.0%	0.0	.0	.00	.0%
DDLTD01	TXCDD01	1.8	0.00	1.309	.0%	1.1	1.00	852.937	.4%	0.3	0.00	1.454	.0%	0.0	.0	.00	.0%
DDLTFPE3	TXCTFPE3	0.0	.0	.00	.0%	161.0	0.45	63.809	1.3%	0.0	.0	.00	.0%	0.0	.0	.00	.0%
DDLTFPE4	TXCTFPE4	0.0	.0	.00	.0%	0.0	.0	.00	.0%	0.0	.0	.00	.0%	0.0	.0	.00	.0%
DDLTLM20	TXCDLM20	0.0	.0	.00	.0%	1.0	0.25	3.956	.8%	0.0	.0	.00	.0%	0.0	.0	.00	.0%
DDLTRN14	TXCDRN14	1.8	0.00	0.067	.0%	0.6	1.00	237.539	1.8%	0.0	.0	.00	.0%	0.0	.0	.00	.0%
PSBDUMMY		0.0	.0	.00	.0%	0.0	.0	.00	.0%	0.0	.0	.00	.0%	0.0	.0	.00	.0%
Rgn	1 *TOTALS*	1.2	0.00	0.949	.0%	17.1	0.26	53.698	1.2%	0.1	0.00	1.454	.0%	0.0	.0	.00	.0%
**Group	BMP	0.0	.0	.00	.0%	132.0	0.10	6.841	5.7%	0.0	.0	.00	.0%	0.0	.0	.00	.0%
**Group	TFP	0.0	.0	.00	.0%	80.5	0.45	63.809	1.3%	0.0	.0	.00	.0%	0.0	.0	.00	.0%
**Group	PSB	0.0	.0	.00	.0%	0.0	.0	.00	.0%	0.0	.0	.00	.0%	0.0	.0	.00	.0%
**Group	DDL	1.3	0.00	0.949	.0%	7.9	0.49	122.043	.9%	0.1	0.00	1.454	.0%	0.0	.0	.00	.0%

Figure 148. Region Analysis report: Program Summary - programs, calls, FP calls

Report from 08Jun2023 13.06.12.71		IMS 15.4.0		IMS Performance Analyzer 4.5				Report to 08Jun2023 13.10.39.26							
PROGRAM SUMMARY															
Region No. 1		From 08Jun2023 13.06.21.86 To 08Jun2023 13.09.52.04				Elapsed= 0 Hrs 3 Mins 30.174.694 Secs									
** PSB Comparison **		*** All values are percents of total ***													
PSBname	TranCode	Schds	Trans	Sc-Dl	Dl-Tm	CPUtm	Calls	CPYE1	DLAE1	IWTs	IWE1p	Calls	ClElp	IWTs	IWE1p
BMPFPE05		8.33%	3.85%	.13%	7.23%	16.67%	14.77%	12.42%	.02%	.00%	.00%	3.39%	2.14%	.00%	.00%
BMP255		8.33%	3.85%	.40%	2.69%	16.67%	14.77%	13.20%	.01%	.00%	.00%	30.51%	22.79%	.00%	.00%
DLTDS01	TXCDDS01	33.33%	46.15%	49.52%	31.92%	.00%	30.68%	37.83%	70.05%	.00%	.00%	6.78%	2.39%	.00%	.00%
DLTTFPE3	TXCTFPE3	8.33%	3.85%	.52%	14.39%	16.67%	.00%	.00%	.00%	.00%	.00%	35.59%	21.65%	.00%	.00%
DLTTFPE4	TXCTFPE4	8.33%	3.85%	18.46%	.00%	16.67%	.00%	.00%	.00%	.00%	.00%	1.69%	.35%	.00%	.00%
DLTLM20	TXCDLM20	8.33%	15.38%	6.39%	7.86%	16.67%	25.00%	26.61%	29.91%	100.00%	100.00%	18.64%	49.14%	100.00%	100.00%
DLTRN14	TXCDRN14	16.67%	19.23%	24.58%	35.90%	.00%	14.77%	9.95%	.01%	.00%	.00%	3.39%	1.55%	.00%	.00%
PSBDUMMY		8.33%	3.85%	.00%	.00%	16.67%	.00%	.00%	.00%	.00%	.00%	.00%	.00%	.00%	.00%
Rgn	1 *TOTALS*	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
**Group	BMP	16.67%	7.69%	.53%	9.92%	33.33%	29.55%	25.62%	.03%	.00%	.00%	33.90%	24.93%	.00%	.00%
**Group	TFP	16.67%	7.69%	18.98%	14.39%	33.33%	.00%	.00%	.00%	.00%	.00%	37.29%	22.00%	.00%	.00%
**Group	PSB	8.33%	3.85%	.00%	.00%	16.67%	.00%	.00%	.00%	.00%	.00%	.00%	.00%	.00%	.00%
**Group	DDL	75.00%	88.46%	99.47%	90.08%	50.00%	70.45%	74.38%	99.97%	100.00%	100.00%	66.10%	75.07%	100.00%	100.00%
** PSB Comparison (FP) ***** All values are percents of total ***															
PSBname	TranCode	----- E M H C a l l s -----				----- D E D B C a l l s -----				----- M S D B C a l l s -----					
BMPFPE05		Calls	ClElp	IWTs	IWTElp	Calls	ClElp	IWTs	IWTElp	Calls	ClElp	IWTs	IWTElp		
BMP255		.00%	.00%	.00%	.00%	.67%	.06%	2.61%	.48%	.00%	.00%	.00%	.00%		
DLTDS01	TXCDDS01	70.97%	97.94%	.00%	.00%	58.65%	7.50%	20.00%	34.53%	.00%	.00%	.00%	.00%		
DLTTFPE3	TXCTFPE3	.00%	.00%	.00%	.00%	2.92%	46.40%	11.30%	16.00%	100.00%	100.00%	.00%	.00%		
DLTTFPE4	TXCTFPE4	.00%	.00%	.00%	.00%	36.18%	42.99%	62.61%	44.52%	.00%	.00%	.00%	.00%		
DLTLM20	TXCDLM20	.00%	.00%	.00%	.00%	.00%	.00%	.00%	.00%	.00%	.00%	.00%	.00%		
DLTRN14	TXCDRN14	.00%	.00%	.00%	.00%	.90%	.07%	.87%	.04%	.00%	.00%	.00%	.00%		
PSBDUMMY		29.03%	2.06%	.00%	.00%	.67%	2.98%	2.61%	4.43%	.00%	.00%	.00%	.00%		
		.00%	.00%	.00%	.00%	.00%	.00%	.00%	.00%	.00%	.00%	.00%	.00%		
Rgn	1 *TOTALS*	100.00%	100.00%	.00%	.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	.00%	.00%		
**Group	BMP	.00%	.00%	.00%	.00%	59.33%	7.56%	22.61%	35.01%	.00%	.00%	.00%	.00%		
**Group	TFP	.00%	.00%	.00%	.00%	36.18%	42.99%	62.61%	44.52%	.00%	.00%	.00%	.00%		
**Group	PSB	.00%	.00%	.00%	.00%	.00%	.00%	.00%	.00%	.00%	.00%	.00%	.00%		
**Group	DDL	100.00%	100.00%	.00%	.00%	40.67%	92.44%	77.39%	64.99%	100.00%	100.00%	.00%	.00%		

Figure 149. Region Analysis report: Program Summary - PSB comparisons

Report from 08Jun2023 13.06.12.71		IMS 15.4.0		IMS Performance Analyzer 4.5				Report to 08Jun2023 13.10.39.26						
Database IWAIT Summary														
Region No.	1	From 08Jun2023 13.06.21.86 To 08Jun2023 13.09.52.04				Elapsed=		0 Hrs 3 Mins 30.174.694 Secs						
DName	Type	IWAITs	Elap/IWAIT	StdDev	Max IWAIT	Calls	IWAITs	Pct Tot	Pct Rgn	Pct Rgn	Pct Rgn	IWAITs	IWTlP	DLAEI
DB23AR0	DEDB	5	3.517	.787	5.827	5	1.00	.68%	4.27%	5.71%	.069%	3.82%	4.955%	.059%
DB23AR1	DEDB	10	5.098	1.200	12.751	8	1.25	1.09%	8.55%	16.579%	.199%	7.63%	14.365%	.171%
DB23AR2	DEDB	34	0.631	3.471	9.402	34	1.00	4.64%	29.06%	6.974%	.084%	25.95%	6.042%	.072%
DB23AR3	DEDB	15	0.914	3.388	12.500	15	1.00	2.05%	12.82%	4.459%	.054%	11.45%	3.863%	.046%
DB23AR4	DEDB	2	15.523	.285	19.950	2	1.00	.27%	1.71%	10.096%	.121%	1.53%	8.748%	.104%
DB23AR5	DEDB	21	2.252	1.920	11.386	14	1.50	1.91%	17.95%	15.382%	.185%	16.03%	13.328%	.159%
DD01AR0	DEDB	28	3.958	1.230	14.039	21	1.33	2.87%	23.93%	36.045%	.433%	21.37%	31.231%	.373%
DTMS01D1	VSAM	1	14.541	.000	14.541	1	1.00	.14%	.85%	4.729%	.057%	.76%	4.097%	.049%
SHMSG	QUE	1	0.055	.000	0.055	1	1.00	.14%	.85%	.018%	.000%	.76%	.015%	.000%
Rgn	1 *Tot	117	2.628	1.791	19.950	101	1.16	13.80%	100.00%	100.00%	1.202%	89.31%	86.645%	1.034%
DEDB	*Grp	115	2.547	1.810	19.950	99	1.16	13.52%	98.29%	95.253%	1.145%	87.79%	82.532%	.985%
VSAM	*Grp	1	14.541	.000	14.541	1	1.00	.14%	.85%	4.729%	.057%	.76%	4.097%	.049%

Figure 150. Region Analysis report: Database IWAIT Summary

Report from 25Jun2023 14.45.00.04				IMS 15.4.0				IMS Performance Analyzer 4.5				Report to 25Jun2023 14.54.59.99					
REGION DETAIL																	
Region No. 23 From 25Jun2023 14.45.00.04 To 25Jun2023 14.54.59.96 Elapsed= 0 Hrs 9 Mins 59.921.048 Secs																	
** Transaction data **																	
Rgn	Elapsed				Trans	Elap/Sched	%ages of Regn elapsed			Sch-DLI	Elap/Tran	CPU/Trn	%ages of Tran Elapsed				
No.	Secs.Mil	Scheds		Trans	/Sched	Sc.Mil.Mic	Sc-DLI	Active	Idle	Mil.Mic	Sc.Mil.Mic	Mil.Mic	CPU	Call	IWAIT		
23	599.921	667		1,310	1.96	364.519	1.75%	38.78%	59.47%	15.747	177.580	12.889	7.26%	35.89%	27.09%		
** Schedule data **																	
Rgn	Trans	Call	IWTs	Schd	Percents of Region Idle Time					No Messages		Blk Ldr Busy	Sched NotIWT	Synch DB IWTs			
No.	/sec	/sec	/sec	On Q	NoMsg	Bldr	I/CK	DBAS	NtIW	No. Avg Elap	No. Avg Elap	No. Avg Elap	No. Avg Elap	No. Avg Elap	No. Avg Elap		
23	2.18	59.50	7.38	0.00	99.9%	.0%	.0%	.0%	.1%	662 538.498	0	666	452	0			
** Call data **																	
				----- M E S S A G E Q U E U E -----				C A L L S -----				----- D A T A B A S E C A L L S -----					
Rgn	Calls	IWTs	IWTs	Calls	IWTs	IWTs	Elap/Call	Pct of Call Elap			Calls	IWTs	IWTs	Elap/Call	Pct of Call Elap		
No.	/Tran	/Tran	/Call	/Tran	/Tran	/Call	Sc.Mil.Mic	CPY	DLA	IWT	/Tran	/Tran	/Call	Sc.Mil.Mic	CPY	DLA IWT	
23	27.2	3.4	0.12	8.5	1.2	0.14	1.575	1.0%	99.0%	4.4%	18.7	2.2	0.12	2.687	.1%	99.9% 94.5%	
** Call data (ESAF) **																	
				- Initialization -		-- Normal Call ---		--- Commit Ph1 ---		--- Commit Ph2 ---		--- Termination --					
Rgn	Calls	ESAF	Calls	Elap/Call	Calls	Elap/Call	Calls	Elap/Call	Calls	Elap/Call	Calls	Elap/Call	Calls	Elap/Call			
No.	/Tran	SSID	/Tran	Sc.Mil.Mic	/Tran	Sc.Mil.Mic	/Tran	Sc.Mil.Mic	/Tran	Sc.Mil.Mic	/Tran	Sc.Mil.Mic	/Tran	Sc.Mil.Mic			
23	3.2	P2I1	1.2	0.304	0.8	25.469	0.8	0.207	0.4	1.109	0.0	0.000					
Elapsed/Schedule																	
				Average		Std-Dev/Avg		Max Value									
				364.519		.590		1.851.209									

Elapsed/Call				Elapsed/IWAIT				IWAITs/Call									
Average		Std-Dev/Avg		Max Value		Average		Std-Dev/Avg		Max Value		Average		Std-Dev/Avg		Max Value	
2.895		3.274		207.898		12.848		1.218		207.898		0.18		2.340		3	

Report from 25Jun2023		14.45.00.04		IMS 15.4.0		IMS Performance Analyzer 4.5				Report to 25Jun2023		14.54.59.99				
PROGRAM SUMMARY																
Region No. 23		From 25Jun2023 14.45.00.04		To 25Jun2023 14.54.59.96		Elapsed=		0 Hrs 9 Mins 59.921.048 Secs								
** Program Analysis ** (Sorted by Total Call Elapsed time; LIMIT 25%)																
----- Per Schedule -----																
----- Transaction -----																
PSBname	TranCode	Scheds	Trans	Trans /Sched	Scd-DLI Mil.Mic	DLI-Term Scd Mil.Mic	on Q	Calls	IWTs	Sc.Mil.Mic	Elapsed CPUtime	Pct of Tran Elap				
RMZIOIS1	RMZITIS1	409	973	2.38	4.288	410.362	.0	32.8	6.1	172.495	5.1%	41.2%	45.9%			
RMZIOIR1	RMZITIR1	124	171	1.38	4.040	300.147	.0	35.2	6.3	217.650	9.646	4.4%	31.3% 32.8%			
Rgn	23 *LIMIT *	533	1,144	2.15	4.230	384.721	.0	33.2	6.1	179.245	8.877	5.0%	39.4% 43.5%			
Rgn	23 *TOTALS*	667	1,310	1.96	15.747	348.771	.0	30.4	5.4	177.580	12.889	7.3%	35.9% 38.9%			
** Call Analysis ** (Sorted by Total Call Elapsed time; LIMIT 25%)																
----- Message Queue Calls -----																
----- Database Calls -----																
PSBname	TranCode	/Tran	/Tran	/Call	Mil.Mic	Mil.Mic	Mil.Mic	/Tran	/Tran	/Call	Mil.Mic	Mil.Mic	Mil.Mic	CPY	DLA	IWT
RMZIOIS1	RMZITIS1	8.3	1.3	.16	0.017	1.704	0.458	21.0	2.5	.12	0.004	2.703	21.557	.1%	99.9%	94.7%
RMZIOIR1	RMZITIR1	9.2	1.6	.17	0.015	1.495	0.673	22.0	2.3	.10	0.004	2.464	22.589	.1%	99.9%	93.7%
Rgn	23 *LIMIT *	8.4	1.4	.16	0.017	1.670	0.495	21.1	2.5	.12	0.004	2.665	21.698	.1%	99.9%	94.6%
Rgn	23 *TOTALS*	8.5	1.2	.14	0.016	1.558	0.495	18.7	2.2	.12	0.004	2.683	21.683	.1%	99.9%	94.5%
** Call Analysis (ESAF) ** (Sorted by Total Call Elapsed time; LIMIT 25%)																
----- Initialization -----																
----- Normal Call -----																
----- Commit Ph1 -----																
----- Commit Ph2 -----																
----- Termination -----																
PSBname	TranCode	ESAF	Calls	Elap/Call	Calls	Elap/Call	Calls	Elap/Call	Calls	Elap/Call	Calls	Elap/Call	Calls	Elap/Call		
RMZIOIS1	RMZITIS1	SSID	/Tran	Sc.Mil.Mic	/Tran	Sc.Mil.Mic	/Tran	Sc.Mil.Mic	/Tran	Sc.Mil.Mic	/Tran	Sc.Mil.Mic	/Tran	Sc.Mil.Mic		
RMZIOIR1	RMZITIR1	P2I1	1.3	0.316	0.9	26.181	0.9	0.207	0.4	1.050						
		P2I1	1.6	0.249	0.9	21.287	0.9	0.204	0.7	1.313						
Rgn	23 *LIMIT *	P2I1	1.4	0.304	0.9	25.469	0.9	0.207	0.4	1.109						
Rgn	23 *TOTALS*	P2I1	1.2	0.304	0.8	25.469	0.8	0.207	0.4	1.109						
** PSB Comparison ** *** All values are percents of total *** (Sorted by Total Call Elapsed time; LIMIT 25%)																
----- Data Base Calls -----																
PSBname	TranCode	Schds	Trans	Sc-DL	DL-Tm	CPUTm	Calls	CPYEl	DLAEl	IWTs	IWElp	Calls	ClElp	IWTs	IWElp	
RMZIOIS1	RMZITIS1	61.32%	74.27%	16.70%	72.15%	50.37%	83.24%	84.71%	83.85%	84.57%	84.08%	71.95%	78.64%	82.84%	76.66%	
RMZIOIR1	RMZITIR1	18.59%	13.05%	4.77%	16.00%	9.77%	15.34%	14.60%	14.09%	13.41%	13.97%	14.05%	13.47%	17.16%	23.34%	
Rgn	23 *LIMIT *	79.91%	87.33%	21.47%	88.15%	60.14%	98.58%	99.31%	97.94%	97.98%	98.05%	86.00%	92.11%	100.00%	100.00%	
Rgn	23 *TOTALS*	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	
** PSB Comparison (ESAF) ** *** All values are percents of total *** (Sorted by Total Call Elapsed time; LIMIT 25%)																
----- Init -----																
----- Normal -----																
----- Commit 1 -----																
----- Commit 2 -----																
----- Term -----																
PSBname	TranCode	SSID	Calls	Elaps	Calls	Elaps	Calls	Elaps	Calls	Elaps	Calls	Elaps				
RMZIOIS1	RMZITIS1	P2I1	83.49%	82.82%	85.93%	85.44%	87.83%	85.46%	85.67%	77.26%	73.09%	.00%	.00%			
RMZIOIR1	RMZITIR1	P2I1	16.51%	17.18%	14.07%	14.56%	12.17%	14.54%	14.33%	22.74%	26.91%	.00%	.00%			
Rgn	23 *LIMIT *	P2I1	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	.00%	.00%			
Rgn	23 *TOTALS*	P2I1	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	.00%	.00%			

Figure 152. Region Analysis report: Program Summary with ESAF Integration and Sequenced by Calls (with Limit)

Application Detail report

A separate Application Detail report is produced for each specified application (PSB) group. This IMS Performance Analyzer report can provide an analysis of program activity for each program group, including details for each PSB name that comprises the group, in the same format as the Program Summary report. Also provided are distribution graphs for the elapsed time per schedule, elapsed time per call, elapsed time per IWAIT, and number of IWAITs per call for each group and for each PSB within the group. You can also see the number or percent of transactions occurring, and overall transaction rate for specified time periods, in the same format as the Transactions by Time Period report.

The Application Detail report cannot be produced from DB Monitor traces.

Monitor records: This report is derived from monitor records 02–29, 38–39, 47–49, 56–65.

Uses

The application grouping feature provides a separate report for each group of PSBs having similar characteristics. The definition of *similar* is whatever is meaningful to you. Groups might be established by department (cash, sales, orders, and so on), by vendor, or by application development group (as in the sample report); or groups might be IMS-oriented, such as by transaction class.

Once the groups have been defined, comparative evaluations can be made. For example, the report might show that one application group has a better design technique that could be shared with other groups. Maybe one application group can share a dependent region with another group. The need to redistribute application workload during the workday or transaction class assignment might be inferred.

Options

To request the Application Detail report, activate the **Application Detail** report in a Monitor Report Set and select **Program Summary** (the default) or **Transactions by Time Period** or both. Also, specify the application groups to include in the report by activating the **Application Grouping** global option, and specifying an Object List of **Application Groups** or **Programs**.

The Application Detail report cannot be produced by region. However, other options include:

- To produce the Transactions by Time Period report, also activate the Transactions by Time Period global option and specify the time periods in which to report transaction activity.
- Optionally, activate the **ESAF Integration** global option to include external subsystem calls in total call and IWAIT counts.
- Optionally, distribution graphs may be added to the report. From the Monitor Global Options panel, select **Include Distributions in Reports** and specify one or more of the following Distributions to produce the corresponding Application Detail graph:
 - **Elapsed Time per Schedule**
 - **Elapsed Time per Call**
 - **Elapsed Time per IWAIT**
 - **IWAITs per Call**

The report output is identified by the Detail Report Output DDname global option.

Content

This is an example of the Application Detail report. For each application group, a report identical in format to the Program Summary report is presented, showing a summary of program activity for each PSB that is part of the application group.

For each application group, the report carries the heading "Application Detail – xxxxxxxx" where xxxxxxxx is a specified application group name.

The Transactions by Time Period report for the application group is presented if the **Transactions by Time Period** Option in the Monitor Report Set is activated and appropriate options specified.

If ESAF Integration is requested, the Program Summary report includes **Call Analysis (ESAF)** and **PSB Comparison (ESAF)** sections.

If distributions are requested, the report also contains the following information for each PSB in each application group, and for the totals of each application group:

- **Program Analysis** line of the Program Summary report
- **Call Analysis** line of the Program Summary report
- **Call Analysis (ESAF)** line of the Program Summary report
- **Distributions.** Elapsed time per schedule, elapsed time per call, elapsed time per IWAIT, and number of IWAITs per call statistical summary line, with graphical output corresponding to the specified Distributions.

Date=14May2023 Time=09.23.41.31			IMS 15.4.0			IMS Performance Analyzer			Report from 14May2023 09.23.41.31								
Application Detail - ZRC																	
** Program Analysis **																	
			----- Per Schedule -----			----- P e r T r a n s a c t i o n -----											
PSBname	TranCode	Schds	Trans	Trans /Schd	Scd-DLI Mil.Mic	DLI-Term Sc.Mil.Mic	on Q	Schd	Calls	IWTs	Sc.Mil.Mic	CPUtme Mil.Mic	Pct of CPU	Call	Tran Elap IWT		
ZRCMCC	ZRCMCC	14	30	2.14	107.966	995.281	3.1	20.3	.8		464.464	30.229	6.5%	62.4%	3.9%		
ZRCMCXR	ZRCMCXRA	1	1	1.00	161.421	2.040.835	.0	22.0	.0		2.040.835	0.000	.0%	80.2%	.0%		
ZRCMMSG	ZRCMMSGGA	2	10	5.00	205.719	9.547.227	.0	38.4	7.2		1.909.445	0.000	.0%	87.8%	13.3%		
ZRCMMSG	ZRCMMSGD	1	5	5.00	77.799	1.024.439	.0	37.4	2.0		204.888	0.000	.0%	29.3%	17.9%		
ZRCMMSG	ZRCMMSGR	1	5	5.00	152.307	1.593.330	.0	52.4	2.0		318.666	0.000	.0%	19.5%	11.9%		
ZRCMSPC	ZRCMSPCA	2	2	1.00	123.230	3.110.981	.0	191.5	19.5		3.110.981	0.000	.0%	15.0%	10.9%		
ZRCMTCW	ZRCMTACL	20	20	1.00	62.204	227.334	1.2	7.0	1.0		227.334	15.868	7.0%	51.9%	3.0%		
ZRCOWHO	ZRCOWHO	20	21	1.05	92.145	1.147	.0	2.5	.0		1.092	0.000	.0%	66.6%	.0%		
ZRCPCD	ZRCPCD	13	13	1.00	39.176	188.510	.0	16.6	1.7		188.510	5.940	3.2%	83.1%	9.4%		
ZRCPCFD	ZRCPCFD	2	2	1.00	258.731	3.404.673	.0	44.5	194.5		3.404.673	135.382	4.0%	56.3%	21.2%		
ZRCPCFS	ZRCPCFS	2	2	1.00	48.039	1.162.620	.0	12.0	2.5		1.162.620	14.170	1.2%	36.5%	3.3%		
ZRCPCDD	ZRCPCDD	14	14	1.00	40.672	144.510	.0	22.4	2.9		144.510	0.000	.0%	35.4%	21.5%		
ZRC1PTC	ZRC1PTC	5	5	1.00	44.371	15.083	.0	5.2	.8		15.083	0.000	.0%	67.0%	11.6%		
**Group	*TOTALS*	97	130	1.34	77.959	640.849	.7	20.8	4.9		478.172	12.312	2.6%	62.0%	10.4%		
** Call Analysis **----- Message Queue Calls -----																	
									----- D a t a b a s e C a l l s -----								
PSBname	TranCode	Calls /Tran	IWTs /Tran	IWTs /Call	CPY Elp Mil.Mic	DLA Elp Mil.Mic	Elp/IWT Mil.Mic	Calls /Tran	IWTs /Tran	IWTs /Call	CPY Elp Mil.Mic	DLA Elp Mil.Mic	Elp/IWT Mil.Mic	Pct DB	Call Elap		
ZRCMCC	ZRCMCC	3.7	.7	.18	0.027	7.223	21.563	16.6	.2	.01	0.103	15.771	21.440	.6%	99.4%		
ZRCMCXR	ZRCMCXRA	5.0	.0	.00	0.027	1.025	0.000	17.0	.0	.00	0.173	95.763	0.000	.2%	99.8%		
ZRCMMSG	ZRCMMSGGA	1.8	1.4	.78	0.033	5.487	3.335	36.6	5.8	.16	0.093	45.459	42.963	.2%	99.8%		
...																	
**Group	*TOTALS*	3.3	.8	.25	0.030	4.774	10.454	17.5	4.1	.23	0.108	15.912	10.106	.7%	99.3%		
** PSB Comparison **												*** All values are percents of total ***					
									----- Data Base			Calls -----			----- Msg Que		
PSBname	TranCode	Schds	Trans	Sc-Dl	Dl-Tm	CPUtme	Calls	CPYE1	DLAE1	IWTs	IWE1p	Calls	CIElp	IWTs	IWE1p		
ZRCMCC	ZRCMCC	14.43%	23.08%	19.99%	22.42%	56.66%	21.86%	20.78%	21.66%	.95%	2.01%	25.81%	38.94%	18.69%	38.55%		
ZRCMCXR	ZRCMCXRA	1.03%	.77%	2.13%	3.28%	.00%	.75%	1.20%	4.50%	.00%	.00%	1.15%	.25%	.00%	.00%		
ZRCMMSG	ZRCMMSGGA	2.06%	7.69%	5.44%	30.72%	.00%	16.09%	13.80%	45.98%	10.96%	46.61%	4.15%	4.77%	13.08%	4.17%		
...																	
**Group	*TOTALS*	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%		

Figure 153. Application Detail report: programs, calls, PSB comparison

Date=14May2023 Time=09.23.41.31		IMS 15.4.0		IMS Performance Analyzer				Report from 14May2023 09.23.41.31							
Application Detail - ZRC															
PSBNAME	Trancode	Midnite	07.00	08.00	09.00	10.00	11.00	12.00	13.00	14.00	15.00	16.00	17.00	18.00	19.00
ZRCMCC	ZRCMCC	-07.00	-08.00	-09.00	-10.00	-11.00	-12.00	-13.00	-14.00	-15.00	-16.00	-17.00	-18.00	-19.00	-24.00
ZRCMCXR	ZRCMCXRA	0	0	0	20	10	0	0	0	0	0	0	0	0	0
ZRCMMSG	ZRCMMSGA	0	0	0	5	5	0	0	0	0	0	0	0	0	0
ZRCMMSG	ZRCMMSGD	0	0	0	5	0	0	0	0	0	0	0	0	0	0
ZRCMMSG	ZRCMMSGR	0	0	0	5	0	0	0	0	0	0	0	0	0	0
ZRCMSPC	ZRCMSPCA	0	0	0	0	2	0	0	0	0	0	0	0	0	0
ZRCMTCW	ZRCMTACL	0	0	0	15	5	0	0	0	0	0	0	0	0	0
ZRCOWHO	ZRCOWHO	0	0	0	8	9	4	0	0	0	0	0	0	0	0
ZRCPCD	ZRCPCD	0	0	0	13	0	0	0	0	0	0	0	0	0	0
ZRCPCFD	ZRCPCFD	0	0	0	0	1	1	0	0	0	0	0	0	0	0
ZRCPCFS	ZRCPCFS	0	0	0	0	1	1	0	0	0	0	0	0	0	0
ZRCPCDD	ZRCPCDD	0	0	0	0	14	0	0	0	0	0	0	0	0	0
ZRC1PTC	ZRC1PTC	0	0	0	0	5	0	0	0	0	0	0	0	0	0
**Group*	*TOTALS*	0	0	0	72	50	8	0	0	0	0	0	0	0	0
**Group*	*TOTALS*/Sec	.00	.00	.00	.02	.01	.00	.00	.00	.00	.00	.00	.00	.00	.00

Figure 154. Application Detail report: Transactions by Time Period

Date=14May2023 Time=09.23.41.31

IMS 15.4.0 IMS Performance Analyzer

Report from 14May2023 09.23.41.31

Application Detail - ZRC

** Program Analysis **

----- Per Schedule -----

----- P e r T r a n s a c t i o n -----

Trans Scd-DLI DLI-Term Schd Elapsed CPUtime Pct of Tran Elap

PSBname TranCode Scheds Trans /Schd Mil.Mic Sc.Mil.Mic on Q Calls IWTs Sc.Mil.Mic Mil.Mic CPU Call IWT

**Group *TOTALS*

97 130 1.34 77.959 640.849 .7 20.8 4.9 478.172 12.312 2.6% 62.0% 10.4%

ELAPSED/SCHEDULE

Average Std-Dev/Avg Max Value

718.808 2.890 18.450.534

Range Count in

Sc Mil Mic Range

To Maximum 16 *****

1.000.000 9 ****

500.000 5 **

300.000 18 *****

100.000 14 *****

50.000 7 ***

30.000 17 *****

10.000 2 *

5.000 9 ****

1.000 0

Total= 97 10 20 30 40 50%

** Call Analysis **

----- Message Queue Calls -----

----- D a t a b a s e C a l l s -----

PSBname TranCode Calls IWTs IWTs CPY Elp DLA Elp Elp/IWT Calls IWTs IWTs CPY Elp DLA Elp Elp/IWT Pct DB Call Elap

PSBname TranCode /Tran /Tran /Call Mil.Mic Mil.Mic Mil.Mic /Tran /Tran /Call Mil.Mic Mil.Mic Mil.Mic CPY DLA IWT

**Group *TOTALS*

3.3 .8 .25 0.030 4.774 10.454 17.5 4.1 .23 0.108 15.912 10.106 .7% 99.3% 14.7%

ELAPSED PER CALL

Average Std-Dev/Avg Max Value

14.223 18.671 11.218.609

Range Count in

Sc Mil Mic Range

To Maximum 8

1.000.000 2

500.000 0

300.000 13

100.000 9

50.000 30

30.000 81 *

10.000 43 *

5.000 111 **

1.000 2411 *****

Total= 2,708 10 20 30 40 50%

ELAPSED PER IWAIT

Average Std-Dev/Avg Max Value

10.165 5.874 1.478.907

Range Count in

Sc Mil Mic Range

To Maximum 1

1.000.000 0

500.000 0

300.000 1

100.000 4

50.000 24 **

30.000 120 *****

10.000 50 ***

5.000 436 *****

1.000 0

Total= 636 10 20 30 40 50%

IWAITS PER CALL

Average Std-Dev/Avg Max Value

0.000 30.086 0.366

Range Count in

Sc Mil Mic Range

To Maximum 0

1.000.000 0

500.000 0

300.000 0

100.000 0

50.000 0

30.000 0

10.000 0

5.000 0

1.000 2708 *****

Total= 2,708 10 20 30 40 50%

Figure 155. Application Detail report: distributions

Report from 31May2023 13.06.10.91				IMS 15.4.0 IMS Performance Analyzer 4.5								Report to 31May2023 13.11.23.46				
Application Detail - APGRP1																
** Program Analysis **																
		-----			Per Schedule			-----			P r o g r a m			T r a n s a c t i o n		
PSBname	TranCode	Schds	Trans	/Schd	Mil.Mic	Sc.Mil.Mic	DLI-Term	Schd on Q	Calls	IWTs	Sc.Mil.Mic	Elapsed CPUtime	Mil.Mic	Pct of Tran	Elap IWT	
AI340	AI340T01	2	2	1.00	1.768	127.793	.0	14.0	8.0	127.793	6.916	5.4%	13.6%	98.2%		
AI342	AI342T01	2	2	1.00	2.041	139.958	.0	15.0	9.0	139.958	6.968	5.0%	41.3%	117%		
PU100	PU100T01	6	6	1.00	2.032	757.796	.0	178.3	162.0	757.796	88.608	11.7%	25.4%	109%		
PU102	PU102T01	30	30	1.00	2.655	302.904	.0	51.7	47.2	302.904	44.332	14.6%	21.0%	90.9%		
**Group	*TOTALS*	628	635	1.01	4.584	120.956	.0	18.4	5.5	119.622	17.223	14.4%	32.0%	58.7%		
** Call Analysis **																
		-----			Message Queue			-----			D a t a b a s e			C a l l s		
PSBname	TranCode	/Tran	/Tran	/Call	Mil.Mic	Mil.Mic	DLA	Elp	Elp/IWT	Calls	IWTs	IWTs	CPY	Elp	Elp/IWT	Pct DB Call
AI340	AI340T01	5.0	3.0	.60	0.011	3.413	29.787	1.0	.0	1.0	.0	.00	0.034	0.178	0.000	15.8%
AI342	AI342T01	5.0	3.0	.60	0.010	8.622	48.217	2.0	1.0	1.0	.50	0.036	7.262	13.822	.5%	99.5%
PU100	PU100T01	7.2	9.3	1.30	0.010	15.504	47.724	12.0	2.8	.24	0.042	6.703	26.428	.6%	99.4%	
PU102	PU102T01	3.0	2.0	.67	0.005	9.814	44.061	3.0	1.5	.51	0.043	11.187	20.980	.4%	99.6%	
**Group	*TOTALS*	8.0	.6	.07	0.017	1.817	27.207	5.7	.7	.13	0.039	4.107	22.268	.9%	99.1%	
** Call Analysis (ESAF) **																
		- Initialization -			-- Normal Call --			--- Commit Ph1 ---			--- Commit Ph2 ---			--- Termination ---		
PSBname	TranCode	ESAF SSID	Calls	Elap/Call	Sc.Mil.Mic	Calls	Elap/Call	Calls	Elap/Call	Calls	Elap/Call	Calls	Elap/Call	Calls	Elap/Call	
AI340	AI340T01	DBP2	2.0	0.178	3.0	11.933	3.0	11.933	3.0	26.580	3.0	26.580	3.0	26.580	3.0	
AI342	AI342T01	DBP2	2.0	0.204	3.0	1.479	3.0	1.479	3.0	46.427	3.0	46.427	3.0	46.427	3.0	
PU100	PU100T01	DBP2	5.2	0.311	144.7	2.095	9.3	43.697	2.0	46.714	2.0	46.714	2.0	46.714	2.0	
PU102	PU102T01	DBP2	2.0	0.250	41.7	3.710	0.0	0.715	0.4	34.053	0.0	5.218	0.0	5.218	0.0	
**Group	*TOTALS*	DBP2	0.3	0.254	3.8	9.996	0.0	0.715	0.4	34.053	0.0	5.218	0.0	5.218	0.0	
**Group	*TOTALS*	Q3P2	0.0	0.178	0.1	2.586	0.0	0.715	0.4	34.053	0.0	5.218	0.0	5.218	0.0	
** PSB Comparison ** *** All values are percents of total ***																
PSBname	TranCode	Schds	Trans	Sc-DL	DL-Tm	CPUtm	Calls	CPYEl	DLAEl	Calls	IWTs	IWEIwp	Calls	CLIElp	Calls	IWTs
AI340	AI340T01	.32%	.31%	.12%	.34%	.13%	.06%	.05%	.00%	.00%	.00%	.00%	.20%	.37%	1.65%	1.81%
AI342	AI342T01	.32%	.31%	.14%	.37%	.13%	.11%	.10%	.20%	.42%	.26%	.20%	.20%	.92%	1.65%	2.93%
PU100	PU100T01	.96%	.94%	.42%	5.99%	4.86%	2.00%	2.18%	3.26%	3.60%	4.27%	.84%	7.13%	15.43%	27.06%	27.06%
PU102	PU102T01	4.78%	4.72%	2.77%	11.96%	12.16%	2.53%	2.83%	6.88%	9.75%	9.18%	1.76%	9.45%	16.53%	26.77%	26.77%
**Group	*TOTALS*	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
** PSB Comparison (ESAF) ** *** All values are percents of total ***																
PSBname	TranCode	SSID	Total	----- Init -----	----- Init -----	----- Normal -----	----- Normal -----	----- Commit 1 -----	----- Commit 1 -----	----- Commit 2 -----	----- Commit 2 -----	----- Term -----	----- Term -----	----- Term -----	----- Term -----	----- Term -----
AI340	AI340T01	DBP2	.54%	1.73%	1.24%	.24%	.30%	.00%	.00%	2.21%	1.85%	.00%	.00%	.00%	.00%	.00%
AI342	AI342T01	DBP2	.54%	1.73%	1.24%	.24%	.30%	.00%	.00%	2.21%	1.85%	.00%	.00%	.00%	.00%	.00%
PU100	PU100T01	DBP2	32.08%	13.42%	16.74%	35.44%	7.53%	.00%	.00%	20.66%	28.38%	.00%	.00%	.00%	.00%	.00%
PU102	PU102T01	DBP2	46.05%	25.97%	26.05%	51.08%	19.21%	.00%	.00%	22.14%	32.50%	.00%	.00%	.00%	.00%	.00%
**Group	*TOTALS*	DBP2	97.31%	93.07%	95.05%	98.24%	99.54%	100.00%	100.00%	92.25%	98.73%	.00%	.00%	.00%	.00%	.00%
**Group	*TOTALS*	Q3P2	2.69%	6.93%	4.95%	1.76%	.46%	.00%	.00%	7.75%	1.27%	.00%	.00%	.00%	.00%	.00%

Figure 156. Application Detail report with ESAF Integration

Database IWAIT Analysis report

The Database IWAIT Analysis report produces IWAIT distribution graphs and IWAIT activity analysis by DDname and DDname Group for each dependent region. The report can be obtained from both IMS Monitor and DB Monitor data.

Monitor records: This report is derived from monitor records 20–29, 56–61.

Uses

The Database IWAIT Analysis report expands the detail already available in the Database IWAIT Summary report by graphically portraying the distribution of IWAIT time for each DDname and DDgroup. Widely dispersed times and long elapsed times, which would be accompanied by a large standard deviation, may indicate inefficient seek patterns. By using DDgroups based on a direct-access device, you can determine if this is the problem. This grouping, in conjunction with the Database IWAIT Analysis distribution graphs, may also help you isolate problems in database organization, data set contention, or shared direct-access device interference.

Options

To obtain the Database IWAIT Analysis report, activate the **Database IWAIT Analysis** report in a Monitor Report Set.

In addition:

- To obtain distribution graphs, specify the following on the Database IWAIT Analysis report panel:
 - Select **Print Distributions**.
 - Specify a Distribution for **Elapsed Time per IWAIT**. If not specified, the sample Distribution DDIWELAP is used.
- To present IWAIT activity by groups of DDnames, activate the **DDname Grouping** Option in the Monitor Report Set, and specify a **DDname** or **DDname Groups** Object List which defines the groups to appear in the report.
- To present IWAIT activity by region, select **Report Breaks by Region** on the Monitor Global Options panel.

Report output is sent to the DDname specified in Detail Report Output DDname on the Monitor Global Options panel.

The **Alternate Sequencing** option is applicable to this report.

Content

The Database IWAIT Analysis report has two parts: the Database IWAIT Summary and the distribution graphs.

The Database IWAIT Summary (which appears in this report under the heading "Database IWAIT Analysis") is repeated in the output for convenience; this summary presents IWAIT activity for each DDname and, if specified, each DDgroup. The Database IWAIT Summary is followed by elapsed time per IWAIT distribution graphs, 12 per page, one for each DDname (in the monitor records; there is no filter on DDname) and each specified DDgroup.

See [“Database IWAIT Summary report” on page 323](#) for a description of the report.

If Alternate Sequencing is requested:

- The report header is suffixed by **Sorted by Total IWAIT Elapsed time**. Only Delay is applicable to this report.
- If a number or percentage (less than 100%) Limit is specified:
 - The report header is also suffixed by **LIMIT nn** or **LIMIT nn%**
 - A ****Limit*** line is printed for the total of the reported (limited) data only.
 - A ***Tot** line is printed for the total of all (100%) of the data.

Database IWAIT Analysis

Region Totals				From 08Jun2023 13.06.21.86 To 08Jun2023 13.09.52.04				Elapsed= 0 Hrs 4 Mins 26.545.110 Secs																	
		Elap/IWAIT		StdDev		Max IWAIT		Calls		IWAITS		Pct Tot		Pct Tot		Pct Tot									
DName	Type	IWAITS	Sc.Mil.Mic	X Avg	Sc.Mil.Mic	Waiting	I/Call	Pct Tot	Calls	IWAITS	IWTElp	DLAE1p													
DB23AR0	DEDB	5	3.517	.787	5.827	5	1.00	.68%		3.82%	4.955%	.059%													
DB23AR1	DEDB	12	4.263	1.382	12.751	9	1.33	1.23%		9.16%	14.414%	.172%													
DB23AR2	DEDB	34	0.631	3.471	9.402	34	1.00	4.64%		25.95%	6.042%	.072%													
DB23AR3	DEDB	16	1.652	2.507	12.726	16	1.00	2.19%		12.21%	7.449%	.089%													
DB23AR4	DEDB	3	10.386	.781	19.950	3	1.00	.41%		2.29%	8.779%	.105%													
DB23AR5	DEDB	31	2.635	1.754	11.386	21	1.48	2.87%		23.66%	23.016%	.275%													
DD01AR0	DEDB	28	3.958	1.230	14.039	21	1.33	2.87%		21.37%	31.231%	.373%													
DIMS01D1	VSAM	1	14.541	.000	14.541	1	1.00	.14%		.76%	4.097%	.049%													
SHMSG	QUE	1	0.055	.000	0.055	1	1.00	.14%		.76%	.015%	.000%													
**Grand*	*Tot	131	2.709	1.761	19.950	111	1.18	15.16%		100.00%	100.00%	1.194%													
DEDB	*Grp	129	2.638	1.776	19.950	109	1.18	14.89%		98.47%	95.887%	1.144%													
VSAM	*Grp	1	14.541	.000	14.541	1	1.00	.14%		.76%	4.097%	.049%													
		Average SD/Avg Max-Value			Average SD/Avg Max-Value			Average SD/Avg Max-Value			Average SD/Avg Max-Value														
		10.386 .786 19.950			2.635 1.758 11.386			3.958 1.234 14.039			14.541 .005 14.541														
Range		Count in	DDnm=DB23AR4 DEDB		Count in	DDnm=DB23AR5 DEDB		Count in	DDnm=DD01AR0 DEDB		Count in	DDnm=DIMS01D1 VSAM													
Sc Mil Mic		Range	Totals all Regions		Range	Totals all Regions		Range	Totals all Regions		Range	Totals all Regions													
To Maximum		0			0			0			0														
100.000		0			0			0			0														
50.000		0			0			0			0														
25.000		0			0			0			0														
20.000		1	*****		0			0			0														
15.000		1	*****		7	*****		1	*		1	*****													
10.000		0			0			10	*****		0														
5.000		0			0			0			0														
2.000		0			0			0			0														
1.000		1	*****		24	*****		17	*****		0														
Total=		3	10	20	30	40	50%	31	10	20	30	40	50%	28	10	20	30	40	50%	1	10	20	30	40	50%
		Average SD/Avg Max-Value			Average SD/Avg Max-Value			Average SD/Avg Max-Value			Average SD/Avg Max-Value														
		0.055 .005 0.055			2.709 1.765 19.950			2.638 1.781 19.950			14.541 .005 14.541														
Range		Count in	DDnm=SHMSG QUE		Count in	DDnm=**Grand* *Tot		Count in	DDnm=DEDB *Grp		Count in	DDnm=VSAM *Grp													
Sc Mil Mic		Range	Totals all Regions		Range	Totals all Regions		Range	Totals all Regions		Range	Totals all Regions													
To Maximum		0			0			0			0														
100.000		0			0			0			0														
50.000		0			0			0			0														
25.000		0			0			0			0														
20.000		0			1			1			0														
15.000		0			16	****		15	****		1	*****													
10.000		0			15	****		15	****		0														
5.000		0			0			0			0														
2.000		0			0			0			0														
1.000		1	*****		99	*****		98	*****		0														
Total=		1	10	20	30	40	50%	131	10	20	30	40	50%	129	10	20	30	40	50%	1	10	20	30	40	50%

Report from 28May2023 15.17.36.27										IMS 15.4.0 IMS Performance Analyzer 4.5 Report to 28May2023 15.40.48.33									
Database IWAIT Analysis (Sorted by Total IWAIT Elapsed time; LIMIT 10%)																			
Region Totals										From 28May2023 15.25.59.45 To 28May2023 15.37.24.84 Elapsed= 0 Hrs 23 Mins 12.057.507 Secs									
DDname	Type	IWAITs	Elap/IWAIT	StdDev	Max IWAIT	Sc.Mil.Mic	X Avg	Sc.Mil.Mic	Waiting	Calls	IWAITs	Pct Tot	Pct Rgn	Pct Rgn	Pct Rgn	Pct Tot	Pct Tot	Pct Tot	Pct Tot
HJOHSG10	VSAM	111	35.394	1.756	591.093	71	1.56	6.62%								33.23%	45.037%	.593%	
**Limit*		111	35.394	1.756	591.093	71	1.56	6.62%								33.23%	45.037%	.593%	
**Grand* *Tot		334	26.118	1.736	591.093	239	1.40	22.27%								100.00%	100.00%	1.316%	
Database IWAIT Analysis (Sorted by Total IWAIT Elapsed time; LIMIT 10%)																			
Region No. 1										From 28May2023 15.25.59.45 To 28May2023 15.37.24.84 Elapsed= 0 Hrs 11 Mins 25.393.819 Secs									
DDname	Type	IWAITs	Elap/IWAIT	StdDev	Max IWAIT	Sc.Mil.Mic	X Avg	Sc.Mil.Mic	Waiting	Calls	IWAITs	Pct Tot	Pct Rgn	Pct Rgn	Pct Rgn	Pct Tot	Pct Tot	Pct Tot	Pct Tot
HJOHSG10	VSAM	63	35.505	2.071	591.093	41	1.54	3.82%								18.86%	25.641%	.337%	
**Limit*		63	35.505	2.071	591.093	41	1.54	3.82%								18.86%	25.641%	.337%	
Rgn 1 *Tot		177	27.675	1.722	591.093	131	1.35	12.21%								52.99%	56.153%	.739%	
Database IWAIT Analysis (Sorted by Total IWAIT Elapsed time; LIMIT 10%)																			
Region No. 2										From 28May2023 15.26.02.27 To 28May2023 15.37.17.06 Elapsed= 0 Hrs 11 Mins 14.792.118 Secs									
DDname	Type	IWAITs	Elap/IWAIT	StdDev	Max IWAIT	Sc.Mil.Mic	X Avg	Sc.Mil.Mic	Waiting	Calls	IWAITs	Pct Tot	Pct Rgn	Pct Rgn	Pct Rgn	Pct Tot	Pct Tot	Pct Tot	Pct Tot
HJOHSG10	VSAM	21	36.189	1.264	217.650	11	1.91	1.03%								6.29%	8.712%	.115%	
**Limit*		21	36.189	1.264	217.650	11	1.91	1.03%								6.29%	8.712%	.115%	
Rgn 2 *Tot		81	20.147	1.555	217.650	56	1.45	5.22%								24.25%	18.707%	.246%	
Database IWAIT Analysis (Sorted by Total IWAIT Elapsed time; LIMIT 10%)																			
Region No. 3										From 28May2023 15.26.04.12 To 28May2023 15.37.17.20 Elapsed= 0 Hrs 11 Mins 13.084.772 Secs									
DDname	Type	IWAITs	Elap/IWAIT	StdDev	Max IWAIT	Sc.Mil.Mic	X Avg	Sc.Mil.Mic	Waiting	Calls	IWAITs	Pct Tot	Pct Rgn	Pct Rgn	Pct Rgn	Pct Tot	Pct Tot	Pct Tot	Pct Tot
HJOHSG10	VSAM	26	34.669	1.187	198.331	18	1.44	1.68%								7.78%	10.333%	.136%	
**Limit*		26	34.669	1.187	198.331	18	1.44	1.68%								7.78%	10.333%	.136%	
Rgn 3 *Tot		71	28.738	1.849	390.802	47	1.51	4.38%								21.26%	23.390%	.308%	
Database IWAIT Analysis (Sorted by Total IWAIT Elapsed time; LIMIT 10%)																			
Region No. 4										From 28May2023 15.26.04.45 To 28May2023 15.28.03.74 Elapsed= 0 Hrs 1 Mins 59.288.831 Secs									
DDname	Type	IWAITs	Elap/IWAIT	StdDev	Max IWAIT	Sc.Mil.Mic	X Avg	Sc.Mil.Mic	Waiting	Calls	IWAITs	Pct Tot	Pct Rgn	Pct Rgn	Pct Rgn	Pct Tot	Pct Tot	Pct Tot	Pct Tot
HJVHSGXJ	VSAM	2	35.944	.044	37.514	2	1.00	.19%								.60%	.824%	.011%	
**Limit*		2	35.944	.044	37.514	2	1.00	.19%								.60%	.824%	.011%	
Rgn 4 *Tot		5	30.532	.384	41.861	5	1.00	.47%								1.50%	1.750%	.023%	

Figure 158. Database IWAIT Analysis report by Region, Sequenced by Delay (with Limit)

DDgroup report

The DDgroup report presents for each specified DDgroup, an analysis of database IWAIT activity for the group and for each data set in the DDgroup. The IMS Performance Analyzer DDgroup report is available from DB Monitor traces.

Uses

The DDgroup report provides information to analyze database IWAIT activity, and is an excellent way to analyze data set placement or database access method. For example, DDgroups could be established for each volume serial number, each IMS access method, the data set type, and so on. [Figure 159 on page 344](#) shows a DDgroup based on access method type (VSAM). If it is known that access to VSAM databases should be random (GU calls), the expected IWAITs/Call ratio is approximately 1.0. In the sample however, one database (CKTLDSDI) has a ratio of 4.53. Either access is not through GU calls, or possibly synonym chains have developed. You can verify this by referring to the PSB Details (Program Activity Detail reports) for the PCB names associated with the DDname.

Grouping in this way also makes it convenient to monitor guideline IWAIT times for different access methods. See the *IMS Performance Guide* for these guideline values.

Options

To request the DDgroup report, activate the **DDname Grouping** global option in a Monitor Report Set and specify an Object List of **DDnames** or **DDname Groups**. Also activate the **Database IWAIT Summary** report or the **Database IWAIT Analysis** report.

Request the **Database IWAIT Summary** report to obtain the DDgroup report showing total statistics for each DDgroup (no details for DDnames).

Request the **Database IWAIT Analysis** report to obtain the DDgroup report showing statistics for each DDname within each DDgroup. Optionally, select **Print Distributions** and specify a Distribution for **Elapsed Time per IWAIT**. If a distribution is not specified, the sample Distribution DDIWELAP is used.

Content

For each DDname group requested in the DDgroup report, a report identical in format to the Database IWAIT Summary report is presented. The report contains a summary of IWAIT activity for each DDname that is part of the group.

Elapsed time per IWAIT distribution graphs for each DDname, identical in format to the Database IWAIT Analysis distribution graphs, are always produced when DDname groups are specified.

For each DDname group, the report carries the heading "IWAIT Analysis DDgrp=xxxxxxx" where xxxxxxxx is a DDname group specified using the DDname Grouping Options panel.

Report from 08Jun2023 13.06.12.71			IMS 15.4.0			IMS Performance Analyzer 4.5			Report to 08Jun2023 13.10.39.26					
IWAIT Analysis DDgrp=DEDB														
DDname	Type	IWAITs	Elap/IWAIT Sc.Mil.Mic	StdDev X Avg	Max IWAIT Sc.Mil.Mic	IWAITs Calls	IWAITs /Call	Pct Tot Calls	Pct Grp IWAITs	Pct Grp IWTelp	Pct Tot IWAITs	Pct Tot IWTelp	Pct Tot DLAElp	
DB23AR0	DEDB	5	3.517	.787	5.827	5	1.00	.68%	3.88%	5.167%	3.82%	4.955%	.059%	
DB23AR1	DEDB	12	4.263	1.382	12.751	9	1.33	1.23%	9.30%	15.033%	9.16%	14.414%	.172%	
DB23AR2	DEDB	34	0.631	3.471	9.402	34	1.00	4.64%	26.36%	6.301%	25.95%	6.042%	.072%	
DB23AR3	DEDB	16	1.652	2.507	12.726	16	1.00	2.19%	12.40%	7.769%	12.21%	7.449%	.089%	
DB23AR4	DEDB	3	10.386	.781	19.950	3	1.00	.41%	2.33%	9.156%	2.29%	8.779%	.105%	
DB23AR5	DEDB	31	2.635	1.754	11.386	21	1.48	2.87%	24.03%	24.003%	23.66%	23.016%	.275%	
DD01AR0	DEDB	28	3.958	1.230	14.039	21	1.33	2.87%	21.71%	32.571%	21.37%	31.231%	.373%	
DEDB	*Grp	129	2.638	1.776	19.950	109	1.18	14.89%	100.00%	100.00%	98.47%	95.887%	1.144%	
			Average SD/Avg 3.517 .791	Max-Value 5.827	Average SD/Avg 4.263 1.386	Max-Value 12.751	Average SD/Avg 0.631 3.475	Max-Value 9.402	Average SD/Avg 1.652 2.512	Max-Value 12.726				
Range Sc Mil Mic To Maximum	Count in Range	DDnm=DB23AR0 DEDB Totals all Regions	Count in Range	DDnm=DB23AR1 DEDB Totals all Regions	Count in Range	DDnm=DB23AR2 DEDB Totals all Regions	Count in Range	DDnm=DB23AR3 DEDB Totals all Regions	Count in Range	DDnm=DEDB Totals all Regions	*Grp			
100.000	0		0		0		0		0					
50.000	0		0		0		0		0					
25.000	0		0		0		0		0					
20.000	0		0		0		0		0					
15.000	0		4	*****	0		0		2	****				
10.000	3	*****	0		2	**	0		0					
5.000	0		0		0		0		0					
2.000	0		0		0		0		0					
1.000	2	*****	8	*****	32	*****	14	*****						
Total=	5		12		34		16							
			Average SD/Avg 10.386 .786	Max-Value 19.950	Average SD/Avg 2.635 1.758	Max-Value 11.386	Average SD/Avg 3.958 1.234	Max-Value 14.039	Average SD/Avg 2.638 1.781	Max-Value 19.950				
Range Sc Mil Mic To Maximum	Count in Range	DDnm=DB23AR4 DEDB Totals all Regions	Count in Range	DDnm=DB23AR5 DEDB Totals all Regions	Count in Range	DDnm=DD01AR0 DEDB Totals all Regions	Count in Range	DDnm=DEDB Totals all Regions	*Grp					
100.000	0		0		0		0							
50.000	0		0		0		0							
25.000	0		0		0		0							
20.000	1	*****	0		1	*	15	****						
15.000	1	*****	7	*****	10	*****	15	****						
10.000	0		0		0		0							
5.000	0		0		0		0							
2.000	0		0		0		0							
1.000	1	*****	24	*****	17	*****	98	*****						
Total=	3		31		28		129							

Figure 159. DDgroup report: DEDB group

Report from 08Jun2023 13.06.12.71					IMS 15.4.0		IMS Performance Analyzer 4.5					Report to 08Jun2023 13.10.39.26						
<u>IWAIT Analysis DDgrp=VSAM</u>																		
DDname	Type	IWAITs	Elap/IWAIT	StdDev	Max IWAIT	Calls	IWAITs	Pct Tot	Pct Grp	Pct Grp		Pct Tot	Pct Tot	Pct Tot				
DIMS01D1	VSAM	1	Sc.Mil.Mic	X Avg	Sc.Mil.Mic	Waiting	/Call	Calls	IWAITs	IWTElp		IWAITs	IWTElp	DLAElp				
CKTLDSOI	VSAM	154	17.323	.638	34.784	34	4.53	12.34%	36.23%	43.32%		13.54%	15.323%	.049%				
VSAM	*Grp	376	15.874	.487	46.324	67	1.32	15.63%	100.00%	100.00%		16.43%	18.324%	.049%				
		Average	SD/Avg	Max-Value	Average	SD/Avg	Max-Value	Average	SD/Avg	Max-Value								
		14.541	.000	14.541	17.323	.638	34.784	15.874	.487	46.324								
Sc Mil Mic	Range	Count in	DDnm=DIMS01D1 VSAM	Count in	DDnm=CKTLDSOI VSAM	Count in	DDnm=VSAM	*Grp										
To Maximum	Range	Totals all Regions		Totals all Regions		Totals all Regions												
100.000	0			0		0												
50.000	0			1	*	1	*											
25.000	0			31	*****	15	***											
20.000	0			44	*****	0												
15.000	1	*****		78	*****	174	*****											
10.000	0			0		186	*****											
5.000	0			0		0												
2.000	0			0		0												
1.000	0			0		0												
Total=	1	10	20	30	40	50%	154	10	20	30	40	50%	376	10	20	30	40	50%

Figure 160. DDgroup report: VSAM group

Performance Exception reports

The Performance Exception reports provide a list report of performance exceptions, and summary reports of intent failures, pool space failures, or deadlock events.

- **Exception Listing.** A chronological listing of several types of exceptional occurrences including violations of performance thresholds for call elapsed time, IWAIT elapsed time, and number of IWAITs per call; and unusual occurrences such as BMP schedule failures, pseudo-schedules (schedules in progress), transaction backouts inferred, and terminations (incomplete schedules).
- **Intent Failure Summary.** Summary information on schedule failures due to PSB/DMB intent conflict.
- **Pool Space Failure Summary.** Summary information on failures of requests to reserve storage for pool space.
- **Deadlock Event Summary.** Summary information on deadlocks occurring in DMB segments.

Only the Exception Listing is available from DB Monitor data.

Monitor records: The Performance Exception reports are derived from the following monitor records:

- Exception Listing: 02–29, 38–39, 47–49, 56–65
- Intent Failure Summary: 80
- Pool Space Failure Summary: 82
- Deadlock Event Summary: 83, 86

Options

To obtain the reports, activate **Performance Exceptions** in a Monitor Report Set, specify a DDname for the output data set, and select any number of the four reports: Exception Listing, Intent Failure Summary, Pool Space Failure Summary, Deadlock Event Summary.

For the Exception Listing, also specify the following options:

- **Ignore Schedules** to suppress printing of Created Schedule and Forced Schedule End lines in the Exception Listing report. See “Exception Listing report” on page 346 for further details.
- The threshold values for call elapsed time, IWAIT elapsed time and IWAITs per call. Any performance exceeding these values causes a corresponding exception entry to be generated.

Alternatively, the threshold values can be specified using Distributions. Select **Include Distributions in Reports** from the Monitor Global Options panel and specify one or more of the following Distributions.

The upper limit of the Distribution defines the threshold value for the corresponding exception entry in the report:

**Exception Entry
Distribution**

Call Elapsed

Elapsed Time per Call

IWAIT Elapsed

Elapsed Time per IWAIT

IWAITs per Call

IWAITs per Call

The threshold value specified on the Performance Exceptions panel takes precedence. If these are not specified, and the Distributions also are not specified, this type of exception item cannot be produced.

- Maximum number of pages to be printed.

The **ESAF Integration** option is applicable to the Exception Listing.

Exception Listing report

The Exception Listing report is a detailed record of two types of exception events.

The reported events are:

1. Each occurrence of a DL/I call in which either the call elapsed time, a single IWAIT elapsed time, or the number of IWAITs experienced by the call exceeded the specified exception value.
2. Each occurrence of an unusual scheduling or termination event, for example:
 - Schedules created by IMS Performance Analyzer for transactions in process at trace start time
 - Terminations forced by IMS Performance Analyzer for transactions in process at trace end time
 - BMP schedule failures
 - Transaction backouts inferred by IMS Performance Analyzer

This example report shows some of the exceptions that might occur.

Report from 30Jun2023 14:24:55:85 IMS 15.4.0 IMS Performance Analyzer Exception Listing														
Page	1	PSBname	Trancode	Scheduled at	in Rgn	PCBname	Func	Sc	Seg	Fdbk	Call #	Call/IWT St	Call/IWT El	IWTs
Excd Call Elapsed		ZRGC001	-ZRGC001	14Jun 09.25.10.24	13	ZRGC01DD	GU		GC01SEG	01	3 +	1.599.988	1.196.821	3
Excd Call Elapsed		ZRGC001	-ZRGC001	14Jun 09.25.10.24	13	COCRR0DD	GU		COCRR01	01	4 +	2.797.145	4.088.958	2
Excd Call Elapsed		ZRGC001	-ZRGC001	14Jun 09.25.10.24	13	ZRGC02DD	GU		GC01SEG	01	8 +	7.647.012	1.188.937	4
Excd Call Elapsed		ZRGC002	-ZRGC002	14Jun 09.25.29.05	13	ZRGCINSP	GU		ZRGCIN01	01	1202 +	4.873.007	1.914.730	3
Excd Call Elapsed		ZRGC002	-ZRGC002	14Jun 09.25.29.05	13	COCXRFDD	ISRT		COCXRF02	02	1205 +	6.901.035	1.237.629	1
Excd Call Elapsed		ZRSCXDR	-RSCXDR	14Jun 09.25.36.52	14	LOCREFDD	GU		LOCREF02	02	5 +	1.326.465	12.409.464	6
DD=LOCINDDI VSAM		ZRSCXDR	-RSCXDR	14Jun 09.25.36.52	14	LOCREFDD	GU		LOCREF02	02	5 +	8.305.755	3.302.570	6
DD=LOCINDDI VSAM		ZRSCXDR	-RSCXDR	14Jun 09.25.36.52	14	LOCREFDD	GU		LOCREF02	02	5 +	11.629.014	1.535.824	6
Excd Call Elapsed		ZRGC002	-ZRGC002	14Jun 09.25.29.05	13	CKTTGMDD	GU		CKTTGM05	02	1215 +	9.623.361	11.636.848	6
Excd Call Elapsed		ZRGC002	-ZRGC002	14Jun 09.25.29.05	13	CKTTGMDD	GU		CKTTGM03	02	1223 +	21.432.949	6.075.017	2
Excd Call Elapsed		ZRSCXDR	-RSCXDR	14Jun 09.25.36.52	14	FEPUTLDI	GU		FEPUTLDX	01	15 +	13.942.526	6.464.565	5
Excd Call Elapsed		ZRSCXDR	-RSCXDR	14Jun 09.25.36.52	14	F1SUBPDP	GU		@SUBP1	01	18 +	20.556.658	12.092.247	4
DD=F1SUBPDI VSAM		ZRSCXDR	-RSCXDR	14Jun 09.25.36.52	14	F1SUBPDP	GU		@SUBP1	01	18 +	30.551.609	1.505.862	4
Excd Call Elapsed		ZRSCXDR	-RSCXDR	14Jun 09.25.36.52	14	CKTXRFDP	GU	GE		00	30 +	32.854.123	14.860.144	15
DD=CKTXRFDI VSAM		ZRSCXDR	-RSCXDR	14Jun 09.25.36.52	14	CKTXRFDP	GU	GE		00	30 +	37.512.582	1.527.260	15
DD=ZRC1LZDI VSAM		ZRSCXDR	-RSCXDR	14Jun 09.25.36.52	14	CKTXRFDP	GU	GE		00	30 +	41.419.089	1.671.658	15
Created Schedule		VKTBLDDP-		14Jun 12.15.41.40	22	to 12.15.46.79			1 Trans		Term Ct=	0		
Excd Call Elapsed		VKS1BLD -		14Jun 12.16.13.42	22	VKS1XXDD GU			S1XXDD01	01	1 +	2.778.156	7.623.341	14
Excd Call Elapsed		VKS1BLD -		14Jun 12.16.13.42	22	VKS1XXDD ISRT			S1XXDD01	01	118 +	14.899.879	2.908.061	2
Created Schedule		VKS1BLD -		14Jun 12.16.13.42	22	to 12.16.49.03			1 Trans		Term Ct=	0		
Created Schedule		%PSB0001-%Tran		14Jun 14.37.03.86	1	to 15.07.01.37			1 Trans		Term Ct=	76		

Figure 161. Performance Exceptions report: Exception Listing

The sample report in [Figure 162 on page 347](#) includes External Subsystem calls that exceed the Call or IWAIT thresholds.

Report from 25Jun2023 14.45.00.04			IMS 15.4.0		IMS Performance Analyzer				Report to 25Jun2023 14.45.00.04					
Exception Listing														
Page 23	PSBname	Trancode	Scheduled at	in	Rgn	PCBname	Func	Sc	Seg	Fdbk	Call #	Call/IWT St	Call/IWT El	IWTs
Too many IWAITS	RMZIOIS1	RMZITIS1	25Jun 14.54.52.47		22	I/O PCB	ASRT				78 +	0.391.646	1.158	1
Too many IWAITS	RMZIOLOG	RMZITLOG	25Jun 14.54.52.82		35	RMZILGDP	ISRT		RMZILG01	01	2 +	0.033.020	39.331	2
DD=RMZILGDP VSAM	RMZIOLOG	RMZITLOG	25Jun 14.54.52.82		35	RMZILGDP	ISRT		RMZILG01	01	2 +	0.036.992	16.905	2
DD=RMZILGDP VSAM	RMZIOLOG	RMZITLOG	25Jun 14.54.52.82		35	RMZILGDP	ISRT		RMZILG01	01	2 +	0.054.012	17.819	2
Too many IWAITS	RMZIOIS1	RMZITIS1	25Jun 14.54.52.97		23	RMCS00DE	GU		RMMSCS05	02	3 +	0.052.023	42.284	1
DD=RMCS275 VSAM	RMZIOIS1	RMZITIS1	25Jun 14.54.52.97		23	RMCS00DE	GU		RMMSCS05	02	3 +	0.052.098	42.135	1
Too many IWAITS	RMZIOIS1	RMZITIS1	25Jun 14.54.52.97		23	P2I1 (E)	Signon		S00	00	6 +	0.226.807	0.084	1
Too many IWAITS	RMZIOIS1	RMZITIS1	25Jun 14.54.52.97		23	P2I1 (E)	Create	Thrd	CT0	00	6 +	0.226.954	0.591	1
Too many IWAITS	RMZIOIS1	RMZITIS1	25Jun 14.54.52.97		23	P2I1 (E)	Normal	Call	PR0	00	6 +	0.227.609	17.180	1
DD=P2I1 (E)	RMZIOIS1	RMZITIS1	25Jun 14.54.52.97		23	P2I1 (E)	Normal	Call	PR0	00	6 +	0.227.609	17.180	1
Too many IWAITS	RMZIOIS1	RMZITIS1	25Jun 14.54.52.97		23	RMSSNDX	GU	GE			10 +	0.245.062	23.999	1
DD=RMSSNDX VSAM	RMZIOIS1	RMZITIS1	25Jun 14.54.52.97		23	RMSSNDX	GU	GE		00	10 +	0.246.898	22.050	1
Excd Call Elapsed	RMZIOIS1	RMZITIS1	25Jun 14.54.52.97		23	I/O PCB	CHNG				17 +	0.269.417	2.612	0
Excd Call Elapsed	RMZIOLOG	RMZITLOG	25Jun 14.54.53.23		35	I/O PCB	GU				1 +	0.000.000	13.554	0
Too many IWAITS	RMZIOIS1	RMZITIS1	25Jun 14.54.52.97		23	I/O PCB	GU				23 +	0.272.889	10.079	1
Too many IWAITS	RMZIOIS1	RMZITIS1	25Jun 14.54.52.97		23	RMCS00DE	GU		RMMSCS05	02	24 +	0.283.104	14.977	1
DD=RMCS052 VSAM	RMZIOIS1	RMZITIS1	25Jun 14.54.52.97		23	RMCS00DE	GU		RMMSCS05	02	24 +	0.283.164	14.846	1
Too many IWAITS	RMZIOIS1	RMZITIS1	25Jun 14.54.52.97		23	P2I1 (E)	Signon		S00	00	28 +	0.298.470	0.613	1
Too many IWAITS	RMZIOLOG	RMZITLOG	25Jun 14.54.53.23		35	RMZILGDP	ISRT		RMZILG01	01	2 +	0.013.606	47.051	2
DD=RMZILGDI VSAM	RMZIOLOG	RMZITLOG	25Jun 14.54.53.23		35	RMZILGDP	ISRT		RMZILG01	01	2 +	0.016.202	21.073	2
DD=RMZILGDP VSAM	RMZIOLOG	RMZITLOG	25Jun 14.54.53.23		35	RMZILGDP	ISRT		RMZILG01	01	2 +	0.037.414	20.525	2
Too many IWAITS	RMZIOIS1	RMZITIS1	25Jun 14.54.52.97		23	P2I1 (E)	Normal	Call	PR0	00	28 +	0.299.148	37.702	1
DD=P2I1 (E)	RMZIOIS1	RMZITIS1	25Jun 14.54.52.97		23	P2I1 (E)	Normal	Call	PR0	00	28 +	0.299.148	37.702	1
Excd Call Elapsed	RMZIOIS1	RMZITIS1	25Jun 14.54.52.97		23	RMSSNDX	GU	GE		00	32 +	0.337.138	5.264	0
Excd Call Elapsed	RMZIOIS1	RMZITIS1	25Jun 14.54.52.97		23	I/O PCB	CHNG				39 +	0.342.747	2.562	0
Excd Call Elapsed	RMZIOLOG	RMZITLOG	25Jun 14.54.53.30		35	I/O PCB	GU				1 +	0.000.000	14.277	0
Too many IWAITS	RMZIOIS1	RMZITIS1	25Jun 14.54.52.97		23	I/O PCB	GU				45 +	0.346.839	10.313	1

Figure 162. Performance Exceptions report: Exception Listing with ESAF Integration

The heading line is applicable to type 1 events:

Page

Page number of the Exception Listing report.

PSBname Trancode

PSB-transaction code that issued the associated call.

Scheduled at

Date and time at which the application program that issued the call was scheduled. This information makes it possible to request a Program Trace of this specific schedule at a later time.

In Rgn

Number of the region into which the application program was scheduled.

PCBname

PCB name associated with this call. If ESAF Integration is activated, this can be the External Subsystem name, suffixed with **(E)** to distinguish it from a DL/I PCB name.

Func Sc Seg Fdbk

Call function, Status code, Segment name and Database level associated with this call. If ESAF Integration is activated, the Function Code field is the ESAF call type, followed by its associated module ID, and then the return code.

Call

Sequence number of the associated call in the schedule.

Call/IWT St

Offset time (seconds.milliseconds.microseconds) of the start of the associated call or IWAIT from the beginning of the schedule.

Call/IWT El

Elapsed time of the call or IWAIT (seconds.milliseconds.microseconds).

IWTs

Number of IWAITS experienced by this call.

Each entry in the Exception Listing report presents additional information which depends on the type and nature of the event:

Type 1 Event Entries

This is an explanation of the type 1 exception events reported by IMS Performance Analyzer.

The nature of the type 1 events is indicated to the far-left of each entry:

Excd Call Elapsed

DL/I call whose elapsed time exceeded the specified **Elapsed Time per Call** threshold value.

Excessive DL/I call elapsed times can be associated with other problem indicators for which a tuning change could be effective. Consistently long call times could be an extension of consistently long database IWAIT times, multiple IWAITs per call, or a general lack of CPU resources. Long call times logically result from program isolation enqueues (this can be correlated with the IMS Performance Analyzer Enqueue/Dequeue Trace reports).

DD=DDname meth

I/O IWAIT that had an elapsed time greater than the specified **Elapsed Time per IWAIT** threshold value. The four character field *meth* to the right of the *DDname* is the data set type (access method) for which the IWAIT occurred, and is either OSAM, VSAM, HSAM, DEDB, or QMGR. Additional data is as described for the heading line for type 1 events with the exception that the offset and elapsed time values refer to this IWAIT, rather than the associated DL/I call.

Unusually long I/O IWAITs can indicate a variety of problems. If average IWAITs are exceeding the expected IWAIT, which will vary by data set type (OSAM, VSAM) or purpose (INDEX, DATA), data set contention or placement may be the problem. High IWAIT times can indicate shared DASD interference. A GTF or RMF analysis report tool may be needed to identify the specific problem. The DDgroup facility of IMS Performance Analyzer can help localize the problem. Long IWAIT elapsed times can also be caused by an insufficient DMB pool causing frequent open activity. Other possible causes also exist, such as the OSAM write check option.

DD=nnnn pool

IWAIT for storage that had an elapsed time greater than the specified **Elapsed Time per IWAIT** threshold value. The number *nnnn* is the number of bytes requested from the storage pool designated by *pool*. Additional data is as described for the heading line for type 1 events with the exception that the offset and elapsed time values refer to this IWAIT, rather than the associated DL/I call.

Too Many IWAITs

DL/I call that experienced more IWAITs than the number specified as the **IWAITs per Call** threshold value.

The number of I/O IWAITs resulting from a database call is an important indication of database design and organization efficiency. An exceptional number of IWAITs per call against a database can indicate the development of long physical twin chains or a deteriorating organization, especially when this number increases over time. Excessive IWAITs per call can also indicate ineffectively designed logical relationships or secondary indexes. DBT can help you analyze twin chains or reorganization requirements. The IMS Performance Analyzer PSB Details reports and Program Trace report can help you determine the I/O profile for the application. Further analysis should help you determine whether the I/O profile can be improved through a more efficient DL/I call pattern.

Type 2 Event Entries

This is an explanation of the type 2 exception events reported by IMS Performance Analyzer.

The type 2 exception event entries have no heading line and the additional information depends on the nature of the event as indicated to the far-left of the entry:

Created Schedule

Schedule created by IMS Performance Analyzer to account for a transaction that was in progress at trace start time or a BMP that does not access the IMS message queues.

For this entry, the additional data displayed is:

- Assigned (unknown) PSB name and transaction code, in the format %PSB00nn-trancode
- Date and time at which this schedule began
- Region number
- Time at which this schedule ended

- Number of transactions dequeued since trace start time (including those in progress at trace start), in the format *nn Trans*
- Number of transactions processed in the actual complete IMS schedule, including those not seen before trace start, in the format *Term Ct=nn*

A pseudo-schedule or transaction is created by IMS Performance Analyzer for either of two reasons:

- The schedule was in progress at the beginning of the reporting interval.
- No transactions were dequeued, that is, a GU to the IOPCB with blank status code was not the first call recorded in the dependent region (this situation is typical of BMPs).

An Exception Listing report appears for each schedule/transaction created by IMS Performance Analyzer. The entries can be used to identify occurrences of BMP activity in an IMS system.

To suppress printing of Created Schedule lines, see [“Performance Exception reports” on page 345](#).

Forced Schedule End

Termination created by IMS Performance Analyzer to account for application programs in execution at trace end time.

The additional data displayed for this entry is:

- PSB name and transaction code
- Date and time at which this schedule began
- Region number
- Time at which this schedule ended (pseudo end)
- Number of transactions dequeued up to the point of forced termination, in the format *nn Trans*

If the IMS Performance Analyzer reporting interval ends before receiving a monitor record indicating the end of a schedule in the dependent region, IMS Performance Analyzer forces the end of the schedule.

To suppress printing of Forced Schedule End lines, see [“Performance Exception reports” on page 345](#).

***BMP Failed in Schd**

Failure to schedule a BMP. The additional data displayed for this entry is:

- PSB name and transaction code
- Date and time at which the attempted schedule began
- Region number

Even though a BMP has entered the system, the IMS control region may refuse to schedule it. For example, the master terminal operator may have stopped the PSB or databases required by the BMP.

Transaction Backout

Execution of an application program for which the IMS Performance Analyzer count of transactions dequeued does not agree with the count given by the IMS monitor termination record. Transaction backout is inferred. The additional data displayed for this entry is the same as that given for **Created Schedule**.

The IMS Monitor does not record IMS transaction backouts. However, IMS Performance Analyzer assumes a backout has occurred if the number of transactions dequeued is less than the number of transactions processed.

IMS Performance Analyzer counts the number of GU calls to the IOPCB that result in a blank status code. This number is compared to the number of messages dequeued as reported in the following IMS monitor records:

- BMP termination start (code 04)
- Message scheduling start (code 10)

If the number of messages dequeued is smaller than the number of transactions counted, IMS Performance Analyzer assumes that one or more transaction backouts have occurred and makes an entry in the Exception Listing report.

The transaction backout determination logic is ignored if any of the following conditions exist at schedule end:

- A pseudo-schedule end was forced by IMS Performance Analyzer because there was no BMP termination start or message scheduling start record.
- There is processing in a WFI region.
- A pseudo-schedule or transaction was created by IMS Performance Analyzer.

Intent Failure Summary report

This is an example of the Performance Exceptions Intent Failure Summary report. It provides the summary information on schedule failures due to intent conflict for the combination of PSBs and DMBs.

If there are no intent conflicts during the reporting period, the report is not produced.

Report from 22Jun2023 14.03.21.55	IMS 15.4.0	IMS Performance Analyzer 4.5	Report to 22Jun2023 14.04.57.18
Intent Failure Summary			
From 22Jun2023 14.03.34.15 To 22Jun2023 14.04.36.34 Elapsed= 0 Hrs 1 Mins 2.185.734 Secs			
PSB Name	DMB Name	Count	
BMP255	DH41SK01	2	
DDLTRN15	DH41ST01	5	
DDLTRN16	DH41ST01	7	
MPP01	DMB52FIN	3	
Total for	DH41SK01	2	
Total for	DH41ST01	12	
Total for	DMB52FIN	3	
*** Total ***		17	

Figure 163. Performance Exceptions report: Intent Failure Summary

The report contains the following data items:

PSB Name

The name of the PSB being reported.

DMB Name

The name of the DMB being reported.

Count

The number of schedule failures.

Pool Space Failure Summary report

The Performance Exceptions Pool Space Failure Summary report presents, by Pool ID, the number of attempts that failed to reserve pool space due to unavailable storage. During the reporting period, if no attempts failed to reserve storage for pool space, the report is not produced.

Report from 22Jun2023 14.03.21.55	IMS 15.4.0	IMS Performance Analyzer 4.5	Report to 22Jun2023 14.14.57.18
Pool Space Failure Summary			
From 22Jun2023 14.03.34.15 To 22Jun2023 14.14.36.34 Elapsed= 0 Hrs 10 Mins 2.185.734 Secs			
Pool ID	Bytes req.	Count	
DLDP	12561	1	
DLHP	4325	2	
DLMP	95697	1	
*** Total ***		4	

Figure 164. Performance Exceptions report: Pool Space Failure Summary

The report contains the following data columns:

Pool ID

The ID of the pool being reported.

Bytes req.

The number of bytes requested as pool space.

Count

The number of failed attempts for pool space.

Deadlock Event Summary report

This is an example of the Performance Exceptions Deadlock Event Summary report. It presents information on the number of deadlocks which occurred in DMB segments.

If no deadlocks occurred during the reporting period, the report is not produced.

Deadlocks occurring in the IRLM environment are not included in this report.

Report from 08Jun2023 13.06.12.71		IMS 15.4.0	IMS Performance Analyzer 4.5		Report to 08Jun2023 13.10.39.26	
<div>Deadlock Event Summary</div>						
From 08Jun2023 13.07.20.93 To 08Jun2023 13.09.52.00 Elapsed= 0 Hrs 2 Mins 31.070.446 Secs						
Winning PSB	Losing PSB	DMB Name	Area Name	Count		
BMPFFE05	BMPFFE06	DEDBJN23	DB23AR5	1		
BMPFFE06	DDLTD01	DEDBJN23	DB23AR5	3		
BMPFFE06	DDLTD01	DIMSRN01		1		
BMPFFE06	DDLTLM20	DEDBJN23	DB23AR5	1		
DDLTRN24	DDLTRN14	DEDBJN23	DB23AR3	1		
*** Total ***				7		

Figure 165. Performance Exceptions report: Deadlock Event Summary

The report contains the following data columns:

Winning PSB

The program that requested and won access.

Losing PSB

The program that was backed out.

DMB Name

The DMB name related to the deadlock.

Area Name

The name of the area related to the deadlock (FP only).

Count

The number of deadlocks.

Enqueue/Dequeue Trace report

The Enqueue/Dequeue Trace report is a detailed trace of the database enqueue conflicts occurring during the reporting interval. A detail line is printed for each enqueue IWAIT interval recorded on the monitor data set. The PSB names active in the IMS region during the interval are displayed.

This report is not available from DB Monitor data.

Monitor records: This report is derived from monitor records 66, 67.

Options

To obtain the Enqueue/Dequeue Trace report, activate the **Enqueue/Dequeue Trace** report from the Monitor Report Set panel, and specify a DDname for the output data set for this report.

You can request any combination of the following reports:

- Detailed Trace
- Summary by Database
- Summary by Transaction Code

If none are selected, the two Summary reports are produced by default.

The **Alternate Sequencing** Option is applicable to the Summary reports.

Content: Detailed Trace

This is an example of the Enqueue/Dequeue detailed trace report.

Report from 17Feb2023 10.15.00.14		IMS 15.4.0		IMS Performance Analyzer 4.5		Report to 17Feb2023 10.15.00.14	
<u>Enqueue-Dequeue Trace</u>							
Date = 17Feb2023		-- Waiting --		----- Active Transactions and Regions -----			
Time	Database	Seg	Tran*****Rgn	ENQ	elapsed	Tran*****Rgn	Tran*****Rgn
10.15.01.547	CKTTGMDD	1	TRAN0001 12		4.006	TRAN0001 1	TRAN0002 2
						TRAN0003 3	TRAN0004 4
						TRAN0005 5	TRAN0006 6
						TRAN0007 7	TRAN0008 8
						TRAN0009 9	TRAN0010 10
						TRAN0011 11	TRAN0012 12
						TRAN0013 13	TRAN0014 14
						TRAN0015 15	TRAN0016 16
10.15.02.574	CKTTGMDD	5	TRAN0099 99		12.324	TRAN0001 1	TRAN0002 2
						TRAN0003 3	TRAN0004 4
						TRAN0005 5	TRAN0006 6
						TRAN0007 7	TRAN0008 8
						TRAN0009 9	TRAN0010 10
						TRAN0011 11	TRAN0012 12
						TRAN0013 13	TRAN0014 14
						TRAN0015 15	TRAN0016 16

Figure 166. Enqueue/Dequeue Trace report

The Enqueue/Dequeue Trace report contains the following information:

Time

Time (with millisecond precision) at which the enqueue IWAIT began or ended.

Database

DMB name for which the contention occurred.

Seg

Physical segment code in the database to which access was requested. If one or more enqueue IWAITs start before a previous one is finished, this field contains END when the IWAIT is complete.

Waiting

The Transaction Code and Region ID that is waiting.

ENQ elapsed

Elapsed time (seconds.milliseconds.microseconds) of the IWAIT. If one or more enqueue IWAITs start before a previous one is finished, this field is blank on the start enqueue trace entry; the elapsed time appears on the END entry.

Active Transactions and Regions

An array of transactions that were active at the time of the enqueue IWAIT in IMS dependent regions. The Transaction Codes are reported with their Region IDs. Up to five transactions are reported across the page. If required, the reporting continues onto extra lines to ensure that all active transactions are shown. A Transaction Code that begins with a percent sign (%) indicates an unknown Transaction Code (the transaction was already active when the reporting period began).

Content: Summary by Database

This is an example of the Enqueue/Dequeue Summary by Database trace report.

The Summary by Database is collated by:

- Database/Segment
- Waiting Transaction Code

Report from 17Feb2023 10.15.00.14			IMS 15.4.0 IMS Performance Analyzer 4.5			Report to 17Feb2023 10.15.00.14		
<u>Enqueue-Dequeue Summary by Database</u>								
			-- Enqueue IWAIT Elapsed Time --					
Database	Seg	Waiting	Count	Average	Std Dev	Maximum		
CKTTGMDD	1	TRAN0001	127	12.431	0.123	16.121		
	2	TRAN0002	233	13.344	0.225	18.676		
** Total **			360	12.876	0.234	18.676		

Figure 167. Enqueue/Dequeue Trace report: Summary by Database

A **** Total **** line is printed for the total of all (100%) of the data.

If Alternate Sequencing is requested:

- The report header is suffixed by **Sorted by Total IWAIT Elapsed time** as Delay is the only sequence applicable to this report
- If a number or percentage (less than 100%) Limit is specified:
 - The report header is also suffixed by **LIMIT nn** or **LIMIT nn%**
 - A **** Limit **** line is printed for the total of the reported (limited) data only.

Report from 25Jun2023 14.45.00.04		IMS 15.4.0		IMS Performance Analyzer 4.5		Report to 25Jun2023 14.54.59.99	
<u>Enqueue-Dequeue Summary by Database (Sorted by Total IWAIT Elapsed time; LIMIT 90%)</u>							
		Waiting		-- Enqueue IWAIT Elapsed Time --			
Database	Seg	Trancode	Count	Average	Std Dev	Maximum	
RMZILGDP	1	RMZIOLOG	6	39.486	0.392	57.069	
	0	RMZIOLOG	12	7.524	3.200	87.380	
** Limit **			18	18.178	1.448	87.380	
** Total **			18	18.178	1.448	87.380	

Figure 168. Enqueue/Dequeue Trace report: Summary by Database, Sequenced by Delay (with Limit)

Content: Summary by Transaction Code

This is an example of the Enqueue/Dequeue Summary by Transaction Code trace report.

The Summary by Transaction Code is collated by:

- Waiting Transaction Code
- Database/Segment

A **** Total **** line is printed for the total of all (100%) of the data.

Report from 17Feb2023 10.15.00.14				IMS 15.4.0 IMS Performance Analyzer 4.5			Report to 17Feb2023 10.15.00.14			
<u>Enqueue-Dequeue Summary by Trancode</u>										
Waiting				-- Enqueue IWAIT Elapsed Time --						
Trancode	Database	Seg	Count	Average	Std Dev	Maximum				
TRAN0001	CKTTGMDD	1	127	12.431	0.123	16.121				
	CKTTGMDD	2	233	13.344	0.225	18.676				
** Total **			360	12.876	0.234	18.676				

Figure 169. Enqueue/Dequeue Trace report: Summary by Transaction Code

If Alternate Sequencing is requested:

- The report header is suffixed by **Sorted by Total IWAIT Elapsed time** as Delay is the only sequence applicable to this report
- If a number or percentage (less than 100%) Limit is specified:
 - The report header is also suffixed by **LIMIT nn** or **LIMIT nn%**
 - A **** Limit **** line is printed for the total of the reported (limited) data only.

Report from 25Jun2023 14.45.00.04		IMS 15.4.0		IMS Performance Analyzer 4.5		Report to 25Jun2023 14.54.59.99	
<u>Enqueue-Dequeue Summary by Trancode (Sorted by Total IWAIT Elapsed time; LIMIT 90%)</u>							
-- Enqueue IWAIT Elapsed Time --							
Waiting	Database	Seg	Count	Average	Std Dev	Maximum	
Trancode	RMZILGDP	1	6	39.486	0.392	57.069	
RMZIOLOG	RMZILGDP	0	12	7.524	3.200	87.380	
** Limit **			18	18.178	1.448	87.380	
** Total **			18	18.178	1.448	87.380	

Figure 170. Enqueue/Dequeue Trace report: Summary by Transaction Code, Sequenced by Delay (with Limit)

Region Histogram report

The Region Histogram report traces region activity by time interval. Activity for up to 13 regions is presented graphically in side-by-side format. Periods of region activity and inactivity can be seen at a glance from the visual presentation.

The Region Histogram cannot be produced from DB Monitor traces.

Monitor records: This report is derived from monitor records 02–05, 10–17, 20–29, 60–65.

Uses

The Region Histogram is a valuable aid in analyzing interrelationships of program activity in the IMS system. You might refer to this report for a variety of reasons. For example, effects of insufficient resources determined from the Region Summary or Total System IWAIT Summary reports may be reflected as periods of region inactivity in the histogram. Insight into spontaneous response time problems may be gained by selecting a histogram during the associated time period. Excessively long scheduling periods may reflect program isolation interference.

Note: Schedules in progress at the start of the reporting interval do not appear on the histogram.

Options

To request the Region Histogram report, select **Region Histogram** in a Monitor Report Set. Due to the detailed nature of this report, substantial output can result. Select the report options carefully to control the volume of output.

The report options are:

- Time interval for the histogram
- DDname of the report output
- Time interval between output lines
- Flag this schedule if the average CPU time per transaction exceeds the specified value
- The number of duplicate lines to print before condensing duplicates
- Region ID by PST Object List specifying the regions to be graphed

Content

The Region Histogram report produced from IMS Monitor data provides at least one detail line for each time interval and up to 13 columns for up to 13 regions.

Region inactive

A row of dashes (-----) is shown.

Schedule start

The transaction code of the transaction for which the region is scheduled is shown. Example:

```
DRC@TR04
```

Region active

Blank rows represent time intervals in which the region is active.

Schedule end

The number of messages enqueued at the time of schedule end (MPR schedule start) time is shown on the left; this value excludes primed messages and, therefore, may be zero. The number on the right is CPU time. If the average CPU time per transaction for the transactions processed during this schedule exceeds the value specified on the **CPU/Transaction Limit** option on the Region Histogram panel, an asterisk * is appended. Example:

```
2    3*
```

Deadlock event

A deadlocked pair of enqueue requests detected by IMS and recorded by the IMS monitor is indicated for each region involved by DDLCKW (requestor) or DDLCKL (loser).

If all activity is identical to previous time intervals, Same to next line is shown, as controlled by the **Duplicate Line Limit** option specified on the Region Histogram panel.

Chapter 25. System Analysis reports

The System Analysis reports provide a summary and detailed account of the IWAIT activity of the entire IMS system. The reports in this category are the Total System IWAIT Summary and Total System IWAIT Detail.

Reported IWAIT events include:

- System data sets
- Databases (Full Function and Fast Path)
- ACBLIB Block loading
- Message Format services
- Scheduler
- Checkpoints
- Line/VTAM node
- Storage Pools
- MSC

Total System IWAIT Summary report

The Total System IWAIT Summary report describes the IWAIT activity for the entire IMS system including system data sets, databases (full function and Fast Path), block loading, format services, scheduler, checkpoints, line/node IWAITs, pools, multiple system transfers. Elapsed time per IWAIT distribution graphs for each category can be requested.

Note: Other IMS Performance Analyzer reports only present IWAITs directly associated with application program activity in the dependent regions.

Uses:

The Total System IWAIT Summary report is compact and informative. A brief time spent with the report may provide a number of areas in which corrective action is required. SHMSG/LGMSG queue data set balance or imbalance can be deduced.

Database IWAIT counts may be higher than those shown in the dependent region Database IWAIT Summary because of sync point processing or use of the VSAM Background Write facility.

A high number of block loading IWAITs should be investigated using the Total System IWAIT Detail report for the appropriate type of block.

A high number of Message Format directory IWAITs may suggest that you should use the \$\$IMSDIR facility to force resident indexes. A high number of MFS block I/Os may suggest that you should review MFS pool allocations, the number of FREs, or both. If the average IWAIT elapsed time for queue data sets versus MFS times are significantly different, then a data set placement problem may be responsible. All of these are OSAM direct data sets and should require approximately the same access time.

A large number of scheduler IWAITs probably indicates a serious bottleneck resulting from insufficient scheduling of pool resources.

The Line/Node IWAITs section is generally not useful for communications analysis. The IWAIT count could be a rough indication of line loading, but other more accurate sources of communications data should be referenced.

Monitor records: This report is derived from monitor records 14–19, 22–33, 36–37, 40–41, 44–45, 50–51, 54–57, 66–73.

Options

To obtain the Total System IWAIT Summary report, select **Total System IWAIT** on the Monitor Report Set panel then select **Total System IWAIT Summary** and specify a DDname for the report output.

To add distribution graphs to the report, specify a Distribution for **Elapsed Time per IWAIT**. The sample Distribution **IWTSUMMY** is provided.

Content

This is an example of the Total System IWAIT Summary report.

The Total System IWAIT Summary report is presented in two sections printed side by side. **I/O IWAITS**, the left-hand section, presents the types of IWAITS for which specific I/O activity can be identified. **NON I/O IWAITS**, the right-hand section, presents the types of IWAITS for which no specific I/O activity can be identified (such as line/node interrupts). VSAM IWAITS greater than the **Min VSAM IWAIT** value specified on the Monitor Global Options panel, are reported in the **NON I/O IWAITS** section. The same column headings are provided for both sections.

Report from 10Jun2023 16.45.54.75		IMS 15.4.0		IMS Performance Analyzer 4.5				Report to 10Jun2023 17.17.14.75			
Total System IWAIT Summary											
		I / O		I W A I T S				N O N		I / O	
		Elap/IWAIT		Max value		Pct of		Elap/IWAIT		StdDv	
		Sc.Mil.Mic		Sc.Mil.Mic		IWAITS		Sc.Mil.Mic		Max value	
		Count		X Avg		IWT Elp		Count		Pct of	
										IWAITS	
										Pct of	
										IWT Elp	
System Data Sets											
SNAP QUEUE	1	5.185.411	.000	5.185.411	1.18%	82.55%					
LGMSG	67	13.368	2.289	190.376	78.82%	14.26%					
QBLKS	2	2.187	.949	4.263	2.35%	.07%					
SHMSG	2	3.501	.967	6.887	2.35%	.11%					
Database IWAITS											
OSAM	55	3.000	1.572	24.225	25.35%	21.17%					
HSAM							577	2.774	.544	15.835	28.35%
VSAM	6	12.720	.189	14.638	3.64%	10.45%					
VSAM							52	0.941	1.087	3.762	2.49%
DEDB (Read)	54	8.022	.906	20.823	52.94%	55.86%					
DEDB (Write)	22	4.959	.449	10.023	21.57%	14.07%					
DEDB (Lock)							17	231.816	.229	348.690	6.16%
MSDB (Write)	3	49.182	.199	57.404	2.94%	19.03%					
Block Loading											
INTENT LIST	7	2.180	.279	3.458	3.45%	2.56%					
PSBS	14	4.618	1.303	25.711	6.90%	10.86%					
DMBS	8	2.706	.212	3.683	3.94%	3.63%					
PGM ISOLATN							8	7.965.021	1.775	39.670.415	.39%
Message Formats											
FORMAT DIR	4	3.688	.394	5.370	17.39%	12.61%					
BLOCK DIR	6	6.341	.975	19.936	26.09%	32.52%					
FORMAT I/O	6	4.255	.463	7.890	26.09%	21.82%					
BLOCK I/O	6	5.359	.289	7.759	26.09%	27.48%					
PA2 HITS							1	0.001	.000	0.001	2.04%
POOL IWAIT							1	0.254	.000	0.254	.81%
Scheduler IWAITS											
MPP RGN WORK	4						13	12.599.685	1.040	32.673.237	.19%
M/B/J INPUT								232.546	.391	440.643	.47%
Checkpoints											
CHECKPOINTS	3	350.862	.385	509.520	1.09%	11.12%					
Line/Node IWAITS											
LINE INTERPT	248	17.762	9.659	2.637.874	89.86%	46.52%					
VTAM TRANSFR	8	8.707	1.030	22.701	2.90%	.74%					
Pool IWAITS											
POOL	4	0.060	1.655	0.232	1.53%	.04%					
POOL SZE	4	4.096	.000	4.096	1.53%	2.72%					
*** Totals ***		263	7.602				936	34.305			

Figure 172. Total System IWAIT Summary report

Report from 15Mar2023 11.21.00.50		IMS 15.4.0		IMS Performance Analyzer 4.5		Report to 15Mar2023 11.25.25.11			
Total System IWAIT Summary									
		Average SD/Avg 5.185.411 .005	Max-Value 5.185.411	Average SD/Avg 13.368 2.294	Max-Value 190.376	Average SD/Avg 2.187 .954	Max-Value 4.263	Average SD/Avg 3.501 .972	Max-Value 6.887
Range		Count in	System Data Sets	Count in	System Data Sets	Count in	System Data Sets	Count in	System Data Sets
Sc Mil Mic	Range	Range	SNAP QUEUE	Range	LGMSG	Range	QBLKS	Range	SHMSG
To Maximum		0	*****	0		0		0	
1.000.000		0		0		0		0	
500.000		0		0		0		0	
300.000		0		1 *		0		0	
100.000		0		7 ****		0		0	
50.000		0		1 *		0		0	
30.000		0		7 ****		0		0	
10.000		0		2 *		0		1	*****
5.000		0		11	*****	1	*****	0	
1.000		0		38	*****	1	*****	1	*****
Total=		1	10 20 30 40 50%	67	10 20 30 40 50%	2	10 20 30 40 50%	2	10 20 30 40 50%
		Average SD/Avg 3.000 1.576	Max-Value 24.225	Average SD/Avg 2.774 .549	Max-Value 15.835	Average SD/Avg 12.720 .194	Max-Value 14.638	Average SD/Avg 0.941 1.091	Max-Value 3.762
Range		Count in	Database IWAITS	Count in	Database IWAITS	Count in	Database IWAITS	Count in	Database IWAITS
Sc Mil Mic	Range	Range	OSAM	Range	HSAM	Range	VSAM I/O	Range	VSAM Non-I/O
To Maximum		0		0		0		0	
1.000.000		0		0		0		0	
500.000		0		0		0		0	
300.000		0		0		0		0	
100.000		0		0		0		0	
50.000		0		0		0		0	
30.000		5 ****		4		4	*****	0	
10.000		3 **		18 *		2	*****	0	
5.000		22	*****	508	*****	0		23	*****
1.000		25	*****	47	***	0		29	*****
Total=		55	10 20 30 40 50%	577	10 20 30 40 50%	6	10 20 30 40 50%	52	10 20 30 40 50%
		Average SD/Avg 8.022 .910	Max-Value 20.823	Average SD/Avg 4.959 .454	Max-Value 10.023	Average SD/Avg 231.816 .234	Max-Value 348.690	Average SD/Avg 49.182 .204	Max-Value 57.404
Range		Count in	Database IWAITS	Count in	Database IWAITS	Count in	Database IWAITS	Count in	Database IWAITS
Sc Mil Mic	Range	Range	DEDB(Read)	Range	DEDB(Write)	Range	DEDB(Lock)	Range	MSDB(Write)
To Maximum		0		0		0		0	
1.000.000		0		0		0		0	
500.000		0		0		3	*****	0	
300.000		0		0		14	*****	0	
100.000		0		0		0		2	*****
50.000		0		0		0		1	*****
30.000		25	*****	1 *		0		0	
10.000		7	*****	9	*****	0		0	
5.000		0		12	*****	0		0	
1.000		22	*****	0		0		0	
Total=		54	10 20 30 40 50%	22	10 20 30 40 50%	17	10 20 30 40 50%	3	10 20 30 40 50%
		Average SD/Avg 2.180 .283	Max-Value 3.458	Average SD/Avg 4.618 1.307	Max-Value 25.711	Average SD/Avg 2.706 .216	Max-Value 3.683	Average SD/Avg 7.965.021 1.779	Max-Value 39.670.415
Range		Count in	Block Loading	Count in	Block Loading	Count in	Block Loading	Count in	Block Loading
Sc Mil Mic	Range	Range	INTENT LIST	Range	PSBS	Range	DMBS	Range	PGM ISOLATN
To Maximum		0		0		0		2	*****
1.000.000		0		0		0		1	*****
500.000		0		0		0		1	*****
300.000		0		0		0		0	
100.000		0		0		0		0	
50.000		0		0		0		0	
30.000		0		1	***	0		0	
10.000		0		2	*****	0		0	
5.000		7	*****	11	*****	8	*****	1	*****
1.000		0		0		0		3	*****
Total=		7	10 20 30 40 50%	14	10 20 30 40 50%	8	10 20 30 40 50%	8	10 20 30 40 50%

Figure 173. Total System IWAIT Summary report: distributions

IWAITS are classified and reported in the following groups:

System Data Sets

IWAITS on the queue data sets **LGMSG**, **SHMSG**, and **QBLKS**.

Database IWAITS

All database IWAITS, whether or not they are associated with region activity, for **OSAM**, **HSAM**, and **VSAM** data sets. Also reported are VSAM background write IWAITS, and IWAITS for Fast Path databases which include DEDB reads, writes, and locks, and MSDB writes. Non-I/O IWAITS for VSAM data sets are a function of the **Min VSAM IWAITS** setting (specified on the Monitor Global Options panel).

Block Loading

All block loading IWAITS encountered by the control region scheduler grouped by:

PSBS

Loading PSBs

INT LIST

Loading the PSB intent list

DMBS

Loading DMBs (DBDs)

PGM ISOLATN

Block loading IWAITs associated with program isolation

Message Formats

All IWAITs associated with message format services grouped by:

FORMAT DIR (I/O)

Directory I/O for format blocks (MID-MOD)

FORMAT DIR (NON I/O)

Directory IWAITs (busy DCB) while fetching MID-MOD formats

BLOCK DIR (I/O)

Directory I/O for MFS blocks (DIF-DOF)

BLOCK DIR (NON I/O)

Directory IWAITs (busy DCB) while fetching DIF-DOF blocks

FORMAT I/O

IWAITs to read MID-MOD formats

BLOCK I/O

IWAITs to read DIF-DOF blocks

MFS PREF

MFS prefetch IWAITs

PA2 HITS

IWAITs resulting from PA2 key service

Scheduler IWAITs

IWAITs occurring during region scheduling grouped by:

JMP RGN WORK

JMP region waiting for work

MPP RGN WORK

MPP region waiting for work

MPP/J INTENT

MPP/JMP region waiting for intent

BMP/J INTENT

BMP/JBP region waiting for intent

M/B/J INPUT

MPP/BMP/JMP region waiting for input

Checkpoints

A count of all IMS control region checkpoints

Line/Node IWAITs

IWAITs in the IMS communication facility grouped by:

LINE INT

Count of interrupts on BTAM lines

VTAM TRANSFR

IWAITs on VTAM transfers

POOL IWAITs

IWAITs for each storage pool are separately identified. Average size of the space waited for is summarized in the **NON I/O IWAITs** section of the report.

MULT SYS XFRS

The number of transmissions occurring in the multiple systems coupling (MSC) feature of IMS.

The data presented for each detail line is as follows:

Count

Number of IWAITs. Maximum value: 10 million

Elap/IWAIT Sc.Mil.Mic

Average elapsed time per IWAIT. Maximum value: 1000 seconds

StdDv X Avg

The standard deviation of IWAIT elapsed time expressed as a multiple of the average.

Max value Sc.Mil.Mic

Maximum IWAIT elapsed time. Maximum value: 1000 seconds

Pct of IWAITs

The number of IWAITs as a percentage of the total number of IWAITs presented in this report section. (Total of this column should be 100 percent; any difference results from rounding.)

Pct of IWT Elp

IWAIT elapsed time as a percentage of the total IWAIT elapsed time for the IWAITs presented in this report section.

The report includes elapsed time per IWAIT distribution graphs for each IWAIT type if you specify a Distribution for **Elapsed Time per IWAIT**.

Total System IWAIT Detail report

The Total System IWAIT Detail report is a detailed breakdown of IWAIT activity for the entire IMS system. IWAIT activity is reported for Databases (full function and Fast Path), Block loading, Format services, Line/Node IWAITs. Elapsed time per IWAIT distributions for each detail line are optionally reported.

These details are summarized in the [“Total System IWAIT Summary report”](#) on page 357.

The Total System IWAIT Detail report can be produced from DB Monitor data.

Note that this report presents IWAIT activity for the entire IMS system, whereas other IMS Performance Analyzer reports only present IWAITs directly associated with application program activity in the dependent regions.

Uses: The uses of the Total System IWAIT Detail report naturally follow from information obtained from the Total System IWAIT Summary report. Specific scheduling and MFS block activity can be specifically identified. This may lead either to redefinition of block allocations or to the use of residency options. Particularly active blocks (DMBs, PSBs, MFS) can often be made resident, which can result in overall performance improvements without significant storage impact. A listing of program isolation enqueue IWAITs is provided. This listing can be cross-referenced with the Enqueue/Dequeue Trace report.

Monitor records: This report is derived from monitor records 14–19, 22–33, 36–37, 40–41, 44–45, 50–51, 54–57, 66–73.

Options

To obtain the Total System IWAIT Detail report, select **Total System IWAIT** in a Monitor Report Set and specify a DDname for the report output.

To add distribution graphs to the report, specify a Distribution for **Elapsed Time per IWAIT**. The sample Distribution IWTSUMMY is provided.

The **Alternate Sequencing** option is applicable to all sections of this report (except the distributions).

Content

The Total System IWAIT Detail report contains six sections. Each section is a detailed breakdown of part of the summary data presented in the Total System IWAIT Summary report. Each section has the same data format as the Total System IWAIT Summary report.

The report section headings and the content of the sections are as follows:

Data Base IWAITS

Detail line for each DDname, and OSAM, VSAM, HSAM, and QUE data sets, and Fast Path data sets for DEDB reads, writes, and locks, and MSDB writes.

ACBLIB block loading IWAITS

Detail line for each PSB and intent list loaded.

ACBLIB miscellaneous IWAITS

Detail line for each DMB loaded, and for each DMB involved in an enqueue IWAIT.

Format services directory I/O

Detail line for each format directory (MID-MOD) name and each block directory (DIF-DOF) name.

Block names are eight bytes. The first two bytes are device flags used by IMS to associate a block with the type of device using this format. For the meaning of these flags, see *IMS Application Programming: Data Communication*. The last six bytes are the user-defined name.

Format services block read I/O

Detail line for each MFS format read (MID-MOD) and for each MFS block read (DIF-DOF).

Line/Node Interrupts

Detail line for each BTAM line number and for each VTAM node.

Each section has a **** Total** line for the total of all (100%) of the data in the report period.

If Alternate Sequencing is requested:

- The report section headings are suffixed by **Sorted by Total IWAIT Elapsed time** as Delay is the only sequence applicable to this report
- If a number or percentage (less than 100%) Limit is specified:
 - The report section headings are also suffixed by **LIMIT nn** or **LIMIT nn%**
 - A **** Limit** line is printed for the total of the reported (limited) data only.

Report from 10Jun2023 16.45.54.75		IMS 15.4.0		IMS Performance Analyzer 4.5				Report to 10Jun2023 17.17.14.75			
Data Base IWAITS											
----- I / O I W A I T S -----											
OSAM Ddn	IWAITS	Elap/IWAIT	StdDv	Max value	Pct Tot	Pct Tot	VSAM Ddn	IWAITS	Elap/IWAIT	StdDv	Pct Tot
DJOHGDG10	14	Sc.Mil.Mic	X Avg	Sc.Mil.Mic	IWAITS	IWT Elp	DBHVSAM1	6	Sc.Mil.Mic	X Avg	IWAITS
DJOHGDG20	2	3.811	1.314	14.788	25.45%	32.33%	DBHVSAM2	3	0.029	.314	0.048
DKOHDG10	28	1.484	.305	1.937	3.64%	1.80%	GSHISAM1	13	0.030	.250	0.040
DKOHDG20	8	3.190	1.647	24.225	50.91%	54.13%	HIDAM	21	0.757	1.219	2.253
DKOHDG30	3	1.768	1.607	8.408	14.55%	8.57%	XDLBT04I	15	2.724	1.435	14.638
		1.744	.454	2.834	5.45%	3.17%			3.865	1.314	14.598
** Total	55	3.000	1.572	24.225	100.00%	100.00%	** Total	58	2.160	1.757	14.638
Data Base IWAITS											
----- I / O I W A I T S -----											
DEDB ADs	IWAITS	Elap/IWAIT	StdDv	Max value	Pct Tot	Pct Tot	DEDB ADs	IWAITS	Elap/IWAIT	StdDv	Pct Tot
DB23AN1	17	Sc.Mil.Mic	X Avg	Sc.Mil.Mic	IWAITS	IWT Elp	DB23AN1	4	Sc.Mil.Mic	X Avg	IWAITS
DB23AN2	17	8.652	.913	17.245	31.48%	33.95%	DB23AN2	4	6.780	.263	9.741
DB23AR0	7	9.368	.922	20.823	31.48%	36.76%	DB23AR0	4	7.073	.286	10.023
DB23AR1	10	6.392	.044	7.006	12.96%	10.33%	DB23AR1	6	3.576	.333	5.785
DB23AR7	3	6.523	.769	11.791	18.52%	15.06%	DB23AR7	6	3.873	.394	6.592
		5.623	1.348	16.340	5.56%	3.89%		2	4.503	.434	6.455
** Total	54	8.022	.906	20.823	100.00%	100.00%	** Total	22	4.959	.449	10.023
Data Base IWAITS											
----- I / O I W A I T S -----											
DEDB ArN	IWAITS	Elap/IWAIT	StdDv	Max value	Pct Tot	Pct Tot	MSDB Ddn	IWAITS	Elap/IWAIT	StdDv	Pct Tot
DB23AN1	4	Sc.Mil.Mic	X Avg	Sc.Mil.Mic	IWAITS	IWT Elp	MSDBCP1	2	Sc.Mil.Mic	X Avg	IWAITS
DB23AN2	4	241.462	.175	314.316	23.53%	24.51%	MSDBCP2	1	46.416	.237	57.404
DB23AR0	4	217.011	.337	333.704	23.53%	22.03%			54.714	.000	54.714
DB23AR1	4	259.047	.203	348.690	23.53%	26.29%					
DB23AR7	1	225.462	.031	236.651	23.53%	22.88%	** Total	3	49.182	.199	57.404
		168.939	.000	168.939	5.88%	4.29%					
** Total	17	231.816	.229	348.690	100.00%	100.00%					

Figure 174. Total System IWAIT Detail report: Data Base IWAITS

Report from 10Jun2023 16.45.54.75				IMS 15.4.0				IMS Performance Analyzer 4.5				Report to 10Jun2023 17.17.14.75							
ACBLIB block loading IWAITS																			
----- I / O I W A I T S -----																			
		Elap/IWAIT		StdDv	Max value		Pct Tot	Pct Tot				Elap/IWAIT		StdDv	Max value		Pct Tot	Pct To	
Int List	IWAITS	Sc.Mil.Mic	X Avg		Sc.Mil.Mic	IWAITS	IWT Elp		PSBname	IWAITS	Sc.Mil.Mic	X Avg		Sc.Mil.Mic	IWAITS	IWT El			
DDLTFPE4	6	1.941	.070		2.088	85.71%	73.24%		BMP255	5	3.228	.273		4.803	35.71%	40.87			
DDLTLM20	1	4.256	.000		4.256	14.29%	26.76%		DDLTFPE4	6	3.230	.354		5.396	7.14%	4.29			
** Total	7	2.272	.361		4.256	100.00%	100.00%		HSBASK41	2	2.402	.261		3.029	14.29%	12.17			
									PLAPJK24	3	2.459	.140		2.867	21.43%	18.68			
									PMVAPZ12	2	2.883	.038		2.992	14.29%	14.60			
									PSVAZZ30	1	3.704	.000		3.704	7.14%	9.38			
									** Total	19	2.820	.279		5.396	100.00%	100.00			
ACBLIB miscellaneous IWAITS																			
----- I / O I W A I T S -----																			
		Elap/IWAIT		StdDv	Max value		Pct Tot	Pct Tot				Elap/IWAIT		StdDv	Max value		Pct Tot	Pct To	
DMBname	IWAITS	Sc.Mil.Mic	X Avg		Sc.Mil.Mic	IWAITS	IWT Elp		PI/Unknown	IWAITS	Sc.Mil.Mic	X Avg		Sc.Mil.Mic	IWAITS	IWT El			
DBHD0J01	1	2.056	.000		2.056	6.67%	5.64%		DHVN202	1	3.786.595	.000		3.786.595	33.33%	.73			
DBHDOK01	1	2.429	.000		2.429	6.67%	6.66%		DIVN202	1	2.819.352	.000		2.819.352	33.33%	99.27			
DBOVLFP0	1	2.270	.000		2.270	6.67%	6.23%		DXVN202	1	12.093.126	.000		12.093.126	33.33%				
DHVN202	1	2.579	.000		2.579	6.67%	7.08%		** Total	3	6.233.024	.668		12.093.126	100.00%	100.00			
DH41SK01	1	2.895	.000		2.895	6.67%	7.94%												
:																			
DXVN202	1	2.568	.000		2.568	6.67%	7.05%												
DX41SK01	1	2.750	.000		2.750	6.67%	7.54%												
DX41SK02	1	2.808	.000		2.808	6.67%	7.70%												
** Total	15	2.430	.138		2.895	100.00%	100.00%												

Figure 175. Total System IWAIT Detail report: ACBLIB Block Loading and Miscellaneous IWAITS

Report from 07May2023		13.55.20.21		IMS 15.4.0		IMS Performance Analyzer 4.5				Report to 07May2023		13.57.41.61	
Foxmat services directory I/O													
----- I / O I W A I T S -----													
Formats	IWAITS	Elap/IWAIT	StdDv	Max value	Pct Tot	Pct Tot	Flgs-Block	IWAITS	Elap/IWAIT	StdDv	Max value	Pct Tot	Pct To
		Sc.Mil.Mic	X Avg	Sc.Mil.Mic	IWAITS	IWT Elp			Sc.Mil.Mic	X Avg	Sc.Mil.Mic	IWAITS	IWT El
DCTLP1I1	1	2.160	.000	2.160	25.00%	14.64%	027F-DCTL1A	2	3.696	.309	4.837	33.33%	19.43
DCTLP1I0	1	2.334	.000	2.334	25.00%	15.82%	027F-DCTL1B	2	2.919	.365	3.983	33.33%	15.34
DCTLPN1I	1	4.888	.000	4.888	25.00%	33.13%	027F-DFSDF2	2	12.410	.607	19.936	33.33%	65.23
DCTLPN1I0	1	5.370	.000	5.370	25.00%	36.40%							
** Total		4	3.688	.394	5.370	100.00%	100.00%	** Total		6	6.341	.975	19.936 100.00% 100.00
Foxmat services block read I/O													
----- I / O I W A I T S -----													
Formats	IWAITS	Elap/IWAIT	StdDv	Max value	Pct Tot	Pct Tot	Flgs-Block	IWAITS	Elap/IWAIT	StdDv	Max value	Pct Tot	Pct To
		Sc.Mil.Mic	X Avg	Sc.Mil.Mic	IWAITS	IWT Elp			Sc.Mil.Mic	X Avg	Sc.Mil.Mic	IWAITS	IWT El
DCTLP1I1	1	2.722	.000	2.722	16.67%	10.66%	027F-DCTL1A	2	5.895	.316	7.759	33.33%	36.67
DCTLP1I0	1	2.823	.000	2.823	16.67%	11.06%	027F-DCTL1B	2	4.277	.325	5.668	33.33%	26.60
DCTLPN1I	1	3.577	.000	3.577	16.67%	14.01%	027F-DFSDF2	2	5.906	.017	6.006	33.33%	36.73
DCTLPN1I0	1	7.890	.000	7.890	16.67%	30.91%							
DFSMI2	1	5.865	.000	5.865	16.67%	22.97%	** Total		6	5.359	.289	7.759 100.00% 100.00	
DFSNO5	1	2.652	.000	2.652	16.67%	10.39%							
** Total		6	4.255	.463	7.890	100.00%	100.00%						

Figure 176. Total System IWAIT Detail report: Format Services

Report from 07May2023		13.55.20.21		IMS 15.4.0		IMS Performance Analyzer 4.5			Report to 07May2023		13.57.41.61						
Line Interrupts																	
----- N O N I / O I W A I T S -----																	
		Elap/IWAIT		StdDv	Max value		Pct Tot Pct Tot				Elap/IWAIT		StdDv	Max value		Pct Tot	
Pct To																	
Line No.	IWAITS	Sc.Mil.Mic	X Avg	Sc.Mil.Mic	IWAITS	IWT Elp	Nodenname	IWAITS	Sc.Mil.Mic	X Avg	Sc.Mil.Mic	IWAITS					
IWT El																	
1	1	139.093	.000	139.093	.05%	1.73%	ADLU2A	10	45.079	1.975	299.867	8.93					
2	195	20.591	2.240	249.137	9.04%	49.96%	ADLU2B	10	16.070	2.717	146.621	8.93					
4	1,240	1.099	12.801	394.797	57.46%	16.95%	ADLU2C	10	16.267	2.887	157.132	8.93					
18	67	15.996	2.676	189.000	3.10%	13.33%	LU376724	32	9.516	3.670	165.657	28.57					
26	655	2.211	5.652	121.887	30.35%	18.02%	NDSLU2A1	10	16.366	2.889	158.164	8.93					
							NDSLU2A2	10	16.631	2.893	160.961	8.93					
** Total	2,158	3.724	5.720	394.797	100.00%	100.00%	NDSLU2A3	10	15.614	2.880	150.478	8.93					
							NDSLU2A4	10	16.380	2.883	158.014	8.93					
							NDSLU2A5	10	16.634	2.884	160.512	8.93					
							** Total	112	16.919	2.956	299.867	100.00					

Figure 177. Total System IWAIT Detail report: Line/Node IWAITS

Report from 25Jun2023 13.06.05.31				IMS 15.4.0				IMS Performance Analyzer 4.5				Report to 25Jun2023 13.11.43.81			
Data Base IWAITS															
Average SD/Avg 0.264 1.561 Max-Value 8.069				Average SD/Avg 1.086 2.944 Max-Value 30.345				Average SD/Avg 7.913 .207 Max-Value 20.180				Average SD/Avg 8.741 .374 Max-Value 20.371			
Count in OSAM DDn=PDHDOKAA				Count in OSAM DDn=PDHDOKCA				Count in VSAM DDn=PVHDJ5AA				Count in VSAM DDn=PVHDJ5DA			
Range	Count	in	Range	Range	Count	in	Range	Range	Count	in	Range	Range	Count	in	Range
Sc Mil Mic				Sc Mil Mic				Sc Mil Mic				Sc Mil Mic			
To Maximum	0			To Maximum	0			To Maximum	0			To Maximum	0		
1.000.000	0			1.000.000	0			1.000.000	0			1.000.000	0		
500.000	0			500.000	0			500.000	0			500.000	0		
300.000	0			300.000	0			300.000	0			300.000	0		
100.000	0			100.000	0			100.000	0			100.000	0		
50.000	0			50.000	1			50.000	0			50.000	0		
30.000	0			30.000	0			30.000	5	**		30.000	2	***	
10.000	1			10.000	2	*		10.000	107	*****		10.000	22	*****	
5.000	54	**		5.000	29	*****		5.000	0			5.000	0		
1.000	1110	*****		1.000	68	*****		1.000	0			1.000	0		
Total=				Total=				Total=				Total=			
1165 10 20 30 40 50%				100 10 20 30 40 50%				112 10 20 30 40 50%				24 10 20 30 40 50%			
Average SD/Avg 13.273 .587 Max-Value 20.916				Average SD/Avg 11.549 1.397 Max-Value 88.639				Average SD/Avg 19.359 1.097 Max-Value 92.091				Average SD/Avg 85.002 .082 Max-Value 91.649			
Count in DEDB ADs=DD01AR0				Count in DEDB ADs=DB22AR0				Count in DEDB ArN=DB22AR0				Count in MSDB DDn=MSDBCP2			
Range	Count	in	Range	Range	Count	in	Range	Range	Count	in	Range	Range	Count	in	Range
Sc Mil Mic				Sc Mil Mic				Sc Mil Mic				Sc Mil Mic			
To Maximum	0			To Maximum	0			To Maximum	0			To Maximum	0		
1.000.000	0			1.000.000	0			1.000.000	0			1.000.000	0		
500.000	0			500.000	0			500.000	0			500.000	0		
300.000	0			300.000	0			300.000	0			300.000	0		
100.000	0			100.000	1	*		100.000	1	**		100.000	4	*****	
50.000	2	****		50.000	3	***		50.000	3	*****		50.000	0		
30.000	4	*****		30.000	8	*****		30.000	7	*****		30.000	0		
10.000	0			10.000	7	*****		10.000	7	*****		10.000	0		
5.000	1	**		5.000	22	*****		5.000	0			5.000	0		
1.000	13	*****		1.000	0			1.000	0			1.000	0		
Total=				Total=				Total=				Total=			
20 10 20 30 40 50%				41 10 20 30 40 50%				18 10 20 30 40 50%				4 10 20 30 40 50%			

Figure 178. Total System IWAIT Detail report: Data Base IWAIT Distributions

Report from 25Jun2023 14.45.00.04				IMS 15.4.0		IMS Performance Analyzer 4.5				Report to 25Jun2023 14.54.59.99					
Data Base IWAITS (Sorted by Total IWAIT Elapsed time; LIMIT 5)															
----- I / O -----															
		Elap/IWAIT	StdDv	Max value	Pct Tot	Pct Tot			Elap/IWAIT	StdDv	Max value	Pct Tot	Pct Tot		
OSAM DDn	IWAITS	Sc.Mil.Mic	X Avg	Sc.Mil.Mic	IWAITS	IWT Elp	VSAM DDn	IWAITS	Sc.Mil.Mic	X Avg	Sc.Mil.Mic	IWAITS	IWT Elp		
RMZIETDD	2	17.266	.030	17.782	100.00%	100.00%	RMZILGDP	6,942	19.799	.568	143.760	39.88%	38.11%		
							RHMSSNDX	3,392	20.925	.634	143.596	19.49%	19.68%		
** Limit	2	17.266	.030	17.782	100.00%	100.00%	RMZILGDI	2,612	20.098	.814	657.201	15.01%	14.56%		
** Total	2	17.266	.030	17.782	100.00%	100.00%	RMCS192	172	20.944	.335	44.861	.99%	1.00%		
							RMCS212	140	25.698	.429	60.893	.80%	1.00%		
							** Limit	13,258	20.223	.638	657.201	76.16%	74.34%		
							** Total	17,407	20.720	.599	657.201	100.00%	100.00%		
ACBLIB miscellaneous IWAITS (Sorted by Total IWAIT Elapsed time; LIMIT 5)															
----- I / O -----															
		Elap/IWAIT	StdDv	Max value	Pct Tot	Pct Tot			Elap/IWAIT	StdDv	Max value	Pct Tot	Pct Tot		
DMBname	IWAITS	Sc.Mil.Mic	X Avg	Sc.Mil.Mic	IWAITS	IWT Elp	PI/Unknown	IWAITS	Sc.Mil.Mic	X Avg	Sc.Mil.Mic	IWAITS	IWT Elp		
							RMZILGDP	18	18.178	1.448	87.380	100.00%	100.00%		
							** Limit	18	18.178	1.448	87.380	100.00%	100.00%		
							** Total	18	18.178	1.448	87.380	100.00%	100.00%		
Line Interrupts (Sorted by Total IWAIT Elapsed time; LIMIT 5)															
----- N O N -----															
		Elap/IWAIT	StdDv	Max value	Pct Tot	Pct Tot			Elap/IWAIT	StdDv	Max value	Pct Tot	Pct Tot		
Line No.	IWAITS	Sc.Mil.Mic	X Avg	Sc.Mil.Mic	IWAITS	IWT Elp	Nodename	IWAITS	Sc.Mil.Mic	X Avg	Sc.Mil.Mic	IWAITS	IWT Elp		
2	320	0.233	.770	1.306	100.00%	100.00%									
** Limit	320	0.233	.770	1.306	100.00%	100.00%									
** Total	320	0.233	.770	1.306	100.00%	100.00%									

Figure 179. Total System IWAIT Detail report: Sequenced by Delay (with Limit)

Chapter 26. Program Analysis reports

The Program Analysis reports provide detailed information on all aspects of application processing.

Program Activity Detail reports

The Program Activity Detail reports provide a detailed breakdown of the database activity of each PSB name by PCB name, function code, DDname, and segment name feedback. Alternate report formats present the data organized by PCB name. No sorting of the input data is required to obtain the reports and they can be produced from either IMS Monitor or DB Monitor data.

PSB Details reports

The PSB Details reports are a series of reports with identical formats that show program activity by PCB name, each report presenting different levels of further detail. Some of the reports show all calls, regardless of resulting IWAIT activity, while other reports show only the calls that result in IWAITs.

Monitor records: The reports are derived from monitor records 02–13, 20–29, 48–49, 56–65.

The following reports show all calls, regardless of resulting IWAIT activity:

Report	Level of detail	Example
PSB Details PCB Totals	PCB	Figure 180 on page 368
PSB Details by Function Code	PCB function	Figure 181 on page 368
PSB Details by Function Code-Segment Name	PCB function, segment status	Figure 182 on page 369
PSB Details by Segment Name Feedback	PCB, segment status	Figure 183 on page 369

The following reports show only the calls that result in IWAITs:

Report	Level of detail	Page
PSB Details PCB Totals (DD)	PCB	Figure 184 on page 370
PSB Details by DDname IWAITed On	PCB, DD	Figure 185 on page 370
PSB Details by Function Code (DD)	PCB function	Figure 186 on page 371
PSB Details by Function Code-DDname	PCB function, DD	Figure 187 on page 371

For each of these reports, PSB-transaction code details can optionally be shown at the lowest level. [Figure 180 on page 368](#) through [Figure 187 on page 371](#) show the eight reports, with all except [Figure 185 on page 370](#) specified with the PSB-Transaction Code option.

Uses

The PSB Details reports are the primary presentations of IMS Monitor data needed for analysis of database use. These reports are of particular interest to DB Monitor users, since the DB Monitor only records database call and associated IWAIT activity. You can select one or more of the report detail options to provide an appropriate level of detail for your investigation. The reports can be used to help identify and analyze a variety of problems, such as database reorganization indications, data set placement problems, inefficient call patterns, and insufficient allocation of database buffer pools. These reports also serve as an excellent source of documentation, because they provide activity profiles for every PCB active during the reporting interval. Use of the PSB Details reports is most effective if based on an understanding of the database and applications involved.

The first report, PSB Details-PCB Totals, as shown in [Figure 180 on page 368](#), is always produced. The most active databases should receive primary attention, and these are readily identified through the **Percent of System** column. A fine-grain picture of the call patterns for very active (or any) PSBs can be obtained by requesting a Program Trace report. By referring to the PSB Details-PCB Totals (DD) report ([Figure 184 on page 370](#)), you can examine for these same PSBs the IWAIT/CALL ratios versus the number of calls; the ratio for this report includes only calls that result in IWAITs.

The PSB Details by DDname IWAITed On report can be examined if you suspect that database buffer pools are insufficient. IWAITs for DDnames not related to the PCB indicate database buffer pool related I/O. A different view of the same type of data is available with the DDname by PSB-Transaction Code report.

Options

To obtain the PSB Details reports, select **Program Activity Detail** in a Monitor Report Set.

Specify the following options:

- Select **1. PSB Details**, or to additionally show the PSBNAME and TranCode details, select **3. PSB Details with PSB-TranCode data added at the lowest level**.
- Select one or more of the report options from the list of **Reports Required** to produce the corresponding report types in addition to the PSB Details PCB Totals report which is always printed first:

all

PSB Details PCB Totals

Function Code

PSB Details by Function Code

Segment Name

PSB Details by Segname Feedbk

Function-Segment Name

PSB Details by Functn-Segname

DDname

PSB Details PCB Totals(DD) PSB Details by DDname IWTd On

Function-DDname

PSB Details PCB Totals(DD) PSB Details by Function(DD) PSB Details by Functn-DDname

Report output is sent to the DDname specified in Detail Report Output DDname on the Monitor Global Options panel.

The **ESAF Integration** Option requests a breakdown of external subsystem call activity together with DL/I call activity. It applies to all the PSB Detail reports except those by DDname or Function-DDname.

Content

The column headings for all PSB Details reports are identical and are of two types: reported line items which represent the level of detail, and the report details themselves.

The level of detail that may be reported is as follows:

PCBNAME

Name of the PCB against which calls are made. If ESAF Integration is activated, this can be the External Subsystem name, suffixed with **(E)** to distinguish it from a DL/I PCB name.

Func

Call function code. GET HOLD calls are combined with their corresponding GET call code, since IMS does not identify them to the IMS Monitor. For example, GHNP calls are included with GNP calls. If ESAF Integration is activated, the Function Code field contains the ESAF call type. For example, Signon, Normal Call, Commit Ph2.

Lvl

Database segment level number of the named segment as returned in the segment feedback area.

DDname

The DDname associated with the data set against which an IWAIT is issued.

Segname

Segment name field from the segment feedback area.

Sc

Status code returned on the call. If ESAF Integration is activated, the Status Code field contains the ESAF call return code.

PSBNAME

PSB name of the calling program.

TranCode

Transaction code of the transaction being processed by the calling program.

The column headings for the details reported are as follows:

Calls

Number of calls. Totals and subtotals of the number of calls are the sum of the detail lines. On several reports, this may be greater than the actual number of calls, since a call can result in IWAITs on more than one DDname. The reports affected are:

- PSB Details by DDname IWAITed On
- PSB Details by Function Code-DDname
- DDname by PSB-Transaction Code

IWAITs

Number of IWAITs.

IWAITs/Call

Average number of IWAITs per call.

Elap/IWAIT Sc.Mil.Mic

Average elapsed time per IWAIT.

IWTElap/CI Sc.Mil.Mic

Average IWAIT elapsed time per call.

Elap/Call(Max IWT)

Average elapsed time per call including IWAIT time. For reports providing detail by DDname, the maximum IWAIT elapsed time is reported.

Percent of System

The percentage of total system activity represented by this line item for the following:

Calls

Number of calls

IWTs

Number of IWAITS

ClElp

Call elapsed time

IWTEl

IWAIT elapsed time

Date=14Jun2023 Time=09.23.41.31				IMS 15.4.0		IMS Performance Analyzer				Report from 14Jun2023 09.23.41.31									
				PSB Details		PCB Totals													
PCBNAME	Func	Lvl	DDname or Segname	Sc	PSBNAME	TranCode	Calls	IWAITS	Elap/IWAIT	IWTElap/Cl	Elap/Call	---Percent of System---	IWTs	ClElp	IWTEl				
CKTTGMDD					RCLBDDS	CLBDDS	70				0.403	.1%	.0%	.0%	.0%				
					RCLBDDS	ZRCLBFDS	102				0.408	.2%	.0%	.0%	.0%				
					RCLBDEN	CLBDEN	230	19	.08	17.417	1.439	9.706	.4%	.2%	.4%	.2%			
					RCLBDEN	CLDC	141				0.363	.3%	.0%	.0%	.0%				
					RCLBDEN	ZRCLBFEN	323	4	.01	18.520	0.229	0.715	.6%	.1%	.0%	.0%			
					RCLBDFN	CLBDFN	120				0.344	.2%	.0%	.0%	.0%				
					RCLBDFN	ZRCLBFFN	104				0.361	.2%	.0%	.0%	.0%				
					RCLBDNX	CLBDNX	56				0.414	.1%	.0%	.0%	.0%				
					RCLBDPT	CLBDPT	460	3	.01	16.360	0.107	0.461	.8%	.0%	.0%	.0%			
					:														
					ZRSC2DR	ZRSC2DR	14	4	.29	13.735	3.824	135.392	.0%	.1%	.3%	.0%	.0%		
					ZRTDD	ZRTDD	30					0.358	.1%	.0%	.0%	.0%	.0%		
					ZRWAD	ZRWAD	160					0.504	.3%	.0%	.0%	.0%	.0%		
CKTTGMDD ** Total						4,165	82	.02	23.195	0.457	6.242	7.5%	1.0%	4.1%	1.1%				
CKTXRFDP					RCLBDFN	CLBDFN	2				1.154	.0%	.0%	.0%	.0%				
					ZRGCA10	ZRGCA10	4	4	1.00	25.222	25.222	28.186	.0%	.1%	.0%	.1%			
					ZRGCO02	ZRGCO02	6	8	1.33	23.804	31.739	225.146	.0%	.1%	.2%	.1%			
					ZRPRI01	ZRPRI02	3	1	.33	44.498	14.833	16.342	.0%	.0%	.0%	.0%			
					ZRSCXDR	RSCXDR	4	32	8.00	191.072	1.528.578	3.720.347	.0%	.4%	2.3%	3.7%			
					ZRSC2DR	ZRSC2DR	4	9	2.25	9.598	21.596	843.898	.0%	.1%	.5%	.1%			
					ZRWAD	ZRWAD	7	3	.43	17.218	7.379	8.401	.0%	.0%	.0%	.0%			
					CKTXRFDP ** Total						30	57	1.80	115.582	219.606	661.025	.1%	.7%	3.1%
ZRVIEWDP					:														
					RCLBDDS	ZRCLBFDS	2				0.786	.0%	.0%	.0%	.0%				
					RCLBDEN	CLBDEN	1				1.093	.0%	.0%	.0%	.0%				
RCLBDFN	CLBDFN	1	9	9.00	17.159	154.434	1.844.606	.0%	.1%	.3%	.1%								
ZRVIEWDP ** Total						4	9	2.25	17.159	38.609	486.818	.0%	.1%	.3%	.1%				
** Total PCB Totals						55,900	8,730	.16	20.227	3.159	11.386	101%	111%	100%	106%				

Figure 180. PSB Details-PCB Totals report

Date=14Jun2023 Time=09.23.41.31				IMS 15.4.0		IMS Performance Analyzer				Report from 14Jun2023 09.23.41.31					
				PSB Details by Function Code											
PCBNAME	Func	Lvl	DDname or Segname	Sc	PSBNAME	TranCode	Calls	IWAITS	Elap/IWAIT	IWTElap/Cl	Elap/Call	---Percent of System---	IWTs	ClElp	IWTEl
CKTTGMDD	DLET				RCLBDEN	ZRCLBFEN	24		/Call	Sc.Mil.Mic	Sc.Mil.Mic	(Max IWT)	Calls	IWTs	ClElp
					ZRC1PTC	ZRC1PTC	5					1.190	.0%	.0%	.0%
					ZRGCP03	ZRGCP03	20					1.128	.0%	.0%	.0%
					ZRGCP61	CCPSTTY	10					1.670	.0%	.0%	.0%
					ZRWAD	ZRWAD	16					1.698	.0%	.0%	.0%
					ZRWAD	ZRWAD	16					1.264	.0%	.0%	.0%
					RCLBDEN	CLBDEN	10					0.245	.0%	.0%	.0%
					RFEPBUMP	FEPBUMP	20					0.135	.0%	.0%	.0%
					ZRCMMSG	ZRCMMSGD	5					0.111	.0%	.0%	.0%
					ZRWAD	ZRWAD	7					0.211	.0%	.0%	.0%
					RCLBDDS	CLBDDS	20					0.330	.0%	.0%	.0%

Figure 181. PSB Details by Function Code report

Date=14Jun2023		Time=09.23.41.31		IMS 15.4.0		IMS Performance Analyzer				Report from 14Jun2023		09.23.41.31						
PSB Details by Functn-Segname																		
PCBNAME	Func	Lvl	DName or Segname	Sc	PSBNAME	TranCode	Calls	IWAITs	Elap/IWAIT	IWTElap/Cl	Elap/Call	---Percent of System---	Calls	IWTs	ClElp	IWTEl		
CKTTGMDD	DLET	01	CKTTGM01		ZRGCP61	CCPSTTY	5				2.523	.0%	.0%	.0%	.0%	.0%		
		02	CKTTGM04		ZRGCP61	CCPSTTY	5				0.872	.0%	.0%	.0%	.0%	.0%		
		02	CKTTGM05		RCLBDEN	ZRCLBFEN	24				1.190	.0%	.0%	.0%	.0%	.0%		
		02	CKTTGM05		ZRC1PTC	ZRC1PTC	5				1.128	.0%	.0%	.0%	.0%	.0%		
		02	CKTTGM05		ZRGCP03	ZRGCP03	20				1.670	.0%	.0%	.0%	.0%	.0%		
		02	CKTTGM05		ZRWAD	ZRWAD	16				1.264	.0%	.0%	.0%	.0%	.0%		
		01	CKTTGM01	GE	RFEPBUMP	FEPBUMP	15				0.102	.0%	.0%	.0%	.0%	.0%		
		01	CKTTGM01	GE	ZRCMMSG	ZRCMMSGD	5				0.111	.0%	.0%	.0%	.0%	.0%		
		01	CKTTGM01	GE	ZRWAD	ZRWAD	7				0.211	.0%	.0%	.0%	.0%	.0%		
		02	CKTTGM05		RCLBDEN	CLBDEN	10				0.245	.0%	.0%	.0%	.0%	.0%		
GNP		02	CKTTGM05		RFEPBUMP	FEPBUMP	5				0.235	.0%	.0%	.0%	.0%	.0%		
		01	CKTTGM01	GE	RCLBDDS	CLBDDS	10				0.466	.0%	.0%	.0%	.0%	.0%		
		02	CKTTGM05		ZRGCP03	ZRGCP03	5				0.197	.0%	.0%	.0%	.0%	.0%		
		02	CKTTGM05		ZRSC2DR	ZRSC2DR	1	2	2.00	12.547	25.094	644.347	.0%	.0%	.1%	.0%	.0%	
		CKTTGMDD ** Total						4,165	82	.02	23.195	0.457	6.242	7.5%	1.0%	4.1%	1.1%	
		CKTXRFDP	GU	00		GE	ZRGCA10	ZRGCA10	2	1	.50	20.877	10.489	12.050	.0%	.0%	.0%	.0%
				00		GE	ZRGCP02	ZRGCP02	3	3	1.00	25.860	25.860	409.328	.0%	.0%	.2%	.0%
				00		GE	ZRSCXDR	RSCXDR	4	32	8.00	191.072	1,528.578	3,720.347	.0%	.4%	2.3%	3.7%
				00		GE	ZRSC2DR	ZRSC2DR	3				0.591	.0%	.0%	.0%	.0%	
				01	CKTXRF01		RCLBDFN	CLBDFN	2				1.154	.0%	.0%	.0%	.0%	
01	CKTXRF01				ZRPRI01	ZRPRI02	3	1	.33	44.498	14.833	16.342	.0%	.0%	.0%	.0%		
01	CKTXRF01				ZRWAD	ZRWAD	7	3	.43	17.218	7.379	8.401	.0%	.0%	.0%	.0%		
01	CKTXRF01				ZRGCA10	ZRGCA10	2	3	1.50	26.637	39.856	44.323	.0%	.0%	.0%	.0%		
01	CKTXRF01				ZRGCP02	ZRGCP02	3	5	1.67	22.510	37.517	40.863	.0%	.1%	.0%	.1%		
01	CKTXRF01				ZRSC2DR	ZRSC2DR	1	9	9.00	9.598	86.385	3,373.821	.0%	.1%	.5%	.1%		
CKTXRFDP ** Total						30	57	1.80	115.582	219.606	661.025	.1%	.7%	3.1%	4.0%			
ZRVIEWDP	GU	01	ZRVIEW01		RCLBDDS	ZRCLBFDS	2				0.786	.0%	.0%	.0%	.0%			
		01	ZRVIEW01		RCLBDEN	CLBDEN	1				1.093	.0%	.0%	.0%	.0%			
		01	ZRVIEW01		RCLBDFN	CLBDFN	1	9	9.00	17.159	154.434	1,844.606	.0%	.1%	.3%	.1%		
ZRVIEWDP ** Total						4	9	2.25	17.159	38.609	486.818	.0%	.1%	.3%	.1%			
** Total by Functn-Segname						55,900	8,730	.16	20.227	3.159	11.386	101%	111%	100%	106%			

Figure 182. PSB Details by Function-Segment Name report

Date=14Jun2023		Time=09.23.41.31		IMS 15.4.0		IMS Performance Analyzer				Report from 14Jun2023		09.23.41.31				
PSB Details by Segname Feedback																
PCBNAME	Func	DName or Lvl Segname	Sc	PSBNAME	TranCode	Calls	IWAITs	Elap/IWAIT /Call	Sc.Mil.Mic	IWTElap/Cl Sc.Mil.Mic	Elap/Call (Max IWT)	---Percent of System---	Calls	IWTs	ClElp	IWTEl
CKTTGMDD	00	GE	ZRGCA10	ZRGCA10		8	3	.38	32.506	12.190	12.823	.0%	.0%	.0%	.1%	
	00	GE	ZRGCO02	ZRGCO02		42	31	.74	22.177	16.369	17.156	.1%	.4%	.1%	.4%	
	00	GE	ZRGCP61	CCPSTTY		1					0.490	.0%	.0%	.0%	.0%	
	00	GE	ZRGTCDB	ZRGTCDB		5					0.569	.0%	.0%	.0%	.0%	
	00	GE	ZRSC2DR	ZRSC2DR		2	2	1.00	14.824	14.824	15.855	.0%	.0%	.0%	.0%	
	01	CKTTGM01	RCLBDEN	ZRCLBFEN		24					0.386	.0%	.0%	.0%	.0%	
	01	CKTTGM01	ZRC1PTC	ZRC1PTC		5					0.582	.0%	.0%	.0%	.0%	
	01	CKTTGM01	ZRGCA10	ZRGCA10		2					3.049	.0%	.0%	.0%	.0%	
	01	CKTTGM01	ZRGCO02	ZRGCO02		48	2	.04	6.720	0.280	17.104	.1%	.0%	.1%	.0%	
	01	CKTTGM01	ZRGCO03	ZRGCO03		5					0.227	.0%	.0%	.0%	.0%	
:		01	CKTTGM01	ZRGCP03	ZRGCP03	18					0.318	.0%	.0%	.0%	.0%	
CKTTGMDD ** Total						4,165	82	.02	23.195	0.457	6.242	7.5%	1.0%	4.1%	1.1%	
CKTXRFDP	00	GE	ZRGCA10	ZRGCA10		2	1	.50	20.877	10.489	12.050	.0%	.0%	.0%	.0%	
	00	GE	ZRGCO02	ZRGCO02		3	3	1.00	25.860	25.860	409.328	.0%	.0%	.2%	.0%	
	00	GE	ZRSCXDR	RSCXDR		4	32	8.00	191.072	1,528.578	3,720.347	.0%	.4%	2.3%	3.7%	
	00	GE	ZRSC2DR	ZRSC2DR		3					0.591	.0%	.0%	.0%	.0%	
	01	CKTXRF01	RCLBDFN	CLBDFN		2					1.154	.0%	.0%	.0%	.0%	
	01	CKTXRF01	ZRGCA10	ZRGCA10		2	3	1.50	26.637	39.856	44.323	.0%	.0%	.0%	.0%	
	01	CKTXRF01	ZRGCO02	ZRGCO02		3	5	1.67	22.510	37.517	40.863	.0%	.1%	.0%	.1%	
	01	CKTXRF01	ZRPRI01	ZRPRI02		3	1	.33	44.498	14.833	16.342	.0%	.0%	.0%	.0%	
	01	CKTXRF01	ZRSC2DR	ZRSC2DR		1	9	9.00	9.598	86.385	3,373.821	.0%	.1%	.5%	.1%	
	01	CKTXRF01	ZRWAD	ZRWAD		7	3	.43	17.218	7.379	8.401	.0%	.0%	.0%	.0%	
CKTXRFDP ** Total						30	57	1.80	115.582	219.606	661.025	.1%	.7%	3.1%	4.0%	
:		01	ZRVIEW01	RCLBDDS	ZRCLBFDS	2					0.786	.0%	.0%	.0%	.0%	
		01	ZRVIEW01	RCLBDEN	CLBDEN	1					1.093	.0%	.0%	.0%	.0%	
		01	ZRVIEW01	RCLBDFN	CLBDFN	1	9	9.00	17.159	154.434	1,844.606	.0%	.1%	.3%	.1%	
ZRVIEWDP ** Total						4	9	2.25	17.159	38.609	486.818	.0%	.1%	.3%	.1%	
** Total by Segname Feedback						55,900	8,730	.16	20.227	3.159	11.386	101%	111%	100%	106%	

Figure 183. PSB Details by Segment Name Feedback report

Date=14Jun2023 Time=09.23.41.31				IMS 15.4.0		IMS Performance Analyzer		Report from 14Jun2023 09.23.41.31										
				PSB Details		PCB Totals(DD)												
PCBNAME	Func Lvl	DName or Segname	Sc	PSBNAME	TranCode	Calls	IWAITs	IWAITs /Call	Elap/IWAIT Sc.Mil.Mic	IWTElap/Cl Sc.Mil.Mic	Elap/Call (Max IWT)	---Percent of System---	Calls	IWTs	ClElp	IWTEl		
CKTTGMDD				RCLBDEN	CLBDEN	6	19	3.17	17.417	55.155	51.373	.0%	.2%	.2%				
				RCLBDEN	ZRCLBFEN	3	4	1.33	18.520	24.693	29.848	.0%	.1%	.0%				
				RCLBDPT	CLBDPT	1	3	3.00	16.360	49.081	25.016	.0%	.0%	.0%				
				ZRCPCD	ZRCPCD	1	1	1.00	43.441	43.441	43.441	.0%	.0%	.0%				
				ZRGCA10	ZRGCA10	2	3	1.50	32.506	48.760	42.190	.0%	.0%	.1%				
				ZRGCO02	ZRGCO02	22	48	2.18	26.084	56.811	287.685	.0%	.6%	.8%				
				ZRSC2DR	ZRSC2DR	2	4	2.00	13.735	27.471	27.810	.0%	.1%	.0%				
				CKTTGMDD ** Total					37	82	2.22	23.195	51.406	287.685	.1%	1.0%	1.1%	
CKTXRFDP			ZRGCA10	ZRGCA10	3	4	1.33	25.222	33.629	33.793	.0%	.1%	.1%					
			ZRGCO02	ZRGCO02	3	8	2.67	23.804	63.477	47.560	.0%	.1%	.1%					
			ZRPRI01	ZRPRI02	1	1	1.00	44.498	44.498	44.498	.0%	.0%	.0%					
			ZRSCXDR	RSCXDR	2	32	16.00	191.072	3.057.157	1.671.658	.0%	.4%	3.7%					
			ZRSC2DR	ZRSC2DR	1	9	9.00	9.598	86.385	27.710	.0%	.1%	.1%					
			ZRWAD	ZRWAD	2	3	1.50	17.218	25.827	31.124	.0%	.0%	.0%					
			CKTXRFDP ** Total					12	57	4.75	115.582	549.014	1.671.658	.0%	.7%	4.0%		
			RTTBLDD			RCLBDDS	ZRCLBFDS	77	130	1.69	8.217	13.873	45.310	.1%	1.7%	.6%		
RCLBDEN	CLBDEN	13				23	1.77	14.635	25.893	41.717	.0%	.3%	.2%					
RCLBDEN	ZRCLBFEN	2				2	1.00	11.378	11.378	14.866	.0%	.0%	.0%					
: ZRSC2DR		8				18	2.25	7.806	17.788	23.215	.0%	.2%	.1%					
ZRWAD	ZRWAD	1				2	2.00	17.813	35.625	21.683	.0%	.0%	.0%					
ZRTTBLDD ** Total								299	473	1.58	8.818	14.107	45.310	.5%	6.0%	2.5%		
ZRVIEWDP	RCLBDFN CLBDFN	1				9	9.00	17.159	154.434	28.024	.0%	.1%	.1%					
** Total PCB Totals(DD)									3,528	7,852	2.23	21.118	47.000	3.302.570	6.3%	100%	100%	

Figure 184. PSB Details-PCB Totals (DD) report

Date=14Jun2023		Time=09.23.41.31		IMS 15.4.0		IMS Performance Analyzer		Report from 14Jun2023		09.23.41.31				
				PSB Details by DDname		IWTd on								
PCBNAME	Func Lvl	DDname or Segname Sc	PSBNAME	TranCode	Calls	IWAITS /Call	Elap/IWAIT Sc.Mil.Mic	IWTElap/Cl Sc.Mil.Mic	Elap/Call (Max IWT)	---Percent of System---	Calls	IWTs	ClElp	IWTEl
CKTTGMDD		CKTLBDDI			1	6	6.00	14.871	89.828	41.346	.0%	.1%	.1%	
		CKTPDCDI			6	15	2.50	34.331	85.827	287.685	.0%	.2%	.3%	
		CKTTGMDD			32	61	1.81	21.266	40.539	66.821	.1%	.8%	.8%	
		** Total			39	82	2.10	23.195	48.770	287.685	.1%	1.0%	1.1%	
CKTXRFDP		CKTXRFDI			6	18	3.00	123.079	369.236	1.527.260	.0%	.2%	1.3%	
		CKTXRFDP			6	9	1.50	18.168	27.252	44.498	.0%	.1%	.1%	
		ZRC1LZDI			4	14	3.50	153.155	536.042	1.671.658	.0%	.2%	1.3%	
		ZRC1SSDI			6	16	2.67	129.067	344.179	1.569.590	.0%	.2%	1.2%	
CKTXRFDP ** Total				22	57	2.59	115.582	299.462	1.671.658	.0%	.7%	4.0%		
CLBDCPDD		CLBDCPDD			51	68	1.33	18.832	25.109	143.811	.1%	.8%	.8%	
		CLBDCPG2			5	9	1.80	26.823	48.282	51.145	.0%	.1%	.1%	
CLBDCPDD ** Total				56	77	1.38	19.766	27.178	143.811	.1%	1.0%	.8%		
ZRTTBLDD		ZRTTBLDD			299	473	1.58	8.818	14.107	45.310	.5%	6.0%	2.5%	
ZRVIEWDP		ZRVIEWDI			1	7	7.00	18.813	131.691	28.024	.0%	.1%	.1%	
		ZRVIEWDP			1	2	2.00	11.372	22.743	19.730	.0%	.0%	.0%	
ZRVIEWDP ** Total				2	9	4.50	17.159	77.217	28.024	.0%	.1%	.1%		
** Total by DDname IWTd on					4,774	7,852	1.64	21.118	34.733	3,302,570	8.6%	100%	100%	

Figure 185. PSB Details by DDname IWAITed On report

Date=14Jun2023 Time=09.23.41.31				IMS 15.4.0		IMS Performance Analyzer				Report from 14Jun2023 09.23.41.31							
				PSB Details by Function(DD)													
PCBNAME	Func	DDname or Lvl Segname	Sc	PSBNAME	TranCode	Calls	IWAITs	Elap/IWAIT	Sc.Mil.Mic	IWTElap/Cl	Elap/Call	---Percent of System---	Calls	IWTs	ClElp	IWTEl	
CKTTGMDD	GU			RCLBDEN	CLBDEN	4	14	3.50	17.172	60.103	41.346	.0%	.2%	.1%			
				RCLBDEN	ZRCLBFEN	1	2	2.00	23.443	46.886	29.848	.0%	.0%	.0%			
				RCLBDPT	CLBDPT	1	3	3.00	16.360	49.081	25.016	.0%	.0%	.0%			
				ZRGCA10	ZRGCA10	2	3	1.50	32.506	48.760	42.190	.0%	.0%	.1%			
				ZRGC002	ZRGC002	21	46	2.19	26.826	58.881	287.685	.0%	.6%	.7%			
				ZRSC2DR	ZRSC2DR	1	2	2.00	14.824	29.847	27.810	.0%	.0%	.0%			
				ZRGC002	ZRGC002	1	2	2.00	6.720	13.440	11.549	.0%	.0%	.0%			
				RCLBDEN	CLBDEN	2	5	2.50	18.103	45.259	51.373	.0%	.1%	.1%			
				RCLBDEN	ZRCLBFEN	2	2	1.00	13.597	13.597	23.128	.0%	.0%	.0%			
				ZRCPD	ZRCPD	1	1	1.00	43.441	43.441	43.441	.0%	.0%	.0%			
				ZRSC2DR	ZRSC2DR	1	2	2.00	12.547	25.094	23.269	.0%	.0%	.0%			
CKTTGMDD ** Total						37	82	2.22	23.195	51.406	287.685	.1%	1.0%		1.1%		
CKTXRFDP	GU			ZRGCA10	ZRGCA10	1	1	1.00	20.877	20.877	20.877	.0%	.0%	.0%			
				ZRGC002	ZRGC002	1	3	3.00	25.860	77.880	28.043	.0%	.0%	.0%			
				ZRPRI01	ZRPRI02	1	1	1.00	44.498	44.498	44.498	.0%	.0%	.0%			
				ZRSCXDR	RSCXDR	2	32	16.00	191.072	3.057.157	1.671.658	.0%	.4%		3.7%		
				ZRWAD	ZRWAD	2	3	1.50	17.218	25.827	31.124	.0%	.0%	.0%			
				ZRGCA10	ZRGCA10	2	3	1.50	26.637	39.856	33.793	.0%	.0%	.0%			
				ZRGC002	ZRGC002	2	5	2.50	22.510	56.276	47.560	.0%	.1%	.1%			
				ZRSC2DR	ZRSC2DR	1	9	9.00	9.598	86.385	27.710	.0%	.1%	.1%			
CKTXRFDP ** Total						12	57	4.75	115.582	549.014	1.671.658	.0%	.7%		4.0%		
ZRTTBLOD	GNP			RCLBDOS	ZRCLBFDS	16	16	1.00	3.087	3.087	10.114	.0%	.2%		.0%		
	GU			ZRSCXDR	RSCXDR	14	38	2.71	12.297	33.378	31.853	.0%	.5%		.3%		
				ZRSC2DR	ZRSC2DR	8	18	2.25	7.806	17.788	23.215	.0%	.2%		.1%		
				ZRWAD	ZRWAD	1	2	2.00	17.813	35.625	21.683	.0%	.0%		.0%		
ZRTTBLOD ** Total						299	473	1.58	8.818	14.107	45.310	.5%	6.0%		2.5%		
ZRVIEWDP GU																	
				RCLBDFN	CLBDFN	1	9	9.00	17.159	154.434	28.024	.0%	.1%		.1%		
** Total by Function(DD)						3,528	7,852	2.23	21.118	47.000	3,302.570	6.3%	100%		100%		

Figure 186. PSB Details by Function Code (DD) report

Date=14Jun2023 Time=09.23.41.31				IMS 15.4.0		IMS Performance Analyzer				Report from 14Jun2023 09.23.41.31								
PSB Details by Functn-DDname																		
PCBNAME	Func	Lvl	Dname or Segname	Sc	PSBNAME	TranCode	Calls	IWAITs	Elap/IWAIT	IWTElap/Cl	Elap/Call	---Percent of System---	Calls	IWTs	ClElp	IWTEl		
CKTTGMDD	GU				RCLBDEN	CLBDEN	1	6	6.00	14.871	89.828	41.346	.0%	.1%	.1%			
					CKTLPDCDI	ZRGCO02	ZRGCO02	1	6	6.00	55.464	332.784	287.685	.0%	.1%	.2%		
					CKTTGMDD	RCLBDEN	CLBDEN	4	8	2.00	18.823	37.646	28.754	.0%	.1%	.1%		
					CKTTGMDD	RCLBDEN	ZRCLBFEN	1	2	2.00	23.443	46.886	29.848	.0%	.0%	.0%		
					CKTTGMDD	RCLBDPT	CLBDPT	1	3	3.00	16.360	49.081	25.016	.0%	.0%	.0%		
					CKTTGMDD	ZRGCA10	ZRGCA10	2	3	1.50	32.506	48.760	42.190	.0%	.0%	.0%		
					CKTTGMDD	ZRGCO02	ZRGCO02	21	40	1.80	22.645	43.134	66.821	.0%	.5%	.5%		
					CKTTGMDD	ZRSC2DR	ZRSC2DR	1	2	2.00	14.824	29.847	27.810	.0%	.0%	.0%		
					CKTTGMDD	ZRGCO02	ZRGCO02	1	2	2.00	6.720	13.440	11.549	.0%	.0%	.0%		
					ISRT	CKTLPDCDI	RCLBDEN	CLBDEN	2	5	2.50	18.103	45.259	51.373	.0%	.1%	.1%	
					REPL	CKTLPDCDI	RCLBDEN	ZRCLBFEN	1	1	1.00	23.128	23.128	23.128	.0%	.0%	.0%	
					CKTLPDCDI	ZRCPD	ZRCPD	1	1	1.00	43.441	43.441	43.441	.0%	.0%	.0%		
					CKTLPDCDI	ZRSC2DR	ZRSC2DR	1	2	2.00	12.547	25.094	23.269	.0%	.0%	.0%		
					CKTTGMDD	RCLBDEN	ZRCLBFEN	1	1	1.00	4.065	4.065	4.065	.0%	.0%	.0%		
CKTTGMDD ** Total							39	82	2.10	23.195	48.770	287.685	.1%	1.0%	1.1%			
CKTXRFDP		GU	CKTXRFDI		ZRGCA10	ZRGCA10	1	1	1.00	20.877	20.877	20.877	.0%	.0%	.0%			
			CKTXRFDI		ZRGCO02	ZRGCO02	1	2	2.00	27.368	54.735	28.043	.0%	.0%	.0%			
ZRTCXDP1		GU	ZRTCXDP1		RCLBDEN	CLBDEN	1	11	11.00	9.784	107.628	27.827	.0%	.1%	.1%			
ZRTTBLOD		GNP	ZRTTBLOD		RCLBDDS	ZRCLBFDS	16	16	1.00	3.087	3.087	10.114	.0%	.2%	.0%			
			ZRTTBLOD		RCLBDEN	CLBDEN	1	1	1.00	2.503	2.503	2.503	.0%	.0%	.0%			
			ZRTTBLOD		RCLBDFN	CLBDFN	3	3	1.00	2.116	2.116	2.129	.0%	.0%	.0%			
			ZRTTBLOD		ZRCMMSG	ZRCMMSG	1	1	1.00	4.723	4.723	4.723	.0%	.0%	.0%			
			ZRTTBLOD		ZRGCO02	ZRGCO02	51	51	1.00	5.082	5.082	32.859	.1%	.6%	.2%			
			ZRTTBLOD		ZRWAD	ZRWAD	1	2	2.00	17.813	35.625	21.683	.0%	.0%	.0%			
ZRTTBLOD ** Total							299	473	1.58	8.818	14.107	45.310	.5%	6.0%	2.5%			
ZRVIEWDP		GU	ZRVIEWDI		RCLBDFN	CLBDFN	1	7	7.00	18.813	131.691	28.024	.0%	.1%	.1%			
			ZRVIEWDP		RCLBDFN	CLBDFN	1	2	2.00	11.372	22.743	19.730	.0%	.0%	.0%			
ZRVIEWDP ** Total							2	9	4.50	17.159	77.217	28.024	.0%	.1%	.1%			
** Total by Functn-DDname							4,774	7,852	1.64	21.118	34.733	3,302.570	8.6%	100%	100%			

Figure 187. PSB Details by Function Code-DDname report

Report from 25Jun2023 14.45.00.04				IMS 15.4.0		IMS Performance Analyzer 4.5				Report to 25Jun2023 14.54.59.99								
PSB Details PCB Totals																		
PCBNAME	Func	Dname or Lvl	Segname	Sc	PSBNAME	TranCode	Calls	IWAITs	IWAITs /Call	Elap/IWAIT	IWTElap/Cl	Elap/Call	---Percent of System---					
I/O PCB							39,624	6,114	.15	Sc.Mil.Mic	Sc.Mil.Mic	(Max IWT)	Calls	IWTs	ClElp	IWTEl		
P2I1 (E)							6,757	6,757	1.00	10.157	10.157	10.157	5.4%	24.0%	12.1%	15.9%		
RMCS00DE							65,367	4,251	.07	22.549	1.466	1.544	52.2%	15.1%	17.8%	22.2%		
RMMSGCDD							30	29	.97	20.927	20.230	22.960	.0%	.1%	.1%	.1%		
RMSSNDP							20	70	3.50	21.700	75.949	79.256	.0%	.2%	.3%	.4%		
RMSSNDX							2,666	3,392	1.27	20.925	26.624	28.579	2.1%	12.1%	13.5%	16.5%		
RMZIETDD							19	2	.11	17.266	1.817	1.960	.0%	.0%	.0%	.0%		
RMZILGDP							3,761	7,429	1.98	20.399	40.293	44.848	3.0%	26.4%	29.8%	35.1%		
RMZIUADP							2,960	82	.03	13.445	0.372	1.562	2.4%	.3%	.8%	.3%		
** Total PCB Totals							121,204	28,126	.23	15.330	3.557	4.665	96.8%	100%	100%	100%		
PSB Details by Function Code																		
PCBNAME	Func	Dname or Lvl	Segname	Sc	PSBNAME	TranCode	Calls	IWAITs	IWAITs /Call	Elap/IWAIT	IWTElap/Cl	Elap/Call	---Percent of System---					
I/O PCB							2,879	1,293	.45	Sc.Mil.Mic	Sc.Mil.Mic	(Max IWT)	Calls	IWTs	ClElp	IWTEl		
	ASRT						2,843			0.992		0.703	2.3%	4.6%	.4%	.3%		
	BFBP											0.189	2.3%	.0%	.1%	.0%		
	CHKP						43					8.531	.0%	.0%	.1%	.0%		
	CHNG						7,524					1.563	6.0%	.0%	2.1%	.0%		
	GU						10,363	4,821	.47	8.215	3.822	12.287	8.3%	17.1%	22.5%	9.2%		
	ISRT						7,524					0.112	6.0%	.0%	.1%	.0%		
	LOG						927					0.100	.7%	.0%	.0%	.0%		
	PURG						7,521					0.150	6.0%	.0%	.2%	.0%		
I/O PCB	** Total						39,624	6,114	.15	6.688	1.032	3.636	31.7%	21.7%	25.5%	9.5%		
P2I1 (E)	Normal Call						2,666	2,666	1.00	25.196	25.196	25.196	2.1%	9.5%	11.9%	15.6%		
	Signon						2,685	2,685	1.00	0.282	0.282	0.282	2.1%	9.5%	.1%	.2%		
	Create Thrd						1,349	1,349	1.00	0.518	0.518	0.518	1.1%	4.8%	.1%	.2%		
	SNO						57	57	1.00	0.063	0.063	0.063	.0%	.2%	.0%	.0%		
P2I1 (E)	** Total						6,757	6,757	1.00	10.157	10.157	10.157	5.4%	24.0%	12.1%	15.9%		
** Total by Function Code							121,204	28,126	.23	15.330	3.557	4.665	96.8%	100%	100%	100%		

Figure 188. PSB Details report with ESAF Integration

PSB-Transaction Code Analysis report

The PSB-Transaction Code Analysis report is a detailed analysis of program activity.

The information presented for each PSB-transaction code includes the following analysis, with optional distributions, of schedule, transaction, and call activity:

- Elapsed time per schedule
- Elapsed time per call
- Elapsed time per IWAIT
- IWAITs per call
- Optionally, detailed analysis of PSB activity by PCB name, DDname, function code, segment name, and status code

Monitor records: This report is derived from monitor records 02–13, 20–29, 48–49, 56–65.

Uses

These PSB-Transaction Code Analysis reports present the same data as the PSB Details reports but in a collating sequence that highlights application program activity relative to databases. These reports are not as useful as the PSB Details reports in identifying general database-related problems, but if particular application problems are suspected, they are useful in more quickly isolating these problems.

These reports also serve as an excellent source of information to be filed with each program documentation package. In addition, the activity profiles reported provide an excellent means of monitoring application performance against installation design and performance standards. If you use the DB Monitor, this report is almost identical to the PSB Details reports because there is only one program reported on. The only difference is that the PSB Details reports are produced with each report on a new page, while the PSB-Transaction Code Analysis reports are concatenated.

Options

To obtain the PSB-Transaction Code Analysis report, select **Program Activity Detail** in a Monitor Report Set.

The options are:

- Select **2. PSB-TranCode Analysis**
- Select one or more of the report options from the list of **Reports Required** to produce the corresponding report types for the PSB Details section of the report:

Function Code

PCB Totals by Function Code

Segment Name

PCB Totals by Segname Feedbk

DDname

PCB Totals PCB Totals(DD) by DDname IWTd On

Function-Segment Name

PCB Totals by Functn-Segname

Function-DDname

PCB Totals PCB Totals(DD) by Function(DD) by Functn-DDname

Report output is sent to the DDname specified in Detail Report Output DDname on the Monitor Global Options panel.

The **ESAF Integration** option is applicable to this report.

The PSB Details section of the report combines information for all dependent regions. If the **Report Breaks by Region** option is selected on the Monitor Global Options panel, the report will also show program analysis, call analysis, and distributions for each region.

To produce the graphical distributions, select **Include Distributions in Reports** from the Monitor Global Options panel and specify one or more of the following Distributions to obtain the corresponding graph:

- **Elapsed Time per Schedule**
- **Elapsed Time per Call**
- **Elapsed Time per IWAIT**
- **IWAITs per Call**

If no Distributions are specified, only the Elapsed Time per Schedule distribution statistics are produced.

Content

The PSB-Transaction Code Analysis report contains Program Summary and PSB Details reports for each PSB-transaction code.

Each page of this report has the heading **Analysis of PSBname - Transaction Code**. In addition, the first page contains **Region Totals** and optionally **Region No. nn** where:

Region Totals

Shows all activity of this PSB-Transaction code

Region No. nn

Shows activity of this PSB-Transaction code for region *nn* when the **Report Breaks by Region** option is selected

The following sections are available in the report:

Program Analysis

This section of the report is identical in format to the Program Analysis section of the Program Summary report. The program analysis is followed by the elapsed time per schedule distribution. The statistics line is always produced. The graph is also presented if a corresponding Distribution is specified.

Call Analysis

This section of the report is identical in format to the Call Analysis section of the Program Summary report. The call analysis is followed by the elapsed time per call, elapsed time per IWAIT, and IWAITS per call distribution graphs if the corresponding Distributions are specified.

PSB Details

This section of the report presents, in PSB Details report format, PSB details for this PSB-transaction code. Specific content is as requested by the report options selected from the list of **Reports Required**. See "PSB Details reports" on page 365 for a detailed description of the content.

Report from 31Jul2014 15:56:59:17			IMS 15.4.0			IMS Performance Analyzer 4.5			Report to 31Jul2014 16:15:52:57							
Analysis of ZRPRW01 - ZRPRW02																
Region Totals																
** Program Analysis **																
----- Per Schedule ----- ----- P e r T r a n s a c t i o n -----																
PSBname	TranCode	Scheds	Trans	Trans /Sched	Scd-DLI Mil.Mic	DLI-Term Scd on Q	Calls	IWTs	Sc.	Elapsed Mil.Mic	CPUtime Mil.Mic	Pct of Tran Elap				
ZRPRW01	ZRPRW02	5	5	1.00	555.104	620.057	0	38.0	7.2	620.057	104.666	16.9% 24.0% 18.1%				
** Call Analysis **----- Message Queue Calls ----- D a t a b a s e C a l l s -----																
PSBname	TranCode	Calls /Tran	IWTs /Tran	Message /Call	CPY Mil.Mic	Elp Mil.Mic	DLA Elp Mil.Mic	Elp/IWT Mil.Mic	Calls /Tran	IWTs /Tran	IWTs /Call	CPY Elp Mil.Mic	DLA Elp Mil.Mic	Elp/IWT Mil.Mic	Pct DB Call Elap	
ZRPRW01	ZRPRW02	8.0	4.4	.55	0.033	8.173	11.934	11.934	30.0	2.8	.09	0.111	2.655	21.291	4.0% 96.0% 71.8%	

Report Type	PCBNAME	Func	lvl	Dname or Segname	Sc	Calls	IWAITS	IWAITS /Call	Elap/IWAIT Sc.	IWAIT Mil.Mic	IWTElap/CI Sc.	Elap/Call (Max IWT)	--%age of Calls	PSB-Tran- IWTs	---- CLElP IWTel	
PCB Totals	COCORDD	** Total				54	1	.02	29.908		0.554	1.373	28.4%	2.8%	10.0% 5.3%	
	COCRRODD	** Total				4						0.407	2.1%	.0%	.2% .0%	
	I/O PCB	** Total				40	22	.55	11.934		6.564	8.206	21.1%	61.1%	44.2% 46.8%	
	ZRGCDADD	** Total				9						0.524	4.7%	.0%	.6% .0%	
	ZRGCD1DD	** Total				15						0.557	7.9%	.0%	1.1% .0%	
	ZRGCD2DD	** Total				9	11	1.22	22.126		27.042	28.709	4.7%	30.6%	34.8% 43.4%	
	ZRPRDADD	** Total				2						0.524	1.1%	.0%	.1% .0%	
	ZRPRTRDP	** Total				11	2	.18	12.392		2.253	3.317	5.8%	5.6%	4.9% 4.4%	
	ZRPRWLDP	** Total				34						0.719	17.9%	.0%	3.3% .0%	
	ZRPRWLDP1	** Total				12						0.471	6.3%	.0%	.8% .0%	

PCB Totals	** Total					190	36	.19	15.573		2.951	3.911	100%	100%	100% 100%	

PCB Totals(DD)	COCORDD	** Total				1	1	1.00	29.908		29.908	29.908	.5%	2.8%		5.3%
	I/O PCB	** Total				5	22	4.40	11.934		52.509	98.928	2.6%	61.1%		46.8%
	ZRGCD2DD	** Total				3	11	3.67	22.126		81.127	50.154	1.6%	30.6%		43.4%
	ZRPRTRDP	** Total				2	2	1.00	12.392		12.392	23.096	1.1%	5.6%		4.4%

PCB Totals(DD)	** Total					11	36	3.27	15.573		50.965	98.928	5.8%	100%		100%

Figure 189. PSB-Transaction Code Analysis report: PCB Totals (DD)

Report from 31Jul2014 15:56:59:17		IMS 15.4.0 IMS Performance Analyzer 4.5						Report to 31Jul2014 16:15:52:57			
Analysis of ZRPW01 -ZRPW02											
Report Type by DDname IWTd on	PCBNAME COCORDD	DDname or Func lvl Segname Sc COCORDD	Calls 1	IWAITs 1	IWAITs /Call 1.00	Elap/IWAIT Sc.Mil.Mic 29.908	IWTElap/Cl Sc.Mil.Mic 29.908	Elap/Call (Max IWT) 29.908	--%age of PSB-Tran--- Calls .5%	IWTs 2.8%	ClElp 5.3%
	COCORDD	** Total	1	1	1.00	29.908	29.908	29.908	.5%	2.8%	5.3%
	I/O PCB	COCORDD	2	2	1.00	19.124	19.124	22.483	1.1%	5.6%	6.8%
		ZRGC01DD	5	5	1.00	4.643	4.643	6.828	2.6%	13.9%	4.1%
		ZRPRTRP1	5	5	1.00	15.929	15.929	66.207	2.6%	13.9%	14.2%
		ZRPRLWDI	5	5	1.00	21.679	21.679	98.928	2.6%	13.9%	19.3%
		ZRPRLWP1	5	5	1.00	2.608	2.608	5.760	2.6%	13.9%	2.3%
	I/O PCB	** Total	22	22	1.00	11.934	11.934	98.928	11.6%	61.1%	46.8%
	ZRGC02DD	ZRGC02DD	3	11	3.67	22.126	81.127	50.154	1.6%	30.6%	43.4%
	ZRGC02DD	** Total	3	11	3.67	22.126	81.127	50.154	1.6%	30.6%	43.4%
	ZRPRTRPD	ZRPRTRPDI	1	1	1.00	1.687	1.687	1.687	.5%	2.8%	.3%
		ZRPRTRP1	1	1	1.00	23.096	23.096	23.096	.5%	2.8%	4.1%
	ZRPRTRPD	** Total	2	2	1.00	12.392	12.392	23.096	1.1%	5.6%	4.4%
by DDname IWTd on ** Total			28	36	1.29	15.573	20.022	98.928	14.7%	100%	100%

Report from 31May2023 13.06.10.91				IMS 15.4.0				IMS Performance Analyzer 4.5				Report to 31May2023 13.11.23.46			
Region Totals				Analysis of AI342				-AI342T01							
** Program Analysis **															
				----- Per Schedule -----				----- P e r T r a n s a c t i o n -----							
PSBname	TranCode	Scheds	Trans	Trans /Schd	Scd-DLI Mil.Mic	DLI-Term Sc.Mil.Mic	Schd on Q	Calls	IWTs	Sc.Elapsed Mil.Mic	CPUTime Mil.Mic	Pct of CPU	Tran Call	Elap IWT	
AI342	AI342T01	2	2	1.00	2.041	139.958	.0	15.0	9.0	139.958	6.968	5.0%	41.3%	117%	
** Call Analysis **															
				----- Message Queue Calls -----				----- D a t a b a s e C a l l s -----							
		Calls	IWTs	IWTs	CPY Elp	DLA Elp	Elp/IWT	Calls	IWTs	IWTs	CPY Elp	DLA Elp	Elp/IWT	Pct DB Call Elap	
PSBname	TranCode	/Tran	/Tran	/Call	Mil.Mic	Mil.Mic	Mil.Mic	/Tran	/Tran	/Call	Mil.Mic	Mil.Mic	Mil.Mic	CPY DLA IWT	
AI342	AI342T01	5.0	3.0	.60	0.010	8.622	48.217	2.0	1.0	.50	0.036	7.262	13.822	.5% 99.5% 94.7%	
Report Type	PCBNAME	Func	DDname or lvl	Segname	Sc	Calls	IWAITs	IWAITs /Call	Elap/IWAIT Sc.Mil.Mic	IWTElap/Cl Sc.Mil.Mic	Elap/Call (Max IWT)	--%age of PSB-Trans IWTs	ClElp	IWTs	
PCB Totals	DBP2 (E)	** Total				12	14	1.17	21.208	24.742	7.724	40.0%	77.8%	74.0% 90.9%	
	DB2621	** Total				2					0.211	6.7%	.0%	.3% .0%	
	DB4131	** Total				2	2	1.00	13.822	13.822	14.385	6.7%	11.1%	23.0% 8.5%	
	I/O PCB	** Total				8	2	.25	1.041	0.260	0.415	26.7%	11.1%	2.7% .6%	
PCB Totals	** Total					24	18	.75	18.146	13.610	5.217	80.0%	100%	100% 100%	
by Segname	Feedbk	DBP2 (E)00 DB			QC	10 2	10 4	1.00 2.00	0.969 71.805	0.969 143.611	0.969 41.501	33.3% 6.7%	55.6% 22.2%	7.7% 66.3%	3.0% 87.9%
	DBP2 (E)	** Total				12	14	1.17	21.208	24.742	7.724	40.0%	77.8%	74.0% 90.9%	
	DB2621	01 S601002				2					0.211	6.7%	.0%	.3% .0%	
	DB2621	** Total				2					0.211	6.7%	.0%	.3% .0%	
	DB4131	01 S652620				2	2	1.00	13.822	13.822	14.385	6.7%	11.1%	23.0% 8.5%	
	DB4131	** Total				2	2	1.00	13.822	13.822	14.385	6.7%	11.1%	23.0% 8.5%	
	I/O PCB					8	2	.25	1.041	0.260	0.415	26.7%	11.1%	2.7% .6%	
	I/O PCB	** Total				8	2	.25	1.041	0.260	0.415	26.7%	11.1%	2.7% .6%	
by Segname	Feedbk	** Total				24	18	.75	18.146	13.610	5.217	80.0%	100%	100% 100%	

DDname by PSB-Transaction Code report

Monitor records: This report is derived from monitor records 02–13, 20–29, 56–65.

Uses

The DDname by PSB-Transaction Code report presents another view of the same type of data presented in the PSB Details By DDname IWAITed On report. You can quickly spot which data set has the greatest IWAIT activity and, within the data set, which PCB and which PSB.

Options

To obtain the DDname by PSB-Transaction Code report, select **Program Activity Detail** in a Monitor Report Set then select the supplementary report **DDname by PSB-TranCode**.

The **Report Format** and **Reports Required** options do not apply to this report.

Content

In the following example, DDname ZRTTBLDD has the highest number of IWAITs (473). Of this number, references made by RCLBDDS to the PCB named ZRTTBLDD account for 25.3% of the IWAIT elapsed time.

Note: The column headings in this report have the same meaning as those for the “PSB Details reports” on page 365.

Report from 18Jul2019 16:54:09:10				IMS Performance Analyzer				Report to 18Jul2019 16:56:09:69					
				DDname by PSB-Tran using									
DDname	PSBNAME	TranCode	PCBNAME	Calls	IWAITs	IWAITs /Call	Elap/IWAIT Sc.Mil.Mic	IWTElap/Cl Sc.Mil.Mic	Max IWAIT Sc.Mil.Mic	Percent Calls	Percent IWTs	DDname Total	
CKTPDCDI	RCLBDEN	CLBDEN	CKTTGMDD	2	5	2.50	18.103	45.259	51.373	7.1%	13.2%	13.2%	
			I/O PCB	7	7	1.00	5.784	5.784	27.552	25.0%	18.4%	5.9%	
	ZRCLBFEN	CKTTGMDD	1	1	1.00	23.128	23.128	23.128	3.6%	2.6%	3.4%		
			I/O PCB	9	9	1.00	4.913	4.913	30.193	32.1%	23.7%	6.4%	
	ZRCPD	ZRCPD	CKTTGMDD	1	1	1.00	43.441	43.441	43.441	3.6%	2.6%	6.3%	
			I/O PCB	1	1	1.00	2.894	2.894	2.894	3.6%	2.6%	.4%	
	ZRGC002	ZRGC002	CKTTGMDD	1	6	6.00	55.464	332.784	287.685	3.6%	15.8%	48.4%	
	ZRGC003	ZRGC003	I/O PCB	3	4	1.33	16.066	21.421	23.919	10.7%	10.5%	9.3%	
	ZRGC061	CCPSTTY	I/O PCB	1	1	1.00	19.592	19.592	19.592	3.6%	2.6%	2.8%	
	ZRSC2DR	ZRSC2DR	CKTTGMDD	1	2	2.00	12.547	25.094	23.269	3.6%	5.3%	3.6%	
			I/O PCB	1	1	1.00	1.790	1.790	1.790	3.6%	2.6%	.3%	
	CKTPDCDI	** Total			28	38	1.36	18.111	24.579	287.685	100%	100%	100%
CKTTGMDD	RCLBDEN	CLBDEN	CKTTGMDD	4	8	2.00	18.823	37.646	28.754	5.6%	5.7%	6.7%	
			I/O PCB	7	7	1.00	4.693	4.693	18.824	9.7%	5.0%	1.5%	
	ZRCLBFEN	CKTTGMDD	2	3	1.50	16.984	25.476	29.948	2.8%	2.1%	2.3%		
	ZRGC002	ZRGC002	CKTTGMDD	22	42	1.91	21.887	41.784	66.821	30.6%	30.0%	41.2%	
			I/O PCB	8	31	3.88	8.832	34.224	38.543	11.1%	22.1%	12.3%	
	ZRGC003	ZRGC003	I/O PCB	3	5	1.67	33.159	55.266	46.588	4.2%	3.6%	7.4%	
	ZRGC061	CCPSTTY	I/O PCB	1	7	7.00	30.552	213.867	45.318	1.4%	5.0%	9.6%	
	ZRSC2DR	ZRSC2DR	CKTTGMDD	1	2	2.00	14.924	29.847	27.910	1.4%	1.4%	1.3%	
			I/O PCB	1	3	3.00	19.716	59.149	54.078	1.4%	2.1%	2.6%	
	ZRWAD	ZRWAD	I/O PCB	1	1	1.00	2.306	2.306	2.306	1.4%	.7%	.1%	
	CKTTGMDD	** Total			72	140	1.94	15.954	31.021	66.821	100%	100%	100%
ZRTTBLDD	RCLBDDS	ZRCLBFDS	ZRTTBLDD	77	130	1.69	8.217	13.873	45.310	25.8%	27.5%	25.3%	
			CLBDEN	ZRTTBLDD	13	23	1.77	14.635	25.893	41.717	4.3%	4.9%	8.0%
	ZRCLBFEN	ZRTTBLDD	2	2	1.00	11.378	11.378	14.966	.7%	.4%	.5%		
	ZRWAD	ZRWAD	ZRTTBLDD	1	2	2.00	17.813	35.625	21.683	.3%	.4%	.8%	
	ZRTTBLDD	** Total			299	473	1.58	8.918	14.107	45.310	100%	100%	100%
	ZRVIEWDI	RCLBDFN	CLBDFN	ZRVIEWDP	1	7	7.00	18.813	131.691	28.024	100%	100%	100%
	ZRVIEWDP	RCLBDFN	CLBDFN	ZRVIEWDP	1	2	2.00	11.372	22.743	19.730	100%	100%	100%

Figure 192. IMS Performance Analyzer DDname by PSB-Transaction Code report

Program Trace report

The Program Trace report is a detailed trace of the events associated with a program schedule. There is a detail line of information for each call and, optionally, each IWAIT occurring during the program schedule. There is also a summary of schedule activity. The Program Trace report is produced from DB Monitor and IMS Monitor traces. It can be used for problem isolation, to determine database use, and for program documentation.

Any number of traces can be specified as part of a single IMS PA execution as long as the DDname used for each report is unique.

Note: When the field values are higher than 999.99, then the Monitor Program Trace report displays the field values in the 99.9K format.

Monitor records: This report is derived from monitor records 02–29, 38–39, 47–49, 56–65.

Uses

The Program Trace report is one of the most useful IMS PA reports, but it is probably one of the least frequently referenced. It is a detailed trace of call and IWAIT activity for MPPs, BMPs or batch region programs.

The trace is an excellent tool for pinpointing the source of performance problems related to program and database design. For example, in the short trace shown in [Figure 193 on page 378](#), the inefficient call pattern suspected from the PSB Detail report is clearly shown as a repetitive, redundant sequence of an unproductive Get Unique (GU) call followed by an ISRT call. The long trace identifies both calls and related IWAIT activity.

If you are using the DB Monitor, a trace of batch region activity can be excessively long if not controlled; this is because each trace is for a full scheduling of an application program. There is only one scheduling of a batch program. The best means of controlling the volume of output is with the From and To date and time options on the Program Trace panel.

Options

To obtain the Program Trace report, select **Program Trace** in a Monitor Report Set. More than one trace can be requested by specifying different options and assigning a unique DDname for each.

The options are:

- Date and time range of the trace
- At least one of the following:
 - Program (PSB) name to be traced
 - Transaction code to be traced
 - Region to be traced
- Type of trace; either Short, Long or Summary
- Schedule limit; the maximum number of schedules to be traced
- DDname of the data set to receive the report output; must be unique for each trace

In addition, to produce graphical distributions with the report, select **Include Distributions in Reports** from the Monitor Global Options panel and specify one or more of the following Distributions to obtain the corresponding graph:

- **Elapsed Time per Call**
- **Elapsed Time per IWAIT**
- **IWAITs per Call**

Reporting of VSAM IWAITs is controlled by **Min VSAM IWAIT** specified on the Monitor Global Options panel.

The **ESAF Integration** Option is applicable to this report.

Content

The Short form of the trace has a single line for each call plus some scheduling data. The Long form, in addition to the data provided by the short trace, has a line for each IWAIT resulting from a call. Both the Short and Long form also produce the one page Summary with optional distributions.

The Summary form of the report provides, for the traced PSB-transaction code, the same data as the **Program Analysis**, **Call Analysis**, **Call Analysis (FP)**, and **Call Analysis (ESAF)** sections of the “Program Summary report” on page 315. The Call Analysis (FP) section is included only if there is Fast Path activity to report. The Call Analysis (ESAF) section is included only if there is External Subsystem activity to report and the ESAF Integration Option is activated. In addition, **ELAPSED PER CALL**, **ELAPSED PER IWAIT**, and **IWAITS PER CALL** distribution graphs are produced if the Monitor Global Option **Include Distributions in Reports** is selected and the corresponding Distributions specified. If selected, but a Distribution is not specified, the corresponding distribution statistics summary line is produced without the graph.

Any VSAM IWAIT whose elapsed time is less than the specified minimum VSAM IWAIT value is flagged with an asterisk (*) following the **IWT Elapsed** column. These IWAITS are not included in the count of the number of IWAITS for the call (**# IWAITS**), the total IWAIT elapsed time for the call (**Call Elap**), or the percent of call time spent in IWAITS (**Pct IWT**).

Report from 02May2022 14:40:22:43										IMS Performance Analyzer									
										P R O G R A M T R A C E									
02May2023 14:41:34:99		PSB=CEXTNPGM		Tran=CEXTN0NC		Scheduled in		Region		3		Page		1					
Relative Time		Pgm Time		Call		ST		PCB Feedback		Mod IWT		DDname		IWT Elapsed		Breakdown of Call Time		Call Elap	
2-	2-	2-	2-	2-	2-	2-	2-	2-	2-	2-	2-	2-	2-	2-	2-	2-	2-	2-	2-
Secs.Mil.Mic		Sc.Mil.Mic		No.		PCBname		Func Cd		Segname Lvl		ULE		# IWAITS)		Sc.Mil.Mic		Pct CPY Pct DLA Pct IWT	
1.049				1		I/O PCB		BFPM										Sc.Mil.Mic	
1.047																		1.047	
*** Schedule start ***																			
2+	2+	2+	2+	2+	2+	2+	2+	2+	2+	2+	2+	2+	2+	2+	2+	2+	2+	2+	2+
-- 0 --		0.000		2		I/O PCB		GU								100.00%		.00%	
2.446		0.000		3		DI21PART		GU		PARTROOT 01						2.80%		97.20%	
2.451		0.002		4		DI21PART		REPL		PARTROOT 01						12.50%		87.50%	
2.882		0.003		5		DI21PART		GU		PARTROOT 01						37.50%		62.50%	
2.915		0.001		6		DI21PART		DLET		PARTROOT 01						7.69%		92.31%	
2.924		0.001		7		DI21PART		ISRT		PARTROOT 01						23.81%		76.19%	
2.951		0.001		8		IVPDB1		GU		A1111111 01						3.36%		96.64%	
2.995		0.002		9		IVPDB1		REPL		A1111111 01						23.08%		76.92%	
3.114		0.000		10		IVPDB1		GU		A1111111 01						50.00%		50.00%	
3.128		0.001		11		IVPDB1		DLET		A1111111 01						8.00%		92.00%	
3.133		0.001		12		IVPDB1		ISRT		A1111111 01						4.00%		96.00%	
3.184		0.001		13		IVPDB2		GU		A1111111 01						11.76%		88.24%	
3.310		0.001		14		IVPDB2		REPL		A1111111 01						36.36%		63.64%	
3.363		0.002		15		IVPDB2		GU		A1111111 01						71.43%		28.57%	
3.375		0.001		16		IVPDB2		DLET		A1111111 01						4.88%		95.12%	
3.382		0.000		17		IVPDB2		ISRT		A1111111 01						9.76%		90.24%	
3.424		0.001		18		IVPDB3		GHU		A1111111 01		1		0.757		.00%		100.00%	
3.476		0.011		19		IVPDB3		REPL		A1111111 01						.00%		100.00%	
4.290		0.003		20		IVPDB3		GHU		A1111111 01						.00%		100.00%	
4.315		0.003		21		IVPDB3		DLET		A1111111 01						.00%		100.00%	
4.319		0.001		22		IVPDB3		ISRT		A1111111 01						.00%		100.00%	
4.324		0.000		23		I/O PCB		ISRT								15.38%		84.62%	
4.901		0.568																.00%	
1.013																		0.013	
Schedule end at 02May2023 14:41:35:06																			
4.915																			

Figure 193. Program Trace report (Short)

Report from 02May2023 14:40:22:43										IMS Performance Analyzer PROGRAM TRACE									
02May2023 14:41:35:05 PSB=CEXTPGM Tran=CEXTN0NC Scheduled in Region 3 Page 3										Relative Time Pgm Time Call ST PCB Feedback Mod IWT DDname IWT Elapsed Breakdown of Call Time Call Elap									
2- Secs.Mil.Mic Sc.Mil.Mic No. PCBname Func Cd Segname Lvl ULE (# IWAITs) Sc.Mil.Mic Pct CPY Pct DLA Pct IWT Sc.Mil.Mic										2- 50.813 50.449 50.449									
2- -- 0 -- 0.364 *** Schedule start ***										2- 3 3.407 .14% 99.86% 67.75% 5.029									
2+ 0.000 5.022 1 I/O PCB GU										2+ VSM VSAM DFSIVD2 0.722									
2+ 0.704										2+ VSM VSAM DFSIVD1I 1.428									
2+ 1.451										2+ VSM VSAM DI21PART 1.257									
2+ 2.898										2+ 10.95% 89.05% .00% 0.137									
2+ 5.037 0.008 2 DI21PART GU PARTROOT 01										2+ 7.94% 92.06% .00% 0.063									
2+ 5.176 0.002 3 DI21PART REPL PARTROOT 01										2+ 44.44% 55.56% .00% 0.009									
2+ 5.241 0.002 4 DI21PART GU PARTROOT 01										2+ 16.00% 84.00% .00% 0.025									
2+ 5.251 0.001 5 DI21PART DLET PARTROOT 01										2+ 20.83% 79.17% .00% 0.024									
2+ 5.276 0.000 6 DI21PART ISRT PARTROOT 01										2+ 2.78% 97.22% .00% 0.072									
2+ 5.301 0.001 7 IVPDB1 GU A1111111 01										2+ 25.00% 75.00% .00% 0.012									
2+ 5.374 0.001 8 IVPDB1 REPL A1111111 01										2+ 75.00% 25.00% .00% 0.004									
2+ 5.386 0.000 9 IVPDB1 GU A1111111 01										2+ 9.38% 90.63% .00% 0.032									
2+ 5.390 0.000 10 IVPDB1 DLET A1111111 01										2+ 2.99% 97.01% .00% 0.067									
2+ 5.423 0.001 11 IVPDB1 ISRT A1111111 01										2+ 6.33% 93.67% .00% 0.079									
2+ 5.491 0.001 12 IVPDB2 GU A1111111 01										2+ 50.00% 50.00% .00% 0.012									
2+ 5.571 0.001 13 IVPDB2 REPL A1111111 01										2+ 50.00% 50.00% .00% 0.006									
2+ 5.583 0.000 14 IVPDB2 GU A1111111 01										2+ 23.53% 76.47% .00% 0.017									
2+ 5.590 0.001 15 IVPDB2 DLET A1111111 01										2+ 7.50% 92.50% .00% 0.040									
2+ 5.608 0.001 16 IVPDB2 ISRT A1111111 01										2+ 0.366 .00% 100.00% 88.62% 0.413									
2+ 5.662 0.014 17 IVPDB3 GHU A1111111 01										2+ FPD DEDB DFSIVD34 0.366									
2+ 5.701										2+ .00% 100.00% .00% 0.008									
2+ 6.077 0.002 18 IVPDB3 REPL A1111111 01										2+ .00% 100.00% .00% 0.002									
2+ 6.086 0.001 19 IVPDB3 GHU A1111111 01										2+ .00% 100.00% .00% 0.003									
2+ 6.089 0.001 20 IVPDB3 DLET A1111111 01										2+ .00% 100.00% .00% 0.007									
2+ 6.093 0.001 21 IVPDB3 ISRT A1111111 01										2+ 2.08% 97.92% .00% 0.096									
2+ 6.669 0.569 22 I/O PCB ISRT										2+ Schedule end at 02May2023 14:41:35:07									

Figure 194. Program Trace report (Long)

Report from 02May2023 14:40:22:43										IMS Performance Analyzer PROGRAM TRACE									
02May2023 14:41:40:09 PSB=CEXTPGM Tran=CEXTN0NC Scheduled in Region 3 Page 8										*** Program Analysis ***									
2- ----- Per Schedule ----- ----- Per Transaction -----										2- PSBname TranCode Scheds Trans /Sched Scd-DLI DLI-Term Schd Calls IWTs Sc.Mil.Mic CPUtime Pct of Tran Elap									
2- CEXTNPGM CEXTN0NC 1 1 1.00 0.000 10.005.325 .0 22.0 4.0 10.005.325 0.000 .0% .0% .0%										2- *** Call Analysis ***									
2- ----- Message Queue Calls ----- ----- Database Calls -----										2- PSBname TranCode /Tran /Tran /Call Mil.Mic Mil.Mic Mil.Mic /Tran /Tran /Call Mil.Mic Mil.Mic Mil.Mic CPY DLA IWT									
2- CEXTNPGM CEXTN0NC 2.0 3.0 1.50 0.013 1.704 0.339 15.0 .0 .00 0.004 0.037 0.000 10.0% 90.0% .0%										2- *** Call Analysis (FP) ***									
2- ----- E M H C a l l s ----- ----- D E D B C a l l s ----- ----- M S D B C a l l s -----										2- PSBname TranCode Calls IWTs Elap/Call Pct of Calls IWTs Elap/Call Pct of Calls IWTs Elap/Call Pct of									
2- CEXTNPGM CEXTN0NC 0.0 /Tran /Call Sc.Mil.Mic IWAIT /Tran /Call Sc.Mil.Mic IWAIT /Tran /Call Sc.Mil.Mic IWAIT										2- ELAPSED PER CALL ELAPSED PER IWAIT IWAITS PER CALL									
2- Average Std-Dev/Avg Max Value Average Std-Dev/Avg Max Value Average Std-Dev/Avg Max Value										2- 203.23 3.419 3,374 312.75 .387 522 0.18 3.571 3									

Figure 195. Program Trace report (Summary)

Report from 25Jun2023 14.45.00.04				IMS 15.4.0				IMS Performance Analyzer 4.5				Report to 25Jun2023 14.45.00.04													
PROGRAM TRACE																									
25Jun2023 14.45.00.04				PSB=RMZIOIS1 Tran=RMZITIS1				Scheduled in Region 23				Page 2													
Relative Time		Pgm Time		Call		No. PCBname		Func		ST PCB Feedback		Mod IWT		DDname		IWT Elapsed		Breakdown of Call Time							
Secs.Mil.Mic		Sc.Mil.Mic				Cd Segname Lvl		ULE		# IWAITS)						Sc.Mil.Mic		Pct CPY		Pct DLA		Pct IWT			
+		79.911		0.017		49 I/O PCB		CHNG										3.91%		96.09%		.00%			
+		80.349		0.029		50 I/O PCB		ISRT										20.69%		79.31%		.00%			
+		80.472		0.036		51 I/O PCB		PURG										9.21%		90.79%		.00%			
+		80.643		0.019		53 I/O PCB		GU						1		0.229		.16%		99.84%		1.54%			
+		95.583		0.112		54 RMCS00DE		GU		RMMSCS05 02				1		32.794		.01%		99.99%		99.57%			
+		128.629		0.109		55 RMCS00DE		GU		RMMSCS10 03								1.92%		98.08%		.00%			
+		128.715		0.034		56 RMCS00DE		GNP		RMMSCS20 03								6.45%		93.55%		.00%			
+		128.758		0.012		57 RMCS00DE		GNP		RMMSCS20 03								10.00%		90.00%		.00%			
+		128.789		0.011		58 RMCS00DE		GNP		GE RMMSCS05 02								5.88%		94.12%		.00%			
+		128.921		0.115		59 P2I1 (E)		00		Signon		S00		1		0.603		.00%		100.00%		100.00%			
+		129.596		0.072		60 P2I1 (E)		00		Normal Call		PR0		1		0.554		.00%		100.00%		100.00%			
+		130.209		0.059		61 RMCS00DE		GNP		RMMSCS30 03								1.03%		98.97%		.00%			
+		130.356		0.050		62 RMCS00DE		GNP		GE RMMSCS05 02								3.64%		96.36%		.00%			
...																									
PROGRAM TRACE																									
25Jun2023 14.45.00.04				PSB=RMZIOIS1 Tran=RMZITIS1				Scheduled in Region 23				Page 3													
** Program Analysis **																									
						Per Schedule				Per															
						Trans		Scd-DLI		DLI-Term		Schd				Elapsed		CPUtime		Pct of Tran		Elap			
PSBname		TranCode		Scheds		Trans		/Schd		Mil.Mic		Sc.Mil.Mic		on Q		Calls		IWTs		Sc.Mil.Mic		Mil.Mic		Pct CPU	
RMZIOIS1		RMZITIS1		1		2		2.00		9.996		155.663		2.0		40.5		5.5		77.832		26.728		34.3%	

Figure 196. Program Trace report (Short and Summary) with ESAF Integration

The first line of the Program Trace report is the heading, which contains the following information:

Date, Time

The date and time of the start of the schedule (message scheduling end, type 11 record).

PSB=xxxxxxx

PSB name of the scheduled program.

Tran=xxxxxxx

Transaction code of the first transaction.

Scheduled in Region nn

IMS region number in which this PSB is scheduled.

Page

Page number of this trace.

The detail lines in the Program Trace report appear under the following column headings:

Relative Time Secs.Mil.Mic

Relative time of reported activity from schedule start. Scheduling activities are also reported. The relative times for these activities are negative.

Pgm Time Sc.Mil.Mic

The elapsed time from the end of the last reported activity until the beginning of this activity. This normally represents program activity between program calls. Maximum value: 10 seconds.

Call No.

The sequence number of the calls in this trace. The buffer prime call (if available) is call 1, and the I/O PCB GU retrieving the primed buffer is call 2.

PCBname

Name of the PCB against which the call is made. If the ESAF Integration Option is activated, this can be the External Subsystem name, suffixed with **(E)** to distinguish it from a DL/I PCB name.

Func

Call function code. BFPM is the function code for the buffer prime call.

St Cd

Status code returned on the call. For an External Subsystem, this is the ESAF call return code.

PCB Feedback

The PCB feedback area as returned to the calling program. See the *IMS Application Programming: Transaction Manager* for the meaning of these fields. This information normally identifies the segment returned in the I/O area. (See [Chapter 18, “Essential terminology for Monitor reporting,”](#) on page 277.)

Segname

Segment name field.

Lvl

Database segment level number of the named segment.

For an External Subsystem, this is the ESAF call type. For example, Signon, Normal Call, Commit Ph2.

Module

The module identifier of the module issuing the IWAIT. DBH is the OSAM database buffer handler; VBH is the VSAM buffer handler.

IWT

The type of IWAIT (VSAM, HSAM, OSAM, DEDB, MSDB, or QUE).

DDname or # IWAITs**DDname**

IWAIT line: the DDname of the data set against which the IWAIT is issued.

IWAITs

Call line: the number of IWAITs occurring during this call.

IWT Elapsed Sc.Mil.Mic

IWAIT line: The elapsed time of this IWAIT. An asterisk (*) indicates the IWAIT is ignored because it is less than the **Min VSAM IWAIT** threshold value specified on the Monitor Global Options panel.

Call line: The total elapsed time for the IWAITs occurring during this call.

Breakdown of Call Time**Pct CPY**

Elapsed time spent in the IMS interregion CPY routines of DL/I as a percentage of total elapsed time for this call.

Pct DLA

Elapsed time spent in the DLA routines of DL/I as a percentage of total elapsed time for this call.

Pct IWT

Elapsed time spent in IWAITs as a percentage of total elapsed time for this call.

Call Elap Sc.Mil.Mic

Total elapsed time for this call.

The **CPU time** reported in the Program Analysis Summary at the end of the Program Trace sometimes reports CPU time as zero or is unreliable. The reason for this is because of the way IMS PA processes WFI transactions and when the IMS monitor records CPU time. The monitor does not record CPU time for each individual transaction. Instead, it only records CPU time at schedule end (SLOG 13 record). And this is an accumulation of all transactions that executed during this program schedule. For WFI, this can be for many transactions over a long period of time.

The Program Trace treats Wait-For-Input IWAITs as a “re-schedule” and flushes transaction information at the point of a WFI IWAIT. Since schedule end (SLOG 13) is not available yet, CPU time is reported as zero. Following on, transaction CPU time is only meaningful when viewed as an average.

The Region and Program Summary or Detail reports average CPU time and these should be used for CPU analysis.

Batch VSAM Statistics report

The Batch VSAM Statistics report provides VSAM usage statistics for batch applications, and is only produced for DB Monitor files built during the execution of the IMS batch system. VSAM Statistics are based on a specific application program PCB, a data set the application program is using, and the type of DL/I call the application program issued.

Note: The VSAM Statistics report should not be used for HSAM or SHSAM databases because neither of these databases use VSAM as the access method.

Uses:

From the Batch VSAM Statistics report, you can determine which calls in an application program require many I/O operations. After you know this, you can improve performance by tuning either the database or the application program to reduce I/O operations. The following fields in the report tell actual I/O activity and are therefore the most important ones to monitor:

- Reads made
- User initiated writes
- Background writes

If you can reduce the averages in these fields, performance can be improved.

Tip: In tuning to reduce I/O operations, pay most attention to calls issued a large number of times. It is more profitable to save 1 second on a call executed 2000 times than to save 5 seconds on a call executed ten times (2000 versus 50 seconds). The [“Program Activity Detail reports” on page 365](#) tells you how many times each DL/I application program call is issued.

Monitor records: This report is derived from monitor records 24, 62, 63.

Options

To obtain the report, select **Batch VSAM Statistics** from the Report Set (MON) panel and specify a DDname for the output data set for the report.

Content

This is an example of the Batch VSAM Statistics report.

Report from 06Jan2023 09.32.07.95			IMS 15.4.0		IMS Performance Analyzer 4.5				Report to 06Jan2023 09.32.31.57					
VSAM Statistics														
PCBname	DDname	From DL/I Func	06Jan2023 VSAM IWAITS	9.32.09.55 Retrieves by RBA	06Jan2023 Retrieves by Key	9.32.29.72 ESDS Inserts	9.32.29.72 KSDS Inserts	Elapsed= Buf Recs Altered	0 Hrs Backgrnd Writes	0 Mins Check Points	20.173.391 Current Err Buffs	Secs Most Err Buffs	Get Calls	
				Buffer Searches	Found in Buffer	Reads Made	User Init Writes	HS Reads	HS Writes	HS Reads Failed	HS Writes Failed	PLH Waits		
DBD02L1	DBD02P	GU	182	0.85 0.00	0.00 1.25	0.00 0.03	0.10 0.97	0.44 0.00	0.00 0.00	0.00 0.00	0.00 0.00	0.00 0.00	0.19	
		ISRT	3	107.00 2.00	2.33 31.33	0.00 1.00	2.00 0.00	26.67 0.00	0.00 0.00	0.00 0.00	0.00 0.00	0.00 0.00	25.67	
	** DD Totals **		185	2.57 0.03	0.04 1.74	0.00 0.04	0.13 0.96	0.86 0.00	0.00 0.00	0.00 0.00	0.00 0.00	0.00 0.00	0.61	
	DBD02PX	GU	8	0.00 0.00	0.13 0.00	0.00 0.75	0.00 0.25	0.00 0.00	0.00 0.00	0.00 0.00	0.00 0.00	0.00 0.00	0.13	
		DBD03P	GU	83	0.01 0.00	0.00 0.94	0.00 0.05	0.00 0.95	0.01 0.00	0.00 0.00	0.00 0.00	0.00 0.00	0.00 0.00	0.01
			ISRT	8	27.00 0.63	1.38 13.88	0.00 1.00	0.25 0.00	8.38 0.00	0.00 0.00	0.00 0.00	0.00 0.00	0.00 0.00	12.63
	** DD Totals **		91	2.38 0.05	0.12 2.08	0.00 0.13	0.02 0.87	0.75 0.00	0.00 0.00	0.00 0.00	0.00 0.00	0.00 0.00	0.00 0.00	1.12
	** PCB Totals **		284	2.44 0.04	0.07 1.80	0.00 0.09	0.09 0.91	0.80 0.00	0.00 0.00	0.00 0.00	0.00 0.00	0.00 0.00	0.00 0.00	0.76
	** Batch Totals **		343	2.19 0.03	0.06 1.57	0.00 0.17	0.11 0.82	0.76 0.00	0.00 0.00	0.00 0.00	0.00 0.00	0.00 0.00	0.00 0.00	0.72

Figure 197. Batch VSAM Statistics report

The report headings and content have the following meaning:

PCBname

The name of the PCB the report is providing information about. Remember that each application program has one or more PCBs. This field can only be used to identify which application program the report is providing information about if PCB names are unique to application programs.

DDname

The name of the data set the application program is using. Within one report, an application program (PCB) can access more than one data set. The statistics compiled are listed separately for each data set.

DL/I Func

DL/I call Function Code.

VSAM IWAITs

This field tells you, by type of DL/I call against a specific data set, the number of times IMS had to wait before processing could proceed. When IMS has to wait, it is almost always waiting for an I/O operation to take place, that is, data is being either read from the database to the buffer or written from the buffer back to the database.

The numbers in each column under all remaining fields in the report are averages. They tell the average number of times an activity occurred rather than the specific number of times. Averages are for waits. These numbers are truncated. For example, a value of 0.019 is printed as 0.01.

Retrieves by RBA

The number of retrieve by relative byte address (RBA) calls that were issued for the subpool. Retrieve by RBA calls are calls issued internally by DL/I. One retrieve by RBA call is issued for each direct-address pointer that must be followed in searching for a segment. For example, a GN call for a dependent segment in an HDAM database uses a series of RBA calls to search for the dependent segment, one call for each direct-address pointer it follows.

If you want to know the exact sequence of a search when a retrieve by RBA call is used, you can record the sequence by turning on the buffer handler trace and using a SNAP call to see the trace records. You can turn on the buffer handler trace using the BHTRACE= operand on the OPTIONS statement for the DFSVSAMP or DFSVSMnn data set. The SNAP call can be issued from the application program or by using the DFSDDLTO test utility.

One call from an application program can generate more than one retrieve by RBA call. The retrieve by RBA call might or might not require an I/O operation. Because the number in this field does not reflect the number of I/O operations to access a segment, do not use it to judge VSAM performance.

Retrieves by Key

The number of retrieve by key calls were issued for the subpool. Retrieve by key calls are calls issued internally by DL/I. The calls are issued to search a KSDS using a key as a qualification (where key is equal to or greater than X). For example, a GU call for a root segment in a HIDAM database causes DL/I to issue a retrieve by key call to access the index segment pointing to the requested root segment.

If you want to know the exact sequence of a search when key calls are used, you can record the sequence by turning on the buffer handler trace and using a SNAP call to see the trace records. You can turn on the buffer handler trace using the BHTRACE= operand on the OPTIONS statement for the DFSVSAMP or DFSVSMnn data set. The SNAP call can be issued from the application program or by using the DFSDDLTO test utility.

One call from an application program can generate more than one retrieve by key calls. The retrieve by key calls might or might not require an I/O operation. Because the number in this field does not reflect the number of I/O operations to access a segment, do not use it to judge VSAM performance.

ESDS Inserts

The number of logical records in your ESDS that were previously empty and now contain segments. When a dependent segment is inserted into an ESDS in a HISAM or HIDAM database, the segment might not fit into a logical record that already contains other segments. In this case, the segment is put into a new ESDS logical record. When a dependent segment is inserted into a logical record in an ESDS in a HISAM database, other segments in the same logical record might need to be shifted into a new ESDS logical record to make room for the segment being inserted.

Look at this field from one report to the next. It helps you determine when you are running out of logical records in the primary space you have allocated. It is best to avoid using logical records from secondary space because this space is probably not close to the primary space.

KSDS Inserts

The number of logical records in your KSDS that were previously empty and now contain segments. HISAM databases use a new logical record when a root segment is inserted. HIDAM index databases use a new logical record for the index segment created when a root segment is inserted.

Look at this field from one report to the next. It helps you determine when you are running out of logical records in the primary space you have allocated. It is best to avoid using logical records from secondary space because this space is probably not close to the primary space. The distance between the two areas of space might cause extra seek time and therefore poor performance. In general, it is best to reorganize your database before you need to use secondary space.

Buf Recs Altered

The number of logical records, while in the buffer pool, that were marked as altered. When a segment is inserted or replaced in a logical record, the logical record in the buffer is marked as altered until it is written back to the database.

Backgrnd Writes

If you have specified use of the background write function, this field tells how many times the function was used. Background write, at intervals, writes buffers containing modified data back to the database. It does this so buffers are available for use when an application program needs them. Without background write, if an application program wants to read data into a buffer that already contains modified data, the application program has to wait while the contents of the buffer are written back to the database. The number of times background write was invoked is the same on each subpool report produced during a given execution of the monitor. This is because, once involved, background write writes buffers from all subpools.

Background write is specified in the BGWRT= operand of the OPTIONS statement for the DFSVSAMP or DFSVSMnn data set.

Check Points

The number of checkpoint calls that were issued in DL/I programs while the monitor was on.

Current Err Buffs

The number of buffers currently in error.

Most Err Buffs

The maximum number of buffers in error during the monitor period.

Get Calls

The number of times VSAM GET calls were issued. VSAM GET calls are calls issued internally by DL/I. The GET call might be satisfied by data in the buffer pool or it might require that data be read into the buffer pool. Because the number in this field does not reflect the number of I/O operations required to access a segment, do not use it to judge VSAM performance.

Buffer Searches

The number of times that the HD space management routine issued calls to search for space in which to insert segments.

If, from one monitor report to the next, the number in this field is increasing, it means that space for storing new segments is not available in the most desirable location. Eventually, you must reorganize your database to improve performance. In reorganizing, pay special attention to the operands affecting database space (the BYTES operand in the RMNAME= keyword in the DBD statement and the fbf and fspf operands in the FRSPC= keyword in the DATASET statement).

Found in Buffer

The number of times that a logical record was found in a CI that was already in the buffers. When this occurs, no I/O operations are required to access the desired segments.

If you are trying to improve performance, increase the number of buffers you have allocated. If you increase the number of buffers, you can monitor this field to see if the number in it increases, which indicates improved performance.

Reads Made

The number of times that a logical record was not found in a CI that was already in the buffers. When this occurs, an I/O operation is required to read the CI containing the logical record into the buffer pool. Because performance is always better when fewer I/O operations are performed, you might want to increase the number of buffers you have specified to see how that affects the number in this field. Specifying more buffers keeps more CIs (and therefore logical records) in the buffer pool. There is a break-even point in this process, however, where too many buffers are specified, and it takes longer to search and maintain the buffers than it takes to read a CI into the buffer.

The number of buffers is specified in the control statements for the DFSVSAMP or DFSVSMnn data sets.

User Init Writes

The number of user writes were initiated. This field tells you the number of times DL/I issued a write request to write data to the database. Write operations are issued when:

- A data set is closed. Database buffers containing data that has been altered by the data set being closed are written to the database.
- Abnormal termination occurs during application program processing. Database buffers containing data that has been altered are written to the database.
- The background write function is invoked. Selected database buffers containing data that has been altered are written to the database.
- A checkpoint call is issued. All altered database buffers are written to the database.

HS Reads

The total number of successful VSAM reads (MOVEPAGE and NON-MOVEPAGE) from hiperspace buffers.

HS Writes

The total number of successful VSAM writes (MOVEPAGE and NON-MOVEPAGE) to hiperspace buffers.

HS Reads Failed

The number of times that a VSAM read request from hiperspace failed, resulting in a read from DASD.

HS Writes Failed

The number of times that a VSAM write request to hiperspace failed, resulting in a write to DASD.

PLH Waits

The number of PLH waits.

DD Totals

For a given data set, the overall average number of times an activity occurred (except for the VSAM CALLS field, which tells total number of times).

PCB Totals

For a given PCB, the overall average number of times an activity occurred (except for the VSAM CALLS field, which tells total number of times).

Batch Totals

For the monitor reporting period, the overall average number of times an activity occurred (except for the VSAM CALLS field, which tells total number of times).

Chapter 27. Resource Usage reports

The Resource Usage reports provide a detailed analysis of the usage of IMS resources.

The resources include:

- Buffer Pools; including Message Queue, OSAM, VSAM, and Message Formatting
- Latches
- Communication
- Multiple Systems Coupling
- External Subsystems

Buffer Pool and Latch Statistics reports

The Buffer Pool and Latch Statistics reports consist of the set of Buffer Pool Statistics reports, which show IMS buffer usage statistics for the Message Queue Pool, Database Buffer Pool, VSAM Buffer Pool, and Message Format Buffer Pool, and the Latch Statistics report which shows IMS latch usage counters. When requested, the Buffer Pool and Latch Statistics reports are always produced regardless of the global (or run-time) report interval specified as they provide summary statistics in the monitor start (90) and monitor end (91) records.

Monitor records: The reports are derived from the monitor records: 90, 91.

Options

To obtain the **Buffer Pool and Latch Statistics** reports, select it from the list of Resource Usage Reports in a Monitor Report Set.

Specify a DDname for the output data set for the reports. The default is STATRPT.

Buffer Pool Statistics report

This is an example of the Buffer Pool Statistics report. Statistics are reported for the following four buffer pools: Message Queue Pool, Database Buffer Pool, VSAM Buffer Pool, Message Format Buffer Pool.

The reports are always produced, even if the monitor start and monitor end records are outside the reporting period. The monitor start and end records are logged when the /TRACE command is set to ON and OFF respectively.

The values when monitor tracing starts and ends, and the difference between these two values, are reported for each pool under the headings:

Start

The value when tracing starts. The start time is shown in the column heading.

End

The value when tracing ends. The end time is shown in the column heading.

Difference

The difference between the End and Start values.

Report from 14Jun2023 18.21.49.48	IMS 15.4.0	IMS Performance Analyzer 4.5	Report to 14Jun2023 18.52.22.79
Message Queue Pool			
	18.21.49 Start	18.52.22 End	Difference
Number of Locate calls from QMGR	180	2100	1920
Number of Record Release calls from QMGR	101	756	655
Number of Locate and Alter calls from QMGR	310	3281	2971
Number of Requests to Purge the Q Pool	2	2	0
Number of Address to DRRN Translation Requests	0	0	0
Number of Read Requests	5	5	0
Number of Write Requests(Total)	6	6	0
Number of Writes done by Purge	6	6	0
Number of Waits for Purge completion	0	0	0
Number of Waits because no Buffer available	0	0	0
Number of Waits for other DECB to Read this Buffer	0	0	0
Number of Waits for other DECB to Write this Buffer	0	0	0
Number of Waits for conflicting end DEQ Buffer req	0	0	0
Number of PSBs unchained from buffers	0	0	0
Number of calls to QMGR(Total)	234	2142	1908
Number of calls to Reposition a Lost Buffer	0	1	1
Number of calls to ENQ a Message	30	370	340
Number of calls to DEQ one or more Messages	30	331	301
Number of calls to Cancel Input or Output	41	56	15

Figure 198. Buffer Pool and Latch Statistics report: Message Queue Pool

Report from 14Jun2023 18.21.49.48	IMS 15.4.0	IMS Performance Analyzer 4.5	Report to 14Jun2023 18.52.22.79
Database Buffer Pool			
	Fix Prefix/Buffers	:	N/N
	Subpool ID	:	
	Subpool Buffer Size	:	2048
	Total Buffers in Subpool	:	4
	18.21.49 Start	18.52.22 End	Difference
Number of Locate-type calls	0	1153	1153
Number of requests to create new Blocks	0	0	0
Number of Buffer Alter calls	0	289	289
Number of Purge calls	0	288	288
Number of Locate-type calls, Data already in OSAM pool	0	1150	1150
Number of Buffers searched by all Locate-type calls	0	1151	1151
Number of Read I/O requests	0	6	6
Number of Single Block Writes by Buffer Steal Routine	0	0	0
Number of Blocks written by Purge	0	289	289
Number of Locate calls waited due to Busy Id	0	0	0
Number of Locate calls waited due to Buffer Busy Write	0	0	0
Number of Locate calls waited due to Buffer Busy Read	0	0	0
Number of Buffer Steal/Purge waited for ownership Rlse	0	0	0
Number of Buffer Steal requests waited for Buffers	0	0	0
Total number of I/O errors for this Subpool	0	0	0
Number of Buffers locked due to Write errors	0	0	0
Number of CF Reads	0	0	0
Number of CF requests expected, but not Read	0	6	6
Number of Writes to CF (Prime)	0	0	0
Number of Writes to CF (Changed)	0	0	0
Number of CF requests not written, Storage Class full	0	0	0
Number of Blocks invalidated with XI	0	3	3
Number of successful XI calls	0	289	289
Number of Sequential Buffer Reads	0	0	0
Number of Sequential Buffer Anticipated Reads	0	0	0

Figure 199. Buffer Pool and Latch Statistics report: Database Buffer Pool

Report from 14Jun2023 18.21.49.48	IMS 15.4.0	IMS Performance Analyzer 4.5	Report to 14Jun2023 18.52.22.79
<u>VSAM Buffer Pool</u>			
		Fix Index/Block/Data	: N/N/N
		Shared Resource Pool ID	: XXXX
		Shared Resource Pool Type	: D
		Subpool ID	: 1
		Subpool Buffer Size	: 1024
		Total Buffers in Subpool	: 8
		Number Hiperspace Buffers	: 0
		18.21.49 Start	18.52.22 End Difference
Number of Retrieve by RBA calls received by Buf Handler	0	152	152
Number of Retrieve by Key calls	0	243	243
Number of Logical Records inserted into ESDS	0	179	179
Number of Logical Records inserted into KSDS	0	363	363
Number of Logical Records altered in this Subpool	0	1243	1243
Number of times Background Write function invoked	0	12	12
Number of Synchronization calls received	0	6	6
Number of Write Error Buffers currently in the Subpool	0	0	0
Largest number of Write Errors in the Subpool	0	0	0
Number of VSAM Get calls issued	0	1796	1786
Number of VSAM SCHBFR calls issued	0	0	0
Number of times CI requested already in pool	0	865	865
Number of CI Read from External Storage	0	0	0
Number of VSAM Writes initiated by IMS	0	0	0
Number of VSAM Reads from HIPERSPACE Buffers	0	0	0
Number of VSAM Writes to HIPERSPACE Buffers	0	0	0
Number of failed VSAM Reads from HIPERSPACE Buffers	0	0	0
Number of failed VSAM Writes to HIPERSPACE Buffers	0	0	0
Number of PLH Waits	0	0	0

Figure 200. Buffer Pool and Latch Statistics report: VSAM Buffer Pool

Report from 14Jun2023 18.21.49.48	IMS 15.4.0	IMS Performance Analyzer 4.5	Report to 14Jun2023 18.52.22.79
<u>Message Format Buffer Pool</u>			
		18.21.49 Start	18.52.22 End Difference
Number of P/F requests	0	78	78
Number of I/F requests	2	158	156
Number of I/F I/Os	2	5	3
Number of times Pool Compress would be successful	0	0	0
Number of Directory I/O operations	6	8	2
Number of times Block washed for FRE	0	0	0
Number of times P/F request ignored	0	78	78
Number of F/B requests	2	158	156
Number of times F/B request ignored	0	0	0
Number of times I/F on F/B queue	0	153	153
Number of times I/F on I/F queue	0	0	0
Number of times F/B on I/F queue	2	158	156
Number of times P/F on I/F queue	0	0	0
Number of times P/F on F/B queue	0	0	0
Number of times there was no DIR Entry for a Block	1	2	1
Number of times I/O Errors POINT or READ Macro	0	0	0
Number of Immed. I/O Requests waited due to Maximum I/O	0	0	0
Number of requests satisfied by Index/Dynamic Directory	1	3	2

Figure 201. Buffer Pool and Latch Statistics report: Message Format Buffer Pool

Latch Statistics report

This is an example of the Latch Statistics report.

Report from 17Feb2020 16:32:24:46		IMS Performance Analyzer Latch Statistics Counters				Report to 17Feb2020 16:33:01:46	
		16.32.24		16.33.01		* Difference *	
Latch Name		*** Call	**** Wait	**** Call	***** Wait	Call	Wait
DISP	SYS/Dispatcher	0	0	0	0	0	0
CTXT	SYS/PC Table	56	0	63	0	7	0
DCSL	DC/Checkpoint DC System	624	0	665	0	41	0
LUML	DC/LU 6.2 LUM	0	0	0	0	0	0
CONV	DC/Conversation Checkpt	0	0	0	0	0	0
TERM	DC/Terminal	0	0	0	0	0	0
LUBT	DC/LU62 LUB-TIB Chain	87	0	87	0	0	0
LRLT	Log Router	0	0	0	0	0	0
LBMP	LAT BMP/IRLM Lock Release	10	0	11	0	1	0
SCHD	TM/Scheduling	168	0	176	0	8	0
TCTB	TM/TCT Block	0	0	0	0	0	0
APSB	TM/Allocate PSB (BLK MVR)	87	0	95	0	8	0
PDRB	TM/PDIR Block (BLK MVR)	160	0	177	0	17	0
PSBP	TM/PSB Pool (BLK MVR)	153	0	169	0	16	0
DMBP	TM/DMB Pool (BLK MVR)	75	0	83	0	8	0
PSBB	TM/PSB Block (BLK MVR)	0	0	0	0	0	0
DMBB	TM/DMB Block (BLK MVR)	196	0	206	0	10	0
PDRP	TM/PDIR Pool (BLK MVR)	22	0	26	0	4	0
DBAU	TM/DBRC Auth (BLK MVR)	47	0	53	0	6	0
DDRB	TM/DDIR Block (BLK MVR)	0	0	0	0	0	0
DDRP	TM/DDIR Pool (BLK MVR)	0	0	0	0	0	0
DBBP	DB/OSAM Buffer Pool	740	0	814	0	74	0
DBLR	DB/DFSDBLR0 Module	6	0	6	0	0	0
SUBQ	TM/TM Subqueues	300	0	316	0	16	0
DBSL	DB/DB Checkpoint	0	0	0	0	0	0
USER	DC/User	0	0	0	0	0	0
DBLT	RSR Sharing Serialize	0	0	0	0	0	0
CCTL	SYS/DBCTL Resource	0	0	0	0	0	0
VTCT	SYS/CBTS VTCB Pool	0	0	0	0	0	0
VLQB	SYS/CBTS LQB Pool	0	0	0	0	0	0
CBTS	SYS/CBTS Pools (All)	3369	0	3652	0	283	0
BLKM	TM/SMB Queue Hash Table	221	0	233	0	12	0
QMGR	SYS/Queue Manager	8029	0	8553	0	524	0
QBSL	SYS/Queue Buffer	366	0	390	0	24	0
SMGT	SYS/Storage Management	4722	0	4888	0	166	0
DBLK	SYS/Dependent Region	83	0	90	0	7	0
XCNQ	DB/Exclusive ENQ/DEQ	96	0	104	0	8	0
ACTL	SYS/Statistics	740	0	823	0	83	0
LOGL	SYS/Logger	2753	22	2944	22	191	0
ALL	Release Hold+Non-Hold	0	0	0	0	0	0
ALLR	Release only Non-Hold	0	0	0	0	0	0

Figure 202. Buffer Pool and Latch Statistics report: Latch Statistics Counters

The report is always produced, even if the monitor start and monitor end records are outside the reporting period. The monitor start and end records are logged when the /TRACE command is set to ON and OFF.



CAUTION: When a system checkpoint is taken while the monitor is active, latch conflict statistics are reset to zero, thus corrupting the values presented in this report. If this situation exists, the following message is inserted at the top of the report:

```
*****
**** A Checkpoint occurred during Monitor run ****
**** Latch Statistics counters are invalid ****
*****
```

However, if the master terminal operator issues the CHECKPOINT command with the STATISTICS keyword parameter specified, latch conflict statistics are reset to zero, but the IMS monitor is not notified. In this case, the report program cannot detect that the statistics have been corrupted and does not issue this message.

You should not issue statistics checkpoints while the monitor is running.

The values when monitor tracing starts and ends, and the difference between them, are reported for each latch name under the headings:

Latch Name

The latch name and its function.

Start

The values when tracing starts.

Call

The number of calls requesting the lock.

Wait

The number of lock request calls that had to wait for the lock to become available.

End

The values for **Call** and **Wait** when tracing ends.

Difference

For **Call** and **Wait**, the difference between the corresponding End and Start values.

Communication reports

The IMS Monitor Communication reports consist of the Communication Summary report, the Communication IWAIT report, and the Communication Line Functions report. The Communication Summary report provides a summary of line or VTAM node activities. The Communication IWAIT report provides detailed information on IWAITs occurring while dispatching communication subtask to lines or VTAM nodes. The Communication Line Functions report provides the functions of lines and VTAM nodes.

Note: These reports are not available from DB Monitor data.

Monitor records: The Communication reports are derived from the following monitor records:

- Communication Summary. 20–21, 26–27, 30–33, 36–37, 40–41
- Communication IWAIT. 20–21, 26–27, 30–33, 36–37, 40–41
- Line Functions. 40, 41, 46

Options

To obtain the reports, select the **Communication** report in a Monitor Report Set then select one or more of the reports: Communication Summary, Communication IWAIT, Line Functions.

Specify a DDname for the output data set for the reports. For all reports, distribution graphs can optionally be produced by specifying Distributions which define the attributes of the graphs.

The **Alternate Sequencing** Option is applicable to the three reports.

Communication Summary report

The Communication Summary report presents summary information on the elapsed time and IWAITs for dispatching communication subtasks to teleprocessing lines or VTAM nodes.

The report is not produced if there is no activity on lines or nodes during the reporting period.

The contents of the Communication Start and End records are reflected in this report only when both are included in the processing.

The contents of the IWAIT Start and End records are reflected in **IWAIT Time** of this report only when both are included in the processing.

Report from 25Jun2023 14.21.41.21		IMS 15.4.0		IMS Performance Analyzer 4.5		Report to 25Jun2023 14.22.46.03					
Communication Summary											
From 25Jun2023 14.21.50.81 To 25Jun2023 14.22.46.03 Elapsed= 0 Hrs 0 Mins 55.218.943 Secs											
		----- Elapsed Time -----				----- IWAIT Time -----					
Node/ Line No.	Interrupt	Elap/Inter Sc.Mil.Mic	Max value StDev	Pct Tot Sc.Mil.Mic	Elapse	IWAITs	Elap/Inter Sc.Mil.Mic	Max value StDev	Pct Tot Sc.Mil.Mic	Pct Tot IWAITs	Pct Tot IWT Elp
1	7	1.819	1.174	5.080	0.62%	0					
4	1	0.038	0.000	0.038	0.00%	0					
ADLU2A	10	50.834	2.505	430.897	24.68%	24	11.386	0.310	29.072	100.00%	100.00%
ADLU2B	10	17.771	2.617	156.196	8.63%	0					
ADLU2C	10	15.635	2.893	151.321	7.59%	0					
LU376724	32	12.721	3.853	226.534	19.76%	0					
NDSL2A1	10	16.209	2.895	156.952	7.87%	0					
NDSL2A2	10	16.499	2.898	159.910	8.01%	0					
NDSL2A3	10	14.723	2.884	142.053	7.15%	0					
NDSL2A4	10	16.130	2.894	156.149	7.83%	0					
NDSL2A5	10	16.207	2.898	157.069	7.87%	0					
** Total	120	17.166	3.372	430.897	100.00%	24	0.949	3.486	29.072	100.00%	100.00%
Communication Summary											
From 25Jun2023 14.21.50.81 To 25Jun2023 14.22.46.03 Elapsed= 0 Hrs 0 Mins 55.218.943 Secs											
		Average SD/Avg Max-Value		Average SD/Avg Max-Value		Average SD/Avg Max-Value		Average SD/Avg Max-Value			
		14.723 2.884 142.053		16.130 2.894 156.149		16.207 2.898 157.069		17.166 3.372 430.897			
Range		Count in Node=NDSL2A3		Count in Node=NDSL2A4		Count in Node=NDSL2A5		Count in ***** Total *****			
Sc Mil Mic	Range										
To											
Maximum	0										
256.000	1 ****			1 ****		1 ****		9 ***			
128.000	0			0		0		0			
64.000	0			0		0		1			
32.000	0			0		0		1			
16.000	0			0		0		2 *			
8.000	0			0		0		2 *			
4.000	1 ****			1 ****		1 ****		8 ***			
2.000	0			0		0		1			
1.000	8 *****			8 *****		8 *****		95 *****			
-----		-----		-----		-----		-----			
Total=	10	10 20 30 40 50%	10 10 20 30 40 50%	10 10 20 30 40 50%	10 10 20 30 40 50%	120 10 20 30 40 50%					

Figure 203. Communication report: Communication Summary

The heading details at the top of each page are:

From

Start time of region activity in the reporting period.

To

End time of region activity in the reporting period.

Elapsed

Elapsed time from start until end of region activity in the reporting period.

The columns of the report are:

Node/Line No.

The VTAM node name or teleprocessing line number being reported.

Interrupt

The number of communication subtasks that were dispatched.

Elapsed Time

The elapsed time for dispatching.

Elap/Inter Sc.Mil.Mic

The average elapsed time per dispatch.

StDev

The standard deviation of elapsed time per dispatch.

Max Value Sc.Mil.Mic

The maximum elapsed time per dispatch.

Pct Tot Elapse

The elapsed time for dispatching to each teleprocessing line or VTAM node, presented as a percentage of the total elapsed time for dispatching to all teleprocessing lines and VTAM nodes.

IWAITs

The number of IWAITs occurring during dispatching.

IWAIT Time

The IWAIT elapsed time of dispatch.

Elap/Inter Sc.Mil.Mic

The average IWAIT elapsed time per dispatch.

StDev

The standard deviation of the IWAIT elapsed time per dispatch.

Max Value Sc.Mil.Mic

The maximum IWAIT elapsed time per dispatch.

Pct Tot IWAITs

The number of IWAITs occurring during dispatching to each line or node, presented as a percentage of the total number of IWAITs occurring during dispatching to lines and nodes.

Pct Tot IWT Elp

The elapsed time of IWAITs occurring during dispatching to each line or node, presented as a percentage of the total elapsed time of IWAITs occurring during dispatching to lines and nodes.

Distributions: If a Distribution for Communication Summary is specified, the distribution graphs for elapsed time of dispatch for each line or node and in total are produced.

If Alternate Sequencing is requested:

- The Communication Summary report header is suffixed by:
 - **Sorted by Dispatch Elapsed time** if sequencing by Occupancy or Calls is requested.
 - **Sorted by Dispatch IWAIT Elapsed time** if sequencing by Delay is requested.
- If a number or percentage (less than 100%) Limit is specified:
 - The report header is also suffixed by **LIMIT nn** or **LIMIT nn%**.
 - A **** Limit** line is printed to total the reported (Limited) data whilst the **** Total** line totals all (100%) of the data.

Report from 09May2023 18.29.32.35 IMS 15.4.0 IMS Performance Analyzer 4.5 Report to 09May2023 18.33.28.85											
Communication Summary (Sorted by Dispatch IWAIT Elapsed time: LIMIT 5%)											
From 09May2023 18.29.32.40 To 09May2023 18.33.28.83 Elapsed= 0 Hrs 3 Mins 56.434.335 Secs											
Node/ Line No.	Interrupt	Elapsed Time		Max value		Pct Tot Elapse	IWAITs	Elap/Inter		IWAIT Time	
		Elap/Inter Sc.Mil.Mic	StDev	Sc.Mil.Mic	Elapse			Sc.Mil.Mic	StDev	Sc.Mil.Mic	Pct Tot IWAITs
DSW10403	32	72.117	4.293	1.779.892	0.13%	2		0.817	4.249	18.785	0.10%
DSW11259	22	140.203	3.751	2.529.040	0.17%	2		1.187	3.309	16.888	0.10%
DSWP5653	2	33.550	1.000	67.095	0.00%	2		13.044	0.010	13.177	0.10%
ET2P1594	14	8.137	2.573	79.564	0.01%	2		1.849	2.515	15.737	0.10%
TP001057	29	0.939	4.987	25.709	0.00%	2		0.876	3.692	13.907	0.10%
TA001333	39	0.751	5.343	25.446	0.00%	2		0.643	4.575	16.977	0.10%
DSW11239	6	443.832	2.102	2.529.110	0.15%	2		4.169	1.421	13.510	0.10%
ET2P0953	2	19.332	1.000	38.659	0.00%	2		12.369	0.253	15.496	0.10%
ET2P4878	16	5.733	2.127	47.677	0.01%	2		1.531	2.647	12.575	0.10%
DSWP5442	2	21.567	1.000	43.130	0.00%	2		12.219	0.125	13.743	0.10%
DSWP5485	2	10.965	0.996	21.887	0.00%	2		10.806	0.241	13.411	0.10%
TP002425	29	0.803	3.460	11.300	0.00%	4		0.737	2.617	6.912	0.20%
ET2P1608	6	8.515	2.220	50.775	0.00%	2		3.460	2.038	19.174	0.10%
** Limit	10322	61.679	3.886	3.009.403	36.08%	1753		40.023	3.720	1.565.615	87.56%
** Total	86915	20.302	5.195	4.105.729	100.00%	2002		4.768	11.099	1.565.615	100.00%

Figure 204. Communication Summary report, Sequenced by Delay (with Limit)

Communication IWAIT report

The Communication IWAIT report presents the elapsed time of IWAITs for each function that caused IWAITs for each teleprocessing line or VTAM node.

The report is not produced if, during the reporting period, there are no activities on the lines or nodes, or no IWAITs occurred within activities.

The contents of the IWAIT Start and End records are reflected in this report only when both are included in the processing.

Report from 06Apr2023 20.04.56.53		IMS 15.4.0		IMS Performance Analyzer 4.5		Report to 06Apr2023 20.06.40.27		
Communication IWAIT								
From 06Apr2023 20.05.29.09 To 06Apr2023 20.05.55.32 Elapsed= 0 Hrs 0 Mins 26.229.227 Secs								
Node/ Line No.		Pool/ Format/ DDname	IWAITs	Elap/IWAIT Sc.Mil.Mic	StDev	Max value Sc.Mil.Mic	Pct Tot IWAITs	Pct Tot IWT Elp
FPEN0001	MFS Dir I/O	DCTLP1I	1	2.168	0.000	2.168	4.55%	3.33%
	MFS Dir I/O	DCTLP10	1	2.052	0.000	2.052	4.55%	3.15%
	MFS Blk I/O	DCTLP1I	1	3.086	0.000	3.086	4.55%	4.74%
	MFS Blk I/O	DCTLP10	1	4.833	0.000	4.833	4.55%	7.43%
...								
** Total			22	2.959	0.341	5.440	100.00%	100.00%
Communication IWAIT								
From 06Apr2023 20.05.29.09 To 06Apr2023 20.05.55.32 Elapsed= 0 Hrs 0 Mins 26.229.227 Secs								
Average SD/Avg		Max-Value	Average SD/Avg		Max-Value	Average SD/Avg		Max-Value
2.168 .000		2.168	2.052 .000		2.052	3.086 .000		3.086
Average SD/Avg		Max-Value	Average SD/Avg		Max-Value	Average SD/Avg		Max-Value
2.168 .000		2.168	2.052 .000		2.052	3.086 .000		3.086
Range		Count in	Range		Count in	Range		Count in
Node=FPEN0001		Node=FPEN0001	Node=FPEN0001		Node=FPEN0001	Node=FPEN0001		Node=FPEN0001
MFS Dir =DCTLP1I		MFS Dir =DCTLP10	MFS Dir =DCTLP10		MFS Blk =DCTLP1I	MFS Blk =DCTLP10		MFS Blk =DCTLP10
SC MIL MIC	Range	0	Range	0	Range	0	Range	0
To Maximum	0		To Maximum	0	To Maximum	0	To Maximum	0
10.000	0		10.000	0	10.000	0	10.000	0
5.000	1	*****	5.000	1	*****	5.000	1	*****
2.000	0		2.000	0		2.000	0	
1.000	0		1.000	0		1.000	0	
0.500	0		0.500	0		0.500	0	
0.250	0		0.250	0		0.250	0	
0.100	0		0.100	0		0.100	0	
0.020	0		0.020	0		0.020	0	
0.005	0		0.005	0		0.005	0	
Total=		1	Total=		1	Total=		1
1 10 20 30 40 50%			1 10 20 30 40 50%			1 10 20 30 40 50%		

Figure 205. Communication report: Communication IWAIT

- The heading details at the top of each page are:
- From

Start time of region activity in the reporting period.
- To

End time of region activity in the reporting period.
- Elapsed

Elapsed time from start until end of region activity in the reporting period.
- The columns of the report are:
- Node/Line No.

The VTAM node name or teleprocessing line number being reported.
- Function

The function that caused the IWAITs.
- STG

IWAITs for storage
- MFS

IWAITs for MFS
- Dir I/O

I/O IWAITs for directory
- Blk I/O

I/O IWAITs for block
- Dir

IWAIT caused by busy DCB for directory
- Blk

IWAIT caused by busy DCB for block
- Other

Other IWAITs

Pool/Format/DDname**Pool ID**

if IWAITs for storage

Format name

if IWAITs for MFS

DDname

if other IWAITs

IWAITs

The number of IWAITs.

IWAIT Time

The IWAIT elapsed time.

Elap/IWAIT Sc.Mil.Mic

The average elapsed time per IWAIT.

StDev

The standard deviation of elapsed time per IWAIT.

Max Value Sc.Mil.Mic

The maximum elapsed time per IWAIT.

Pct Tot IWAITs

The number of IWAITs for each function, presented as a percentage of the total number of IWAITs for each line or node.

Pct Tot IWT Elp

The IWAIT elapsed time for each function, presented as a percentage of the total IWAIT elapsed time for each line or node.

Distributions: If a Distribution for Communication IWAIT is specified, the distribution graphs for IWAIT elapsed time for each line or node are presented by function.

If Alternate Sequencing is requested:

- The Communication IWAIT report header is suffixed by **Sorted by Total IWAIT Elapsed time; LIMIT 5%**. Delay is the only sequence that is applicable to this report.
- If a number or percentage (less than 100%) Limit is specified:
 - The report header is also suffixed by **LIMIT nn** or **LIMIT nn%**.
 - A **** Limit** line is printed to total the reported (Limited) data whilst the **** Total** line totals all (100%) of the data.

Report from 09May2023 18.29.32.35		IMS 15.4.0		IMS Performance Analyzer 4.5		Report to 09May2023 18.33.28.85		
Communication IWAIT (Sorted by Total IWAIT Elapsed time; LIMIT 5%)								
From 09May2023 18.29.33.51 To 09May2023 18.33.23.17				Elapsed= 0 Hrs 3 Mins 49.657.667 Secs				
		Pool/ Format/ DDname		----- IWAIT Time -----				
Node/ Line No.	Function		IWAITs	Elap/IWAIT Sc.Mil.Mic	StDev	Max value Sc.Mil.Mic	Pct Tot IWAITs	Pct Tot IWT Elp
DSWP5652	QMGR	LGMSG	4	914.419	0.349	1.355.789	0.20%	0.88%
DSWP6403	QMGR	LGMSG	4	895.484	0.224	1.171.407	0.20%	0.86%
DSWP5402	QMGR	LGMSG	4	826.931	0.309	1.085.433	0.20%	0.80%
DSWP5406	QMGR	LGMSG	6	500.499	0.464	754.072	0.30%	0.72%
ET2P1474	QMGR	LGMSG	5	553.049	0.892	1.428.242	0.25%	0.67%
DSWP5064	QMGR	LGMSG	4	646.311	0.370	977.239	0.20%	0.62%
DSW10747	QMGR	LGMSG	4	610.966	0.646	1.098.716	0.20%	0.59%
ET2P1846	QMGR	LGMSG	4	608.409	0.888	1.434.218	0.20%	0.59%
...								
DSWP5685	QMGR	LGMSG	2	909.066	0.337	1.215.168	0.10%	0.44%
DSWP5848	QMGR	LGMSG	2	908.121	0.317	1.195.725	0.10%	0.44%
** Limit			131	824.109	0.493	1.565.615	6.54%	26.05%
** Total			2002	206.982	1.364	1.565.615	100.00%	100.00%

Figure 206. Communication IWAIT report, Sequenced by Delay

Communication Line Functions report

The Communication Line Functions report presents the information on transmitted or received block sizes and turnaround intervals for each teleprocessing line and VTAM node.

Note: The report is not produced if, during the reporting period, there are no activities on the lines or nodes. Activities related to a system console are not reflected in this report. The contents of the Communication Start and End records are reflected in this report only when both are included in the processing.

Report from 25Jun2023 14.21.41.21				IMS 15.4.0				IMS Performance Analyzer 4.5				Report to 25Jun2023 14.22.46.03					
Line Functions																	
From 25Jun2023 14.21.50.81 To 25Jun2023 14.22.46.03 Elapsed= 0 Hrs 0 Mins 55.218.943 Secs																	
Node/ Line No.		Device Type	----- Received Receive Blksize Blocks /Block		Blocks StDev	----- Max Blksize	Trans. Blocks	----- Blksize /Block	StDev	----- Max Blksize	T/A Intvls	----- Turnaround Elapse Sc.Mil.Mic		Interval StDev	----- Max Sc.Mil.Mic	Paging Requests	
1 CONSOLE			7	8955	0.00	8955	0	0	0.00	0	7	1.819		1.17	5.080	0	
4 3270R			0	0	0.00	0	0	0	0.00	0	1	0.038		0.00	0.038	0	
ADLU2A SLU2			2	14	0.11	15	3	210	0.67	346	10	50.834		2.51	430.897	0	
ADLU2B SLU2			2	14	0.11	15	3	210	0.67	346	10	17.771		2.62	156.196	0	
ADLU2C SLU2			2	14	0.11	15	3	210	0.67	346	10	15.635		2.89	151.321	0	
LU376724 SLU1			4	15	0.57	29	13	101	0.55	218	32	12.721		3.85	226.534	0	
NDSL2A1 SLU2			2	14	0.11	15	3	212	0.67	350	10	16.209		2.90	156.952	0	
NDSL2A2 SLU2			2	14	0.11	15	3	212	0.67	350	10	16.499		2.90	159.910	0	
NDSL2A3 SLU2			2	14	0.11	15	3	212	0.67	350	10	14.723		2.88	142.053	0	
NDSL2A4 SLU2			2	14	0.11	15	3	212	0.67	350	10	16.130		2.89	156.149	0	
NDSL2A5 SLU2			2	14	0.11	15	3	210	0.67	346	10	16.207		2.90	157.069	0	
** Total			27	2332	1.68	8955	37	173	0.75	350	120	17.166		3.37	430.897	0	
Line Functions																	
From 25Jun2023 14.21.50.81 To 25Jun2023 14.22.46.03 Elapsed= 0 Hrs 0 Mins 55.218.943 Secs																	
Received Blocksize/Block				Transmitted Blocksize/Block				Turnaround Interval									
Average		Std-Dev/Avg		Max Value		Average		Std-Dev/Avg		Max Value		Average		Std-Dev/Avg		Max Value	
15		.566		29		101		.552		218		12.721		3.853		226.534	
Range		Count in		Node=LU376724		Range		Count in		Node=LU376724		Range		Count in		Node=LU376724	
Block Size		Range		Device=SLU1		Block Size		Range		Device=SLU1		Sc Mil Mic		Range		Device=SLU1	
To Maximum		0				To Maximum		0				To Maximum		0			
1,000		0				1,000		0				2,000.000		0			
800		0				800		0				1,500.000		0			
400		0				400		1		***		1,000.000		0			
200		0				200		8		*****		800.000		0			
100		0				100		0				500.000		1		*	
60		0				60		2		*****		200.000		1		*	
40		1		*****		40		0				100.000		0			
20		1		*****		20		1		***		10.000		1		*	
10		2		*****		10		1		***		1.000		29		*****	
-----				-----				-----				-----					
Total=		4		10 20 30 40 50%		Total=		13		10 20 30 40 50%		Total=		32		10 20 30 40 50%	

Figure 207. Communication report: Line Functions

The heading details at the top of each page are:

From

Start time of region activity in the reporting period.

To

End time of region activity in the reporting period.

Elapsed

Elapsed time from start until end of region activity in the reporting period.

The columns of the report are:

Node/Line No.

The VTAM node name or teleprocessing line number being reported.

Device Type

The device type.

Received Blocks

The size of received blocks presented as follows:

Receive Blocks

The number of blocks received.

Blksize/Block

The average block size per receive.

StDev

The standard deviation of the block size per receive.

Max Blksize

The maximum block size per receive.

Transmitted Blocks

The size of transmitted blocks presented as follows:

Trans. Blocks

The number of blocks transmitted.

Blksize/Block

The average block size per transmission.

StDev

The standard deviation of block size per transmission.

Max Blksize

The maximum block size per transmission.

Turnaround Interval

Turnaround intervals presented as follows:

T/A Intvls

The number of turnaround intervals.

Elapse Sc.Mil.Mic

The average elapsed time per turnaround.

StDev

The standard deviation of elapsed time per turnaround.

Max Sc.Mil.Mic

The maximum elapsed time per turnaround.

Paging Requests

The number of requests for the next page in multiple-page messages from the MFS-supported terminal.

Distributions: If the corresponding Distributions are specified, the distribution graphs of the size of received or transmitted blocks and turnaround intervals are produced for each line and node.

If Alternate Sequencing is requested:

- The Communication Line Functions report header is suffixed by **Sorted by Total Elapsed time**. Occupancy is the only sequence that is applicable to this report.
- If a number or percentage (less than 100%) Limit is specified:
 - The report header is also suffixed by **LIMIT nn** or **LIMIT nn%**.
 - A **** Limit** line is printed to total the reported (Limited) data whilst the **** Total** line totals all (100%) of the data.

Report from 09May2023 18.29.32.35		IMS 15.4.0		IMS Performance Analyzer 4.5		Report to 09May2023 18.33.28.85								
Line Functions (Sorted by Total Elapsed time; LIMIT 5%)														
From 09May2023 18.29.32.40 To 09May2023 18.33.28.83 Elapsed= 0 Hrs 3 Mins 56.434.335 Secs														
Node/ Line No.	Device Type	----- Receive Blocks	Received Blksize /Block	----- StDev	Max Blksize	----- Trans. Blocks	Transmitted Blksize /Block	----- StDev	Max Blksize	----- T/A Intvls	Turnaround Elapse Sc.Mil.Mic	----- StDev	Max Sc.Mil.Mic	Paging Requests
DSW10773	SLU2	7	51	1.04	151	10	199	1.04	591	20	24.247	2.67	237.236	0
DSWP5932	SLU2	1	45	0.00	45	2	72	0.97	141	4	120.904	1.31	387.094	0
DSW11343	SLU2	8	39	0.97	100	10	226	0.91	591	23	20.993	2.17	162.676	0
DSW11276	SLU2	9	33	1.37	151	11	81	1.36	369	22	21.863	2.36	202.467	0
DSW10839	SLU2	8	40	1.23	151	10	146	1.10	481	21	22.888	3.31	352.312	0
ETOP2425	SLUP	3	122	0.00	122	2	249	0.16	289	7	68.500	2.32	457.330	0
DSW10197	SLU2	8	90	0.97	249	12	358	1.45	1550	24	19.926	2.23	200.302	0
JBBP5552	3600	3	146	0.23	194	2	166	0.25	207	7	67.818	1.62	280.847	0
...														
DSW10199	SLU2	10	49	1.48	249	13	139	1.24	516	27	17.360	2.66	173.278	0
DSW11337	SLU2	4	71	1.46	249	5	252	0.84	516	11	42.590	1.97	276.527	0
DSW10604	SLU2	7	77	0.85	208	11	394	1.34	1550	23	20.346	2.20	184.841	0
ET2P1982	SLU2	1	45	0.00	45	1	2	0.00	2	2	233.310	1.00	466.616	0
ETOP4425	SLUP	3	170	0.20	194	2	127	0.00	127	7	66.458	1.76	327.619	0
TA000787	SLU2	27	12	1.02	36	27	365	1.50	1289	62	7.479	7.74	459.786	0
** Limit		4474	57	1.21	274	6055	281	1.73	3190	12650	67.778	3.75	4.105.729	0
** Total		32025	78	0.82	274	34136	205	1.59	3190	86915	20.302	5.19	4.105.729	0

Figure 208. Communication report: Line Functions, Sequenced by Occupancy (with Limit)

MSC reports

The Multiple Systems Coupling (MSC) reports are the MSC Summary, MSC Traffic, and MSC Queuing Summary. The MSC Summary report provides summary information on the number of cross-system messages. The MSC Traffic report provides detailed information on local system IDs and cross-system traffic. The MSC Queuing Summary report provides detailed information on the cross-system message queue.

Note: The reports are not available from DB Monitor data.

Monitor records: The MSC reports are derived from the following monitor records:

- MSC Summary: 44, 45
- MSC Traffic: 44, 45, 90
- MSC Queuing Summary: 44, 45, 90

Options

To obtain the reports, select the **MSC** report in a Monitor Report Set and select one or more of the reports: MSC Summary, MSC Traffic, MSC Queuing.

Specify a DDname for the output data set for the reports.

The **Alternate Sequencing** Option is applicable to this report.

Optionally, distribution graphs for the MSC Queuing Summary can be produced by specifying one or both Distributions for queue length per message or queue time per message.

MSC Summary report

The MSC Summary report presents the number of enqueued and dequeued messages categorized by input name, destination name, relative link number, destination system ID.

The report is not produced if there are no cross-system messages during the reporting period.

Report from 04Feb2023 13.19.28.51			IMS 15.4.0			IMS Performance Analyzer 4.5			Report to 04Feb2023 13.20.42.21		
						MSC Summary					
From 04Feb2023 13.19.28.51 To 04Feb2023 13.20.42.19						Elapsed= 0 Hrs 1 Mins 13.674.014 Secs					
Summary by Input Name	by Input Enqueue Count	Name Dequeue Count	Summary by Destination Name	by Destination Enqueue Count	Destination Name Dequeue Count	Summary by Relative Link No.	by Relative Enqueue Count	Link Dequeue Count	Summary by Destination SID	by Destination Enqueue Count	Destination SID Dequeue Count
..None..	7	26	AB01	2	2	1	326	309	2	547	0
CSQFED5E	0	1	DRJSYP	12	0	2	70	69	3	321	0
DFSG22	2	2	DRJSY4	16	24	3	86	86	4	62	0
DFSJ44	3	2	DRJSY5	6	19	4	386	403	5	109	0
DFSKH2	4	3	DFFP1003	45	75	6	190	192	7	76	0
DFSK02	6	6	DFFP1008	14	22	9	27	25	9	5	0
DFSLF0	0	1	DFFP1009	6	9	10	25	26	12	185	309
DFSL66	13	11	DFFP1018	0	1	11	0	2	13	45	69
DFSL67	3	2	DFFP1025	4	6	15	0	14	14	58	86
RDBAH5	2	2	DFFP1102	63	91	17	125	123	16	112	143

Figure 209. MSC reports: MSC Summary

The presentation format is common to all categories:

Input Name (or Dest Name, Link No., Dest SID)

The input name (or destination name, link number, or destination system ID).

Enqueue Count

The number of enqueued messages.

Dequeue Count

The number of dequeued messages.

If Alternate Sequencing is requested:

- The MSC Summary report header is suffixed by **Sorted by Enqueue Count**. Calls is the only sequencing option applicable to this report.
- If a number or percentage (less than 100%) Limit is specified, the report header is also suffixed by **LIMIT nn** or **LIMIT nn%**.

Report from 15Jan2023 16.06.43.44			IMS 15.4.0			IMS Performance Analyzer 4.5			Report to 15Jan2023 16.25.15.30		
						MSC Summary (Sorted by Enqueue Count; LIMIT 3)					
From 15Jan2023 16.15.23.81 To 15Jan2023 16.24.29.89						Elapsed= 0 Hrs 9 Mins 06.075.874 Secs					
Summary by Input Name	by Input Enqueue Count	Name Dequeue Count	Summary by Destination Name	by Destination Enqueue Count	Destination Name Dequeue Count	Summary by Relative Link No.	by Relative Enqueue Count	Link Dequeue Count	Summary by Destination SID	by Destination Enqueue Count	Destination SID Dequeue Count
L62MVS1	15	15	TRAN31B0	7	9	10	15	15	31	7	9
			L62MVS1	6	0				12	5	0
			TRAN31B1	2	6				32	2	6

Figure 210. MSC Summary report, Sequenced by Calls

MSC Traffic report

The MSC Traffic report presents, under each local system ID, the number of enqueued and dequeued cross-system messages by the combination of input name, destination name, input system ID, destination system ID, link number, and link type.

The report is not produced if there are no cross-system messages during the reporting period.

Report from 04Feb2023 13.19.28.51		IMS 15.4.0		IMS Performance Analyzer 4.5		Report to 04Feb2023 13.20.42.21	
MSC Traffic Report							
From 04Feb2023 13.19.28.51 To 04Feb2023 13.20.42.19						Elapsed= 0 Hrs 1 Mins 13.674.014 Secs	
Local SIDs = 1, 2, 3, 4, 5, 6, 7, 8, 9							
Input Name	Dest Name	Input SID	Dest SID	Link No.	Link Type	Enqueue Count	Dequeue Count
..None..	TEFJ87	79	9	48	VTAM	1	0
CSVFED3E	TFWP613	9	29	16	VTAM	0	1
DFBU22	KKKU4	2	42	25	C-C	1	1
DFBU22	T082554	2	42	25	C-C	1	1
DFCC67	T192838	3	73	42	VTAM	1	2
DFDT70	T082545	2	52	33	C-C	1	1
DFGH92	DFS1102	3	73	42	VTAM	2	3
DFGH92	DFS1108	3	73	42	VTAM	0	1
DFGH92	DFGH92	3	3	42	VTAM	4	0

Figure 211. MSC reports: MSC Traffic

The report contains the following data items:

Local SIDs

The local system IDs.

Input Name

The input name (terminal name or program name).

Input SID

ID of the system that created the message.

Dest SID

ID of the system that received the message.

Link No.

Link number of the communication link that was assigned when the system was defined.

Link Type

Types of link:

BSYNC

BISYNC

M-M

Main storage to main storage

C-C

Channel to channel

VTAM

VTAM

Enqueue Count

The number of enqueued messages. Messages with the local destination name appear only in Enqueue Count.

Dequeue Count

The number of dequeued messages. Messages created in a local system appear only in Dequeue Count.

If Alternate Sequencing is requested:

- The MSC Traffic report header is suffixed by **Sorted by Enqueue Count**. Calls is the only sequencing option applicable to this report.
- If a number or percentage (less than 100%) Limit is specified:
 - The report header is also suffixed by **LIMIT nn** or **LIMIT nn%**
 - The **** Limit** line gives the total of the reported (Limited) data whilst the ****Total** line gives the total of all (100%) of the data.

Report from 15Jan2023 16.06.43.44		IMS 15.4.0		IMS Performance Analyzer 4.5		Report to 15Jan2023 16.25.15.30	
MSC Traffic Report (Sorted by Enqueue Count; LIMIT 2)							
From 15Jan2023 16.15.23.81		To 15Jan2023 16.24.29.89		Elapsed= 0 Hrs 9 Mins		06.075.874 Secs	
Local SIDs = 3, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 41, 44, 45, 300, 500, 1012, 2036							
Input Name	Dest Name	Input SID	Dest SID	Link No.	Link Type	Enqueue Count	Dequeue Count
L62MVS1	TRAN31B0	11	31	10	VTAM	7	9
L62MVS1	L62MVS1	12	12	10	VTAM	5	0
** Limit						12	9
** Total Traffic **						15	15

Figure 212. MSC Traffic report, Sequenced by Calls (with Limit)

MSC Queuing Summary report

The MSC Queuing Summary report presents the information on the number of queued messages and their waiting time by the combination of the enqueued link number or type and the dequeued link number or type.

The report is not produced if there are no cross-system messages during the reporting period.

The contents of the MSC Receive and Retrieve records are reflected in the report only when both are present.

Report from 04Feb2023 13.19.28.51		IMS 15.4.0		IMS Performance Analyzer 4.5		Report to 04Feb2023 13.20.42.21			
MSC Queuing Summary									
From 04Feb2023 13.19.28.51 To 04Feb2023 13.20.42.19 Elapsed= 0 Hrs 1 Mins 13.674.014 Secs									
Enqueue.....		Dequeue.....		Q Length		Max		Q Time/Msg	
Link No.	Type	Link No.	Type	Messages	/Message	StDev	Q Length	Sc.Mil.Mic	StDev
								Max	Sc.Mil.Mic
									Pct Tot
									Messages
1	C-C	1	C-C	35	67	0.64	148	760.646	1.87
3	C-C	3	C-C	3	38	0.52	55	716.926	1.41
4	C-C	4	C-C	43	117	0.66	237	102.271	2.50
5	C-C	5	C-C	19	65	0.18	76	22.457	1.99
6	C-C	6	C-C	13	124	0.51	210	11.417	1.49
6	C-C	38	C-C	6	122	0.57	218	589.764	2.14
17	C-C	25	C-C	5	232	0.39	387	18.561	0.51
42	VTAM	42	VTAM	107	177	0.66	401	89.343	5.97
45	VTAM	5	C-C	7	137	0.26	167	67.825	1.94
45	VTAM	45	VTAM	8	129	0.54	227	21.624	0.82
** Total **				408	163	0.82	529	191.679	4.07
								6.743.317	100.00%

Report from 04Feb2023 13.19.28.51		IMS 15.4.0		IMS Performance Analyzer 4.5		Report to 04Feb2023 13.20.42.21			
MSC Queuing Summary									
From 04Feb2023 13.19.28.51 To 04Feb2023 13.20.42.19 Elapsed= 0 Hrs 1 Mins 13.674.014 Secs									
Queue Length/Message					Queue Time/Message				
Average	Std-Dev/Avg	Max Value			Average	Std-Dev/Avg	Max Value		
177	.659	401			89.343	5.973	5.511.042		
Range Count in Enq Link - 42 VTAM					Range Count in Enq Link - 42 VTAM				
To Maximum Range Deq Link - 42 VTAM					To Maximum Range Deq Link - 42 VTAM				
10,000	0				800.000	2	*		
5,000	0				400.000	16	*****		
1,000	71	*****			50.000	56	*****		
100	14	*****			10.000	21	*****		
50	22	*****			5.000	11	****		
10	0				1.000	0			
5	0				0.500	0			
2	0				0.200	0			
1	0				0.100	0			
Total= 107 10 20 30 40 50%					Total= 107 10 20 30 40 50%				

Figure 213. MSC reports: MSC Queuing

The report contains the following data items:

Enqueue Link No.

The enqueued link number.

Enqueue Type

The enqueued link type.

Dequeue Link No.

The dequeued link number.

Dequeue Type

The dequeued link type. The types of link are the same as those for the MSC Traffic report:

BSYNC

BISYNC

M-M

Main storage to main storage

C-C

Channel to channel

VTAM

VTAM

Messages

The number of messages.

Queue Length**Q Length/Message**

The average queue length per message from when it is enqueued until dequeued (from enqueue to dequeue).

StDev

The standard deviation of the queue length per message from enqueue to dequeue.

Max Q Length

The maximum queue length per message from enqueue to dequeue.

Queue Time**Q Time/Msg Sc.Mil.Mic**

The average elapsed time per message from enqueue to dequeue.

StDev

The standard deviation of the elapsed time per message from enqueue to dequeue.

Max Sc.Mil.Mic

The maximum elapsed time per message from enqueue to dequeue.

Pct Tot Messages

The number of messages for each link number or type, presented as a percentage of the total number of cross-system messages.

If Alternate Sequencing is requested:

- The MSC Queuing report header is suffixed by **Sorted by Total IWAIT Elapsed time**. Delay is the only sequencing option applicable to this report.
- If a number or percentage (less than 100%) Limit is specified:
 - The report header is also suffixed by **LIMIT nn** or **LIMIT nn%**
 - The **** Limit** line gives the total of the reported (Limited) data whilst the ****Total** line gives the total of all (100%) of the data.

Distributions: If the corresponding Distributions are specified, this report includes distribution graphs of the queue length and the elapsed time in a queue for the combination of each enqueued link number and dequeued link number.

ESAF report

The IMS Monitor External Subsystem (ESAF) report provides a detailed analysis of external subsystem activity in regions and by application programs. This IMS Performance Analyzer report provides individual subsystem activity broken down by Region and Program, with statistics of ESAF activity per Transaction.

Monitor records: This report is derived from monitor records 02–29, 38–39, 47–49, 56–65.

Options

To obtain the External Subsystem report, select the **ESAF** report in a Monitor Report Set and specify a DDname for the output data set for this report.

The **Alternate Sequencing** Option is applicable to this report.

Content

This is an example of the four ESAF reports: Region Summary, Region Detail, Program Summary, Program Detail.

The Region Detail report breaks down external subsystem usage by Region ID.

The Program Detail report breaks down external subsystem usage by Program and Transaction Code within Region.

All reports have the same format, except for the addition of the PSBname and Trancode columns in the Program Detail report.

The following figures show the four reports with Alternate Sequencing activated. When Alternate Sequencing is requested:

- The ESAF report header is suffixed by **Sorted by Total Call Elapsed time**. Calls is the only sequencing option applicable to this report.
- If a number or percentage (less than 100%) Limit is specified, the report header is also suffixed by **LIMIT nn** or **LIMIT nn%**.

Report from 04Feb2023 13.19.28.51		IMS 15.4.0		IMS Performance Analyzer 4.5				Report to 04Feb2023					
13.20.42.21													
External Subsystem: Region Summary (Sorted by Total Call Elapsed time; LIMIT 2)													
From 04Feb2023 13.19.28.57 To 04Feb2023 13.20.42.21 Elapsed= 0 Hrs 1 Mins 13.641.560 Secs													
----- Subsystem Calls -----													
-- Transaction --													
Rgn No.	SSID	Function	Mod	Count	Avg Elapse Sc.Mil.Mic	Std Dev	Max Elapse Sc.Mil.Mic	Count	Avg Elapse Sc.Mil.Mic	Calls /Tran	Pct Elaps		
*Tot	DB2N	Normal Call	PR0	33631	4.077	40.127	16.975.719	2983	324.932	11.3	14.15%		
		Signon	S00	1160	0.107	3.063	8.483			0.4	0.01%		
		Create Thread	CT0	846	0.632	5.728	64.391			0.3	0.06%		
		Commit PH1	P10	1153	1.915	2.684	91.087			0.4	0.23%		
		Commit PH2	P20	232	5.183	1.942	96.114			0.1	0.12%		
		Commit Verify	P30	838	2.794	3.263	98.724			0.3	0.24%		
		Abort	AB0	1	0.817	0.000	0.817			0.0	0.00%		
		** Total **		37861	3.791	40.678	16.975.719			12.7	14.81%		
*Tot 8.37%	MQ01	Normal Call	PR0	998	81.322	5.948	5.018.993	2983	324.932	0.3			
0.00%		Signon	S00	79	0.123	0.887	0.372			0.0			
0.00%		Create Thread	CT0	21	0.031	0.858	0.150			0.0			
0.00%		Commit PH1	P10	78	0.581	2.173	6.286			0.0			
0.00%		Commit PH2	P20	78	0.618	1.855	3.446			0.0			
0.01%		Commit Verify	P30	20	3.812	0.195	6.613			0.0			
8.39%		** Total **		1274	63.846	6.725	5.018.993			0.4			

Figure 214. ESAF report (Region Summary): Sequenced by Calls (with Limit)

External Subsystem: Region Detail (Sorted by Total Call Elapsed time; LIMIT 2)											
From 04Feb2023 13.19.28.57 To 04Feb2023 13.20.42.21 Elapsed= 0 Hrs 1 Mins 13.641.560 Secs											
----- Subsystem Calls -----											
Rgn No.	SSID	Function	Mod	Count	Avg Elapse Sc.Mil.Mic	Std Dev	Max Elapse Sc.Mil.Mic	Count	Avg Elapse Sc.Mil.Mic	Calls /Tran	Pct Elaps
28	MQ01	Normal Call	PR0	41	1.541.438	1.170	5.018.993	1	69.660.964	41.0	90.72%
		Signon	S00	42	0.026	0.103	0.036			42.0	0.00%
		Commit PH1	P10	42	0.062	0.219	0.146			42.0	0.00%
		Commit PH2	P20	42	0.011	0.097	0.015			42.0	0.00%
		** Total **		167	378.462	2.940	5.018.993			167.0	90.73%
95	DB2N	Normal Call	PR0	432	126.296	10.393	16.975.719	1	45.743.862	432.0	99.99%
		Signon	S00	2	0.183	0.014	0.185			2.0	0.00%
		** Total **		434	125.715	10.417	16.975.719			434.0	99.99%

Figure 215. ESAF report (Region Detail): Sequenced by Calls (with Limit)

External Subsystem: Program Summary (Sorted by Total Call Elapsed time; LIMIT 2)													
From 04Feb2023 13.19.28.57 To 04Feb2023 13.20.42.21 Elapsed= 0 Hrs 1 Mins 13.641.560 Secs													
----- Subsystem Calls -----													
Rgn	PSBname	Trancode	SSID	Function	Mod	Count	Avg Elapse Sc.Mil.Mic	Std Dev	Max Elapse Sc.Mil.Mic	Count	Avg Elapse Sc.Mil.Mic	Calls /Tran	Pct Elaps
*Tot	CSQQTRMN		MQ01	Normal Call	PR0	41	1.541.438	1.170	5.018.993	1	69.660.964	41.0	90.72%
				Signon	S00	42	0.026	0.103	0.036			42.0	0.00%
				Commit PH1	P10	42	0.062	0.219	0.146			42.0	0.00%
				Commit PH2	P20	42	0.011	0.097	0.015			42.0	0.00%
			** Total **			167	378.462	2.940	5.018.993			167.0	90.73%
*Tot	AXI74	T17094	DB2N	Normal Call	PR0	432	126.296	10.393	16.975.719	1	45.743.862	432.0	99.99%
				Signon	S00	2	0.183	0.014	0.185			2.0	0.00%
			** Total **			434	125.715	10.417	16.975.719			434.0	99.99%

Figure 216. ESAF report (Program Summary): Sequenced by Calls (with Limit)

External Subsystem: Program Detail (Sorted by Total Call Elapsed time; LIMIT 2)													
From 04Feb2023 13.19.28.57 To 04Feb2023 13.20.42.21 Elapsed= 0 Hrs 1 Mins 13.641.560 Secs													
						----- Subsystem Calls -----							
Rgn No.	PSBname	Trancode	SSID	Function	Mod	Count	Avg Elapse Sc.Mil.Mic	Std Dev	Max Elapse Sc.Mil.Mic	Count	Avg Elapse Sc.Mil.Mic	Calls /Tran	Pct Elaps
28	CSQQTRMN		MQ01	Normal Call	PR0	41	1.541.438	1.170	5.018.993	1	69.660.964	41.0	90.72%
				Signon	S00	42	0.026	0.103	0.036			42.0	0.00%
				Commit PH1	P10	42	0.062	0.219	0.146			42.0	0.00%
				Commit PH2	P20	42	0.011	0.097	0.015			42.0	0.00%
				** Total **		167	378.462	2.940	5.018.993			167.0	90.73%
95	AXI74	T17094	DB2N	Normal Call	PR0	432	126.296	10.393	16.975.719	1	45.743.862	432.0	99.99%
				Signon	S00	2	0.183	0.014	0.185			2.0	0.00%
				** Total **		434	125.715	10.417	16.975.719			434.0	99.99%

Figure 217. ESAF report (Program Detail): Sequenced by Calls (with Limit)

The report headings and content have the following meaning:

Rgn No.

The Region number.

PSBname

The PSB (program) name.

Trancode

The Transaction Code name.

SSID

The external subsystem name.

Function

A description of the ESAF call type.

Mod

The IMS module that issued the ESAF call.

Subsystem Calls**Count**

The number of ESAF calls.

Avg Elapse Sc.Mil.Mic

The average elapsed time of an ESAF call, in microseconds.

Std Dev

The standard deviation of the elapsed time of the ESAF calls.

Max Elapse Sc.Mil.Mic

The maximum elapsed time of an ESAF call, in microseconds.

Transaction**The number of transactions that issued the ESAF calls.**

The number of transactions that issued the ESAF calls.

Avg Elapse Sc.Mil.Mic

The average elapsed time of the transactions, in microseconds.

Calls/Tran

The average number of ESAF calls made by a transaction.

Pct Elaps

The percentage of time transactions spent processing ESAF calls.

Synchronous Callout report

The Synchronous Callout report provides a detailed analysis of sync callout activity in regions and by application programs. This IMS Performance Analyzer report shows individual subsystem activity is broken down by Region and Program, with statistics of sync callout activity per Transaction.

Monitor records: This report is derived from monitor records 78, 79.

Options

To obtain the report, select the **Synchronous Callout** report in a Monitor Report Set and specify a DDname for the output data set for this report.

The Alternate Sequencing option is not applicable to this report.

The format of the operand is:

IMSPAMON	SYNCCOUT([DDNAME(ddname)])	default SYNCCOUT
----------	--------------------------------	------------------

Content

Similar to the ESAF report, the Synchronous Callout report provides a summary and detailed analysis of sync callout activity in regions and by transactions.

Report from 01Apr2009 15.05.10.62				IMS 10.1.0 IMS Performance Analyzer 4.5				Report to 01Apr2009 15.23.03.40			
Synchronous Callout Summary											
From 01Apr2009 15.19.25.67 To 01Apr2009 15.20.17.68				Elapsed= 0 Hrs 0 Mins 52.011.289 Secs							
----- Sync Call-Outs -----											
								-- Transaction --			
Rgn	PSBname	Trancode	Count	Avg Elapse	Std Dev	Max Elapse	Max	Avg Elapse	Calls	Pct	
No.				Sc.Mil.Mic		Sc.Mil.Mic	RC	Sc.Mil.Mic	/Tran	Elaps	
*Tot	JLMPGM01	JLMTRAN1	2	6.743.041	0.094	7.374.092	0	6.744.624	1.0	99.98%	
Synchronous Callout Detail											
From 01Apr2009 15.19.25.67 To 01Apr2009 15.20.17.68				Elapsed= 0 Hrs 0 Mins 52.011.289 Secs							
----- Sync Call-Outs -----											
								-- Transaction --			
Rgn	PSBname	Trancode	Count	Avg Elapse	Std Dev	Max Elapse	Max	Avg Elapse	Calls	Pct	
No.				Sc.Mil.Mic		Sc.Mil.Mic	RC	Sc.Mil.Mic	/Tran	Elaps	
2	JLMPGM01	JLMTRAN1	2	6.743.041	0.094	7.374.092	0	6.744.624	1.0	99.98%	

Figure 218. Synchronous Callout report

The report columns are:

Rgn No.

The Region number.

PSBname

The PSB (program) name.

Trancode

The Transaction Code name.

Sync Call-Outs

Count

The number of sync callouts.

Avg Elapse Sc.Mil.Mic

The average elapsed time of a sync callout, in microseconds.

Std Dev

The standard deviation of the elapsed time of the sync callouts.

Max Elapse Sc.Mil.Mic

The maximum elapsed time of a sync callout, in microseconds.

Max RC

The maximum return code from a sync callout request.

Transaction

Count

The number of transactions that issued the sync callouts.

Avg Elapse Sc.Mil.Mic

The average elapsed time of the transactions, in microseconds.

Calls/Tran

The average number of sync callouts made by a transaction.

Pct Elaps

The percentage of time that transactions spent processing sync callouts.

Chapter 28. Fast Path Analysis reports

The Fast Path Analysis reports provide an analysis of all Fast Path resources and functions, including DEDB resource contention, Fast Path buffers, BALG and shared EMHQ, OTHREADS, DEDB IWAITs, and VSO.

The reports are not available from DB Monitor data.

DEDB Resource Contention report

The DEDB Resource Contention report provides summary information about IWAITs on data entry database (DEDB) locks of various types, including CI, unit of work (UOW), segment level, area, buffer overflow, main storage database (MSDB), non-DBRC DB, command and dummy locks.

Note: The report is not available from DB Monitor data.

Monitor records: This report is derived from monitor records 68, 69, 95.

Options

To obtain the Fast Path DEDB Resource Contention report, select the **DEDB Resource Contention** report in a Monitor Report Set.

Specify a DDname for the output data set for the report and optionally specify a Distribution for Lock IWAIT Elapsed Time.

The **Alternate Sequencing** option is applicable to this report.

Content: DEDB Lock IWAITs

This is an example of the Fast Path DEDB Resource Contention report showing the DEDB Lock IWAITs Summary.

This report provides summary information on IWAITs on the following DEDB lock IWAIT types:

Name	Description
CI	IWAIT on CI Lock
UOW	IWAIT on UOW Lock
Segment Level	IWAIT on Segment Level Lock
Area	IWAIT on Area Lock
Buffer Overflow	IWAIT on Buffer Overflow Lock
MSDB	IWAIT on MSDB Lock
Non-DBRC DB	IWAIT on Database not registered to DBRC Lock
Command	IWAIT on Command Lock
Dummy	IWAIT on Dummy Lock

Report from 09Jun2023 14.25.56.36			IMS 15.4.0		IMS Performance Analyzer 4.5			Report to 09Jun2023 14.30.06.71		
Fast Path DEDB Resource Contention Summary										
From 09Jun2023 14.26.11.74			To 09Jun2023 14.29.21.57		Elapsed= 0 Hrs		3 Mins 09.836.240 Secs			
**** CI Lock IWAIT ****			Sharing Types:							
Area Sharing							A : Area / Non Level Share			
Name Type							B : 1 IRLM Block Level Share			
							C : 2 IRLM Block Level Share			
DB23AR0 A		3	3.313	0.466	5.498	9.09%	0.05%			
DB23AR1 A		4	2.222	0.551	3.386	12.12%	0.04%			
DB23AR3 A		1	4.871.974	0.000	4.871.974	3.03%	24.50%			
DB23AR4 A		1	0.257	0.000	0.257	3.03%	0.00%			
DB23AR5 A		11	1.358.286	1.620	4.981.761	33.33%	75.15%			
DD01AR0 A		13	3.880	0.499	6.863	39.39%	0.25%			
** Total		33	602.504	2.668	4.981.761	100.00%	100.00%			
**** Area Lock IWAIT ****			Sharing Types:							
Area Sharing							A : Area / Non Level Share			
Name Type							B : 1 IRLM Block Level Share			
							C : 2 IRLM Block Level Share			
BANKC00 C		11	18.813	0.129	22.795	39.29%	15.18%			
BANKC01 C		17	68.036	2.828	837.022	60.71%	84.82%			
** Total		28	48.699	3.118	837.022	100.00%	100.00%			
**** CI Lock IWAIT ****										
Value		Average SD/Avg Max-Value		Average SD/Avg Max-Value		Average SD/Avg Max-Value		Average SD/Avg Max-		
		3.313 .471 5.498		2.222 .556 3.386		4.871.974 .005 4.871.974		0.257 .005		
0.257										
Range Count in		Aareaname=DB23AR0		Count in Aareaname=DB23AR1		Count in Aareaname=DB23AR3		Count in		
Aareaname=DB23AR4										
Sc Mil Mic Range		Share Type=A		Range Share Type=A		Range Share Type=A		Range Share Type=A		
To Maximum		0		0		1 *****		0		
256.000		0		0		0		0		
128.000		0		0		0		0		
64.000		0		0		0		0		
32.000		0		0		0		0		
16.000		0		0		0		0		
8.000		1 *****		0		0		0		
4.000		2 *****		2 *****		0		0		
2.000		0		1 *****		0		0		
1.000		0		1 *****		0		1		

-----				-----		-----		-----		
Total=		3 10 20 30 40 50%		4 10 20 30 40 50%		1 10 20 30 40 50%		1 10 20 30		
40 50%										

Average SD/Avg Max-Value		Average SD/Avg Max-Value		Average SD/Avg Max-Value		Average SD/Avg Max-Value				
1.358.286 1.624 4.981.761		3.880 .503 6.863		602.504 2.673 4.981.761						
Range Count in		Aareaname=DB23AR5		Count in Aareaname=DD01AR0		Count in Aareaname=** Total				
Sc Mil Mic Range		Share Type=A		Range Share Type=A		Range Share Type=				
To Maximum		3 *****		0		4 *****				
256.000		0		0		0				
128.000		0		0		0				
64.000		1 ****		0		1 *				
32.000		0		0		0				
16.000		2 *****		3 *****		5 *****				
8.000		1 ****		2 *****		4 *****				
4.000		2 *****		3 *****		9 *****				
2.000		1 ****		5 *****		7 *****				
1.000		1 ****		0		3 *****				
Total=		11 10 20 30 40 50%		13 10 20 30 40 50%		33 10 20 30 40 50%				

Figure 219. DEDB Resource Contention report: DEDB Lock IWAIT Summary

The report heading at the top of the page has the following:

From

Start time of region activity in the reporting period.

To

End time of region activity in the reporting period.

Elapsed

Elapsed time from start until end of region activity in the reporting period.

Each section of the report includes the following items:

Area Name

The name of the area whose activity is being summarized.

Sharing Type**SHARELVL****Name****0 or 1**

A : Area / Non Level Share

2

B : 1 IRLM Block Level Share

3

C : 2 IRLM Block Level Share

Counts

The number of locks of this type requested.

Elap/Count Sc.Mil.Mic

The average elapsed time to wait for this type of lock per request.

StDev

The standard deviation of the elapsed time to wait for this type of lock per request.

Max IWAIT Sc.Mil.Mic

The maximum elapsed time to wait for this type of lock per request.

Pct Tot Counts

The number of waits for this type of lock in each area, presented as a percentage of the total number of waits for this type of lock in all areas.

Pct Tot IW Elp

The elapsed time to wait for this type of lock in each area, presented as a percentage of the total elapsed time to wait for this type of lock in all areas.

Distributions: If a Distribution for Lock IWAIT Elapsed Time is specified, the Elap/Count distribution graphs for each area are presented by lock IWAIT type.

If Alternate Sequencing is requested:

- The DEDB Resource Contention Summary report header is suffixed by **Sorted by Total IWAIT Elapsed time**. Delay is the only sequencing option applicable to this report.
- If a number or percentage (less than 100%) Limit is specified, the report header is also suffixed by **LIMIT nn** or **LIMIT nn%**.

Report from 09May2023 18.29.32.35		IMS 15.4.0		IMS Performance Analyzer 4.5		Report to 09May2023 18.33.28.85	
Fast Path DEDB Resource Contention Summary (Sorted by Total IWAIT Elapsed time; LIMIT 10%)							
From 09May2023 18.29.32.90 To 09May2023 18.33.28.31		Elapsed=		0 Hrs 3 Mins 55.405.756 Secs			
**** CI Lock IWAIT ****	Sharing Types:						
Area Name	Sharing Type	Counts	Elap/Count Sc.Mil.Mic	StDev	Max IWAIT Sc.Mil.Mic	Pct Tot Counts	Pct Tot IW Elp
CMFA15	C	4	249.742	1.093	657.358	0.32%	0.20%
CMFA38	C	2	454.032	0.393	632.274	0.16%	0.18%
CMFA39	C	2	1.774	0.201	2.130	0.16%	0.00%
CMFA05	C	4	0.855	0.366	1.237	0.32%	0.00%
CMFA27	C	1	867.111	0.000	867.111	0.08%	0.17%
CMFA30	C	2	24.901	0.969	49.041	0.16%	0.01%
** Limit		15	188.728	1.525	867.111	1.20%	0.56%
** Total		1245	405.830	1.262	4.168.837	100.00%	100.00%

Figure 220. DEDB Resource Contention Summary report, Sequenced by Delay (with Limit)

Content: DEDB Area Lock Activity

This is an example of the Fast Path DEDB Resource Contention report showing a summary of DEDB Area Lock Activity.

Report from 09Jun2023 14.25.56.36			IMS 15.4.0		IMS Performance Analyzer 4.5				Report to 09Jun2023 14.30.06.71					
Fast Path DEDB Lock Activity														
			From 09Jun2023 14.26.11.74 To 09Jun2023 14.29.21.57			Elapsed= 0 Hrs 3 Mins 09.831.742 Secs								
			Lock Elapsed			IWAIT Elapsed								
Area Name	Shr Lvl	Loc Type	Lock Count	Average Sc.Mil.Mic	StDev	Maximum Sc.Mil.Mic	** Pct Total Locks	** Pct Total El	IWAIT Count	Average Sc.Mil.Mic	StDev	Maximum Sc.Mil.Mic	** Pct Total IWTs	** Pct Total IWT Ela
DB23AR0	1	CI	8	1.731.126	1.710	7.895.488	6.54%	8.87%	3	2.152	0.078	2.388	7.09%	0.04%
DB23AR1	1	CI	16	3.561.822	2.561	27.694.288	13.08%	36.51%	4	2.280	0.532	3.508	10.32%	0.05%
DB23AR4	1	CI	3	56.263	1.401	167.765	2.67%	0.11%	1	0.306	0.000	0.306	0.21%	0.00%
DB23AR5	1	CI	36	1.525.901	1.846	10.159.705	30.34%	35.19%	11	1.422.873	1.395	4.985.499	27.43%	85.57%
DD01AR0	2	CI	40	417.830	4.100	7.888.613	34.54%	10.71%	13	3.898	0.542	9.214	32.65%	0.28%
		UOW	2	26.282	0.571	41.278	0.73%	0.29%	0					
		Tot	42	398.654	3.499	7.888.613	36.43%	11.00%	13	3.898	0.542	9.214	32.65%	0.28%
** Total	CI UOW Tot	CI	153	1.020.175	3.514	27.694.288	99.27%	99.71%	33	554.285	2.475	4.985.499	100.00%	100.00%
		UOW	2	26.282	0.571	41.278	0.73%	0.29%	0					
		Tot	155	1.001.324	2.345	27.694.288	100.00%	100.00%	33	554.285	2.475	4.985.499	100.00%	100.00%

Figure 221. DEDB Resource Contention report: Fast Path DEDB Lock Activity

The report contains the following information:

Area Name

The name of the area whose activity is being summarized.

Shr Lvl

The Database Share Level (SHARELVL), either 0, 1, 2 or 3.

Loc Typ

The Lock Type, either CI or UOW. **Tot** is the combined CI and UOW total for the area, or grand total.

Lock Elapsed

Lock Count

The number of locks requested.

Average Sc.Mil.Mic

The average lock elapsed time.

StDev

The standard deviation of lock elapsed time.

Maximum Sc.Mil.Mic

The maximum lock elapsed time.

Pct Total Locks

The number of locks presented as a percentage of the total number of locks for all areas.

Pct Total Lock El

The lock elapsed time presented as a percentage of the total lock elapsed time for all areas.

IWAIT Elapsed

IWAIT Count

The number of IWAITs.

Average Sc.Mil.Mic

The average lock IWAIT elapsed time.

StDev

The standard deviation of lock IWAIT elapsed time.

Maximum Sc.Mil.Mic

The maximum lock IWAIT elapsed time.

Pct Total IWAITs

The number of lock IWAITs presented as a percentage of the total number of lock IWAITs for all areas.

Pct Total IWT Ela

The lock IWAIT elapsed time presented as a percentage of the total lock IWAIT elapsed time for all areas.

If Alternate Sequencing is requested:

- The Fast Path DEDB Lock Activity report header is suffixed by **Sorted by Total IWAIT Elapsed time**. Delay is the only sequencing option applicable to this report.
- If a number or percentage (less than 100%) Limit is specified, the report header is also suffixed by **LIMIT nn** or **LIMIT nn%**.

Fast Path Buffer Statistics report

The Fast Path Buffer Statistics report provides statistical information on activities in the Fast Path buffers, for all regions combined and for each region.

Note: The report is not available from DB Monitor data.

Monitor records: The report is derived from monitor record 43.

Options

Specify a DDname for the output data set for the report, and optionally a Distribution to produce a distribution graph of Buffer Statistics.

The **Alternate Sequencing** Option is applicable to this report.

Content

The Fast Path Buffer Statistics report presents the statistical information of the Fast Path buffers by transaction for all regions and for each region.

If there is no activity in the Fast Path buffers during the reporting period, the report is not produced.

Report from 08Jun2023 13.06.12.71				IMS 15.4.0				IMS Performance Analyzer 4.5				Report to 08Jun2023 13.10.39.26						
Fast Path Buffer Statistics																		
Region Totals		From 08Jun2023 13.06.23.92 To 08Jun2023 13.09.52.02				Elapsed=		0 Hrs 3 Mins 28.096.284 Secs										
Trans Code	No.of Sync	No.of Buifs Requested Avg	No.of Buifs Requested Max	No.of Buifs Updated Avg	No.of Buifs Updated Max	No.of Steal Avg	No.of Invoc. Max	No.of Buifs Stolen Avg	No.of Buifs Stolen Max	No.of Buifs Used (NBA) Avg	No.of Buifs Used (NBA) Max	No.of Buifs Used (OBA) Avg	No.of Buifs Used (OBA) Max	No.of Waits for OBA Avg	No.of Waits for OBA Max			
DDLTRN01	38	3	21	3	20	0	0	0	0	3	20	0	0	0	0			
DDLTRN02	6	3	5	1	1	0	0	0	0	3	5	0	0	0	0			
TXCDS01	4	4	7	0	1	1	2	1	1	2	3	1	2	0	1			
TXCDRN14	1	3	3	0	0	0	0	0	0	3	3	0	0	0	0			
** Total	49	3	21	2	20	0	2	0	1	3	20	0	2	0	1			
Region No. 1		From 08Jun2023 13.06.23.92 To 08Jun2023 13.09.52.02				Elapsed=		0 Hrs 3 Mins 28.096.284 Secs										
Trans Code	No.of Sync	No.of Buifs Requested Avg	No.of Buifs Requested Max	No.of Buifs Updated Avg	No.of Buifs Updated Max	No.of Steal Avg	No.of Invoc. Max	No.of Buifs Stolen Avg	No.of Buifs Stolen Max	No.of Buifs Used (NBA) Avg	No.of Buifs Used (NBA) Max	No.of Buifs Used (OBA) Avg	No.of Buifs Used (OBA) Max	No.of Waits for OBA Avg	No.of Waits for OBA Max			
DDLTRN01	38	3	21	3	20	0	0	0	0	3	20	0	0	0	0			
TXCDS01	4	4	7	0	1	1	2	1	1	2	3	1	2	0	1			
TXCDRN14	1	3	3	0	0	0	0	0	0	3	3	0	0	0	0			
** Total	43	3	21	3	20	0	2	0	1	3	20	0	2	0	1			
Region Totals		From 08Jun2023 13.06.23.92 To 08Jun2023 13.09.52.02				Elapsed=		0 Hrs 3 Mins 28.096.284 Secs										
Trancode	DDLTRN01	Average	SD/Avg	Max-Value	Average	SD/Avg	Max-Value	Average	SD/Avg	Max-Value	Average	SD/Avg	Max-Value	Average	SD/Avg			
		2.79	1.58	21	2.97	1.40	20	0.00	.00	0	0.00	.00	0	0.00	.00			
Range	Count in	** Buffer		Count in	** Buffer		Count in	** Steal		Count in	** Buffer		Count in	** Buffer				
Counts	Range	Requested **		Range	Updated **		Range	Invocation **		Range	Stolen **		Range	Stolen **				
To Maximum	0	0		0	0		0	0		0	0		0	0				
50	1 *	0		0	1 *		0	0		0	0		0	0				
20	1 *	0		0	2 **		0	0		0	0		0	0				
15	1 *	0		0	2 **		0	0		0	0		0	0				
10	0	0		0	4 ****		0	0		0	0		0	0				
5	0	0		0	2 **		0	0		0	0		0	0				
4	3 ***	0		0	7 *****		0	0		0	0		0	0				
3	5 *****	0		0	38 *****		0	0		0	0		0	0				
2	9 *****	0		0	38 *****		0	0		0	0		0	0				
1	18 *****	0		0	38 *****		0	0		0	0		0	0				
Total=	38	10	20	30	40	50%	38	10	20	30	40	50%	38	10	20	30	40	50%
		Average	SD/Avg	Max-Value	Average	SD/Avg	Max-Value	Average	SD/Avg	Max-Value	Average	SD/Avg	Max-Value	Average	SD/Avg			
		3.18	1.30	20	0.00	.00	0	0.00	.00	0	0.00	.00	0	0.00	.00			
Range	Count in	** Buffer		Count in	** Buffer		Count in	** Wait for		Count in	** Wait for		Count in	** Wait for				
Counts	Range	Used (NBA) **		Range	Used (OBA) **		Range	OBA(Count) **		Range	OBA(Count) **		Range	OBA(Count) **				
To Maximum	0	0		0	0		0	0		0	0		0	0				
50	0	0		0	0		0	0		0	0		0	0				
20	1 *	0		0	0		0	0		0	0		0	0				
15	2 **	0		0	0		0	0		0	0		0	0				
10	0	0		0	0		0	0		0	0		0	0				
5	3 ***	0		0	0		0	0		0	0		0	0				
4	3 ***	0		0	0		0	0		0	0		0	0				
3	6 *****	0		0	0		0	0		0	0		0	0				
2	4 *****	0		0	0		0	0		0	0		0	0				
1	19 *****	0		0	0		0	0		0	0		0	0				
Total=	38	10	20	30	40	50%	38	10	20	30	40	50%	38	10	20	30	40	50%

Figure 222. Fast Path Buffer Statistics

The report heading at the top of each page has the following:

Region Totals or Region No. *nn*

Region Totals

Designates that the report is a summary of system activity.

Region No. *nn*

Designates that the report is a summary of region activity for region *nn*.

From

Start time of region activity in the reporting period.

To

End time of region activity in the reporting period.

Elapsed

Elapsed time from start until end of region activity in the reporting period.

%NO - TRAN indicates that there are no transaction codes in the monitor input data, and is also printed for the regions not related to transactions such as batch regions.

The columns of the report are:

Trans Code

The name of the transaction code being analyzed.

In the DBCTL environment, this is a CICS transaction code if a DL/I call is issued against the DEDB in a CICS application program.

It is not always possible to determine the transaction code for activity in progress at the start of the IMS Performance Analyzer reporting interval. In this case, the transaction code is reported as %Tnnnnnn where nnnn is the region number.

No.of Sync

The number of sync points.

The **Average** and **Maximum** values per transaction are presented for the following items:

No.of Bufs Requested

The number of Fast Path buffers requested.

No.of Bufs Updated

The number of buffers updated by DDEP, SDEP, and MSDB activity.

No.of Steal Invoc.

The number of STEAL requests to buffers that are not in use.

No.of Bufs Stolen

The number of successful STEALS to buffers that are not in use.

No.of Bufs Used (NBA)

The number of NBA (Normal Buffer Allocation) buffers used.

No.of Bufs Used (OBA)

The number of OBA (Overflow Buffer Allocation) buffers used.

No.of Waits for OBA

The number of requests that waited to obtain a buffer from OBA.

Elapsed Time for OBA

The elapsed time waiting to obtain buffers from OBA.

Distributions: If a Distribution for Fast Path Buffer Statistics is specified, seven distribution graphs for the above items, with the exception of Elapsed Time for OBA, are produced.

If Alternate Sequencing is requested:

- The Fast Path Buffer Statistics report header is suffixed by:
 - **Sorted by Total Buffer Requests** if sequencing by Occupancy or Calls is requested. The Occupancy request is translated to a Calls request.
 - **Sorted by Total Buffer Steals** if sequencing by Delay requested.
- If a number or percentage (less than 100%) Limit is specified:
 - The report header is also suffixed by **LIMIT nn** or **LIMIT nn%**
 - The **** Limit** line gives the total of the reported (Limited) data whilst the ****Total** line gives the total of all (100%) of the data.

Report from 09May2023 18.29.32.35				IMS 15.4.0				IMS Performance Analyzer 4.5				Report to 09May2023 18.33.28.85					
Fast Path Buffer Statistics (Sorted by Total Buffer Requests: LIMIT 30%)																	
Region No. 186		From 09Jun2023 18.31.16.29 To 09Jun2023 18.33.20.24								Elapsed= 0 Hrs 2 Mins 03.945.370 Secs							
Trans Code	No.of Sync	No.of Bufs Requested		No.of Bufs Updated		No.of Steal Invoc.		No.of Bufs Stolen		No.of Bufs Used (NBA)		No.of Bufs Used (OBA)		No.of Waits for OBA		Elapsed Time for OBA	
		Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max
%Tnn0186	7	3	4	2	4	0	0	0	0	3	4	0	0	0	0	0.000	0.000
** Limit	7	3	4	2	4	0	0	0	0	3	4	0	0	0	0	0.000	0.000
** Total	7	3	4	2	4	0	0	0	0	3	4	0	0	0	0	0.000	0.000

Figure 223. Fast Path Buffer Statistics, Sequenced by Calls (with Limit)

BALG/Shared EMHQ Analysis report

The BALG/Shared EMHQ Analysis report provides statistical information on Balancing Group (BALG) activities and the shared Expedited Message Handler queue (EMHQ).

Note: The report is not available from DB Monitor data.

Monitor records: The report is derived from monitor record 47.

Options

To obtain the Fast Path BALG/Shared EMHQ Analysis report, select the **BALG/Shared EMHQ** report in a Monitor Report Set.

Specify a DDname for the output data set for the report. Optionally, specify Distributions for the Queue Length per Message and Queue Time per Message distribution graphs.

Content

The BALG/Shared EMHQ Analysis report presents the statistical information on Balancing Group (BALG) activities and the shared Expedited Message Handler Queue (EMHQ).

This report is not produced if there are no BALG or shared EMHQ activities during the reporting period.

Report from 08Jun2023 13.06.12.71			IMS 15.4.0		IMS Performance Analyzer 4.5			Report to 08Jun2023 13.10.39.26					
Fast Path BALG/Shared EMHQ Analysis													
From 08Jun2023 13.07.14.69 To 08Jun2023 13.09.21.73 Elapsed= 0 Hrs 2 Mins 07.044.819 Secs													
<div><div>----- Queue Length / Message -----</div><div>----- Queue Time / Message -----</div></div>													
PSBname	TranCode	Queue	Msg Counts	Length /Msg	StDev	Max Value	Pct Tot Counts	Elap/Msg Sc.Mil.Mic	StDev	Max Value Sc.Mil.Mic	Pct Tot Elaps		
DDLTD01	TXCDD01	BALG	10	1	0.571	2	29.43%	8.048	0.524	13.542	31.32%		
DDLTRN14	TXCDRN14	BALG	4	1	0.663	2	10.57%	20.674	0.514	24.436	8.68%		
DRPTRS21	TXCDD01	BALG	15	1	0.465	2	40.43%	8.048	0.689	16.282	38.32%		
DRPTRN17	TXCDRN17	BALG	7	1	0.667	2	19.57%	20.674	0.532	27.563	21.68%		
** Total **			36	1	0.598	2	100.00%	11.655	0.755	27.563	100.00%		
<div><div>Queue Length/Message</div><div>Queue Time/Message</div></div>													
Average			Std-Dev/Avg		Max Value		Average			Std-Dev/Avg		Max Value	
1.40			.571		2		8.048			.524		13.542	
Range			Count in		PSB=DDLTD01 Queue=		Range			Count in		PSB=DDLTD01 Queue=	
Length			Range		TC =TXCDD01 BALG		Sc Mil Mic			Range		TC =TXCDD01 BALG	
To Maximum			0				To Maximum			0			
90			0				10.000.000			0			
30			0				5.000.000			0			
15			0				1.000.000			0			
10			0				500.000			0			
5			0				100.000			0			
4			0				50.000			3		*****	
3			0				10.000			5		*****	
2			6		*****		5.000			2		*****	
1			4		*****		1.000			0			
Total=			10		10 20 30 40 50%		Total=			10		10 20 30 40 50%	

<div><div>Queue Length/Message</div><div>Queue Time/Message</div></div>													
Average			Std-Dev/Avg		Max Value		Average			Std-Dev/Avg		Max Value	
1.25			.663		2		20.674			.514		24.436	
Range			Count in		PSB=DDLTRN14 Queue=		Range			Count in		PSB=DDLTRN14 Queue=	
Length			Range		TC =TXCDRN14 BALG		Sc Mil Mic			Range		TC =TXCDRN14 BALG	
To Maximum			0				To Maximum			0			
90			0				10.000.000			0			
30			0				5.000.000			0			
15			0				1.000.000			0			
10			0				500.000			0			
5			0				100.000			0			
4			0				50.000			3		*****	
3			0				10.000			0			
2			2		*****		5.000			1		*****	
1			2		*****		1.000			0			
Total=			4		10 20 30 40 50%		Total=			4		10 20 30 40 50%	

Figure 224. BALG/Shared EMHQ Analysis report

The report heading at the top of each page has the following:

From

Start time of region activity in the reporting period.

To

End time of region activity in the reporting period.

Elapsed

Elapsed time from start until end of region activity in the reporting period.

The time difference between From and To may show as 0 in the report because the report was created based on only one record.

The report columns are:

PSBname

The PSB whose activity is being analyzed.

TranCode

The transaction code whose activity is being analyzed.

It is not always possible to determine the transaction code for activity in progress at the start of the IMS Performance Analyzer reporting interval. In this case, the transaction code is reported as %Trnnnnnn where nnnn is the region number.

Queue

BALG

Balancing Group

EMHQ

Shared EMH (Expedited Message Handler) Queue

Msg Counts

The number of message GU calls.

Queue Length / Message

Information on the length of the BALG/Shared EMHQ queues:

Length/Msg

The average queue length per message processed at GU call time.

StDev

The standard deviation of the queue length.

Max Value

The maximum queue length for a message processed at GU call time.

Pct Tot Counts

The number of GU calls for this transaction shown as a percentage of the total number of GU calls for all transactions.

Queue Time / Message

The elapsed time of a GU call message staying in BALG/Shared EMHQ:

Elap/Msg Sc.Mil.Mic

The average elapsed time that GU call messages stayed in BALG/Shared EMHQ.

StDev

The standard deviation of the elapsed queue time.

Max Value Sc.Mil.Mic

The maximum elapsed time that a message stayed in BALG/Shared EMHQ.

Pct Tot Elaps

The elapsed time that GU call messages stayed in BALG/Shared EMHQ for this transaction shown as a percentage of the total elapsed time of GU call messages for all transactions.

Distributions: If the corresponding Distributions are specified, the report includes distribution graphs for the BALG/Shared EMHQ queue length per message and for the elapsed time per transaction of a message staying in BALG/Shared EMHQ.

OTHREAD Analysis report

The OTHREAD Analysis report is a summary analysis of activities in the output thread (OTHREAD) queue.

Note: The report is not available from DB Monitor data.

Monitor records: The report is derived from monitor records 72, 87.

Options

To obtain the report, select the **OTHREAD Analysis** report in a Monitor Report Set.

Specify a DDname for the output data set for the report. Optionally, specify up to three Distributions for the following distribution graphs:

- Active OTHREAD Counts
- Waiting Area

- Buffers on Queue

Content

The OTHREAD Analysis report provides a summary analysis of OTHREAD activities.

If there are no activities in the OTHREAD queue during the reporting period, a report is not produced.

Report from 14Jun2023 18.22.05.26				IMS 15.4.0				IMS Performance Analyzer 4.5				Report to 14Jun2023 18.52.30.76								
Fast Path OTHREAD Analysis																				
From 14Jun2023 18.30.29.14 To 14Jun2023 18.44.19.38 Elapsed= 0 Hrs 13 Mins 50.236.850 Secs																				
----- Active OTHREADs -----				----- Waiting Areas -----				----- Buffers on Queue -----												
Enq Counts	Counts OTHREAD/Enq	StdDev	Max value	Counts Area/Enq	StdDev	Max value	Counts Buff/Enq	StdDev	Max value	Counts Buff/Enq	StdDev	Max value	Counts Buff/Enq	StdDev	Max value					
731	0.03	6.444	2	0.01	12.025	1	3.20	1.066	16											
Active OTHREAD / Enq				Waiting Area / Enq				Buffer Count / Enq												
Average	Std-Dev/Avg	Max Value		Average	Std-Dev/Avg	Max Value	Average	Std-Dev/Avg	Max Value	Average	Std-Dev/Avg	Max Value	Average	Std-Dev/Avg	Max Value					
0.03	6.444	2		0.01	12.025	1	3.20	1.066	16											
Range	Count in			Range	Count in		Range	Count in		Range	Count in		Range	Count in						
Counts	Range			Counts	Range		Counts	Range		Counts	Range		Counts	Range						
To Maximum	0			To Maximum	0		To Maximum	0		To Maximum	0		To Maximum	0						
50	0			50	0		50	0		50	0		50	0						
20	0			20	0		20	0		20	1		20	1						
15	0			15	0		15	0		15	64 ****		15	64 ****						
10	0			10	0		10	0		10	64 ****		10	64 ****						
5	0			5	0		5	0		5	4		5	4						
4	0			4	0		4	0		4	42 **		4	42 **						
3	0			3	0		3	0		3	17 *		3	17 *						
2	1			2	0		2	0		2	262 *****		2	262 *****						
1	730 *****			1	731 *****		1	277 *****		1	277 *****		1	277 *****						
-----				-----				-----				-----								
Total=	731	10	20	30	40	50%	Total=	731	10	20	30	40	50%	Total=	731	10	20	30	40	50%
-----				-----				-----				-----				-----				

Report from 19Jun2023 10.57.53.58				IMS 15.4.0				IMS Performance Analyzer 4.5				Report to 19Jun2023 11.01.41.40											
Fast Path OTHREAD Analysis																							
From 19Jun2023 10.49.38.15 To 19Jun2023 10.58.57.52 Elapsed= 0 Hrs 9 Mins 19.363.112 Secs																							
**** DEDB Write IWAIT ****																							
ADSname	Share	VSO	IWAITS	Elap/IWAIT	Max value	Pct Tot	Pct Tot	CI Write	Count	CI/IWAIT	Max value	ADSname	Share	VSO	IWAITS	Elap/IWAIT	Max value	Pct Tot	Pct Tot	CI Write	Count	CI/IWAIT	Max value
	Level			Sc.Mil.Mic	Sc.Mil.Mic	IWAITS	IWT Elp						Level			Sc.Mil.Mic	Sc.Mil.Mic	IWAITS	IWT Elp				
DB23AR0	1	NO	5	5.387	17.631	0.63%	1.89%	1	1			DB23AR0	1	NO	5	5.387	17.631	0.63%	1.89%	1	1		
DB23AR1	1	NO	5	4.196	5.392	0.63%	0.38%	2	4			DB23AR1	1	NO	5	4.196	5.392	0.63%	0.38%	2	4		
DB23AR2	1	NO	7	4.860	6.245	1.28%	1.07%	5	6			DB23AR2	1	NO	7	4.860	6.245	1.28%	1.07%	5	6		
DD01AR0	1	NO	17	2.949	5.488	2.53%	1.58%	2	5			DD01AR0	1	NO	17	2.949	5.488	2.53%	1.58%	2	5		
BANKC00	3	YES	426	4.404	140.204	47.53%	21.28%	2	8			BANKC00	3	YES	426	4.404	140.204	47.53%	21.28%	2	8		
BANKC01	3	YES	434	14.246	511.090	58.47%	74.72%	2	8			BANKC01	3	YES	434	14.246	511.090	58.47%	74.72%	2	8		
** Total			903	7.941	511.090	100.00%	100.00%	3	8			** Total			903	7.941	511.090	100.00%	100.00%	3	8		

Figure 225. OTHREAD Analysis report

The report heading at the top of the page has the following:

From

Start time of region activity in the reporting period.

To

End time of region activity in the reporting period.

Elapsed

Elapsed time from start until end of region activity in the reporting period.

The report presents the following data for OTHREAD schedule and OTHREAD queue length:

Enq Counts

The number of OTHREAD requests (write requests).

Active OTHREADs

The number of SRB schedules:

Counts OTHREAD/Enq

The average number of SRBs scheduled for OTHREAD requests.

StdDev

The standard deviation of the number of SRBs scheduled for OTHREAD requests.

Max Value

The maximum number of SRBs scheduled for OTHREAD requests.

Waiting Areas

The number of areas waiting to be processed:

Counts Area/Enq

The average number of areas waiting to be processed at the time of the OTHREAD request.

StDev

The standard deviation of the number of areas waiting to be processed at the time of the OTHREAD request.

Max Value

The maximum number of areas waiting to be processed at the time of the OTHREAD request.

Buffers on Queue

The length of the buffer queue to be written to the database:

Counts Buff/Enq

The average queue length on OTHREAD per enqueue request.

StDev

The standard deviation of the queue length on OTHREAD per enqueue request.

Max Value

The maximum queue length on OTHREAD per enqueue request.

Distributions: If the corresponding Distributions are specified, the report includes distribution graphs for the active OTHREAD counts, waiting areas, and buffers on queue.

DEDB Write IWAIT: This report includes detailed information on IWAITs for DEDB:

ADSname

Area Data Set name.

Share Level

Database Share Level (SHARELVL) can be 0, 1, 2 or 3.

VSO

The DEDB Area uses VSO (YES) or does not use VSO (NO).

IWAITs

The number of IWAITs.

Elap/IWAIT Sc.Mil.Mic

The average elapsed time per IWAIT.

Max Value Sc.Mil.Mic

The maximum IWAIT elapsed time.

Pct Tot IWAITs

The number of IWAITs as a percentage of the total number of IWAITs reported here. (The total of this column should be 100%; any difference results from rounding.)

Pct Tot IWT Elp

The IWAIT elapsed time as a percentage of the total IWAIT elapsed time for the IWAITs reported here.

CI Write Count

The number of CIs written at DEDB WRITE:

CI/IWAIT

The average number of CIs written per IWAIT.

Max Value

The maximum number of CIs written per IWAIT.

VSO Summary report

The DEDB VSO Summary provides summary information on Virtual Storage Option (VSO) activity including VSO preload, VSO I/O activities for the various data base share levels, VSO Write IWAITs, VSO area castout operations, and VSO Coupling Facility I/O Waits.

Note: The report is not available from DB Monitor data.

Monitor records: The report is derived from monitor records 72, 73, 84, 85, 88, 89, 94.

Options

To obtain the report, select the **VSO Summary** report in a Monitor Report Set and specify a DDname for the output data set for the report.

The **Alternate Sequencing** Option is applicable to this report.

Content

The VSO Summary report provides summary information on activities in the VSO area. The report has six sections: Preload, VSO I/O Activities for Share Level 0 and 1, VSO I/O Activities for Share Level 2 and 3, DEDB Write IWAIT, Castout, and CF I/O Wait.

The report is not produced if there are no activities in the VSO during the reporting period.

Report from 06Jun2023 14.57.22.94		IMS 15.4.0		IMS Performance Analyzer 4.5				Report to 06Jun2023 15.05.15. 02			
Fast Path DEDB VSO Summary											
From 06Jun2023 15.03.09.85 To 06Jun2023 15.03.11.32		Elapsed=		0 Hrs 0 Mins 1.473.389 Secs							
**** Preload ****											
Area Name	Share Level	Start Time HH.MM.SS.TH	End Time HH.MM.SS.TH	Elapse Time Sc.Mil.Mic	No. of CI Read						
BANKC00	1	15.03.09.85	15.03.09.90	52.019	150						
BANKC01	1	15.03.11.25	15.03.11.32	70.153	150						
** Total				122.172	300						
**** I/O Activities	**** (SHARELVL 0/1)										
Area Name	Share Level	VSO Reads	VSO Writes	DASD Reads	DASD Writes	Castouts Scheduled					
BANKC00	1	393	457	64	393	163					
BANKC01	1	393	393	0	390	165					
** Total		786	850	64	783	328					
**** I/O Activities	**** (SHARELVL 2/3)										
Area Name	Share Level	Look-aside	CF Reads	CF Writes	Read Hits	Valid Reads	DASD Reads	DASD Writes	Castouts Scheduled		
BANKC00	2	NO	393	457	-	-	64	393	163		
BANKC01	2	YES	393	393	123	112	0	390	165		
** Total			786	850	123	112	64	783	328		
**** DEDB Write IWAIT ****											
ADSname	Share Level	VSO	IWAITs	Elap/IWAIT Sc.Mil.Mic	Max value Sc.Mil.Mic	Pct Tot IWAITs	Pct Tot IWT Elp	---- CI Write Count ----	----- Castout -----		
								CI/IWAIT	Max value		
BANKC00	1	YES	426	4.404	140.204	49.53%	23.28%	2	8		
BANKC01	1	YES	434	14.246	511.090	50.47%	76.72%	2	8		
** Total			860	9.371	511.090	100.00%	100.00%	2	8		
**** CF I/O Wait ****											
From 14Jun2023 18.25.49.73 To 14Jun2023 18.39.21.84		Elapsed=		0 Hrs 13 Mins 32.107.462 Secs							
CF Structure Name	Found Count	Elap/IWAIT Sc.Mil.Mic	Max value Sc.Mil.Mic	Not Found	CI Count	Elap/IWAIT Sc.Mil.Mic	Max value Sc.Mil.Mic	CI Writes	Elapsed/CI Sc.Mil.Mic	Max value Sc.Mil.Mic	
BANKC00STR1	393	1.011	10.035	12	457	2.479	12.250	457	2.479	12.250	
BANKC01STR1	393	1.183	40.644	26	393	2.922	12.562	393	2.922	12.562	
*** Total ***		786	1.097	40.644 1 38	850	2.684	12.562	850	2.684	12.562	
**** Castout ****											
Area Name	Share Level	Start Time HH.MM.SS.TH	End Time HH.MM.SS.TH	Elapse Time Sc.Mil.Mic	CI Writes	Structure Name 1	Elapse Time Sc.Mil.Mic	Structure Name 2	Elapse Time Sc.Mil.Mic		
BANKC00	2	15.03.09.85	15.03.09.90	52.019	150	BANKC00STR1	1.011	BANKC00STR2	1.045		
BANKC01	2	15.03.11.25	15.03.11.32	70.153	150	BANKC01STR1	1.183	BANKC01STR2	1.246		
** Total				154.678.543	45656	12.324.564		15.937.285			

Figure 226. DEDB VSO Summary report

If Alternate Sequencing is requested:

- The VSO Summary report sections are sequenced as follows:
 - Preload. No change, sorting is not applicable.
 - I/O Activities (SHARELVL 0/1). Section header is suffixed by:
 - Sorted by Total VSO R+W Counts** if sequencing by Occupancy or Calls is requested (Occupancy is translated to Calls).
 - Sorted by Total DASD R+W Counts** if sequencing by Delay is requested.
 - I/O Activities (SHARELVL 2/3). Section header is suffixed by:
 - Sorted by Total VSO R+W Counts** if sequencing by Occupancy or Calls is requested (Occupancy is translated to Calls).
 - Sorted by Total DASD R+W Counts** if sequencing by Delay is requested.
 - DEDB Write IWAIT. Section header is suffixed by **Sorted by Total IWAIT Elapsed time**. Only sequencing by Delay is applicable (Occupancy and Calls requests are translated to Delay).
 - CF I/O Wait. Section header is suffixed by **Sorted by Total R+W IWAIT Elapsed time**. Only sequencing by Delay is applicable (Occupancy and Calls requests are translated to Delay).
 - Castout. No change, sorting is not applicable.

- If a number or percentage (less than 100%) Limit is specified:
 - The report header is also suffixed by **LIMIT nn** or **LIMIT nn%**.
 - A **** Limit** line is printed to total the reported (Limited) data whilst the **** Total** line totals all (100%) of the data.

Report from 09May2023 18.29.32.35		IMS 15.4.0		IMS Performance Analyzer 4.5				Report to 09May2023 18.33.28.85			
Fast Path DEDB VSO Summary											
From 09May2023 18.30.34.78 To 09May2023 18.31.04.00 Elapsed= 0 Hrs 0 Mins 29.216.678 Secs											
**** I/O Activities (SHARELVL 2/3) **** (Sorted by Total DASD R+W Counts; LIMIT 10%)											
Area Name	Share Level	Look-aside	VSO (CF) Reads	VSO (CF) Writes	Read Hits	Valid Reads	DASD Reads	DASD Writes	Castouts Scheduled		
BOCTRA01	3	NO	26546	13284	N/A	N/A	8	2604	1		
FPITMA1C	3	NO	95	89	N/A	N/A	57	29	1		
STOREA01	3	YES	18880	12824	6815	6760	0	69	1		
FPITMA2C	3	NO	30	30	N/A	N/A	20	19	1		
** Limit			45551	26227	6815	6760	85	2721	4		
** Total			52534	26387	7158	6964	111	2741	34		
**** DEDB Write IWAIT **** (Sorted by Total IWAIT Elapsed time; LIMIT 10%)											
ADSname	Share Level	VSO	IWAITs	Elap/IWAIT Sc.Mil.Mic	Max value Sc.Mil.Mic	Pct Tot IWAITs	Pct Tot IWT Elp	---- CI Write Count ---- CI/IWAIT	Max value		
BOCTRA01	3	YES	459	34.669	1.210.145	94.44%	38.35%	6	9		
** Limit			459	34.669	1.210.145	94.44%	38.35%	6	9		
** Total			486	85.378	6.738.536	100.00%	100.00%	6	9		
**** CF I/O Wait **** (Sorted by Total R+W IWAIT Elapsed time; LIMIT 10%)											
CF Structure Name	Found Count	Elap/IWAIT Sc.Mil.Mic	Read Max value Sc.Mil.Mic	Not Found	CI Count	Elap/IWAIT Sc.Mil.Mic	Write Max value Sc.Mil.Mic	CI Writes	Castout Elapsed/CI Sc.Mil.Mic	Max value Sc.Mil.Mic	
JBBBOCTR	18923	0.066	87.232	6	9533	0.154	0.994	2604	0.030	3.635	
FP2STOREDBA	8454	0.045	4.511	0	6208	0.153	1.791	69	0.109	1.785	
FP2EXCEPTA	3342	0.058	5.590	0	43	0.141	0.367	9	0.078	0.032	
WH12STR1								0	0.000	0.000	
** Limit		30719	0.059	87.232	6	15784	0.153	1.791	2682	0.032	3.635
*** Total ***		30719	0.059	87.232	6	15784	0.153	1.791	2741	0.033	3.635
**** Castout ****											
Area Name	Share Level	Start Time HH.MM.SS.TH	End Time HH.MM.SS.TH	Elapse Time Sc.Mil.Mic	CI Writes	Structure Name 1	Elapse Time Sc.Mil.Mic	Structure Name 2	Elapse Time Sc.Mil.Mic		
BOCTRA01	3	18.30.13.02	18.30.34.78	21.763.064	2604	JBBBOCTR	77.629				
STOREA01	3	18.30.34.84	18.30.36.48	1.636.324	69	FP2STOREDBA	7.511				
FPITMA3C	3	18.30.36.66	18.30.38.74	2.082.538	11	DSWFPITMA3C	0.863				
FPITMA2C	3	18.30.38.90	18.30.40.99	2.090.938	19	DSWFPITMA2C	1.066				
FPITMA1C	3	18.30.41.01	18.30.45.71	4.707.953	29	DSWFPITMA1C	1.785				
EXCEPA01	3	18.30.46.35	18.31.02.39	16.042.507	9	FP2EXCEPTA	0.703				
AREAWH03	3	18.31.02.65	18.31.02.65	0.117	0	WH03STR1	0.000	WH03STR2	0.000		
AREADI03	3	18.31.03.94	18.31.03.94	0.172	0	DI03STR1	0.000				
AREADI02	3	18.31.03.98	18.31.03.98	0.150	0	DI02STR1	0.000				
AREADI01	3	18.31.04.00	18.31.04.00	0.221	0	DI01STR1	0.000				
** Total				48.329.708	2741		89.557		0.000		

Figure 227. VSO Summary report, Sequenced by Delay (with Limit)

The report heading at the top of each page has the following:

From

Start time of region activity in the reporting period.

To

End time of region activity in the reporting period.

Elapsed

Elapsed time from start until end of region activity in the reporting period.

The following sections are displayed:

Preload

This section provides information on preloads in the VSO area.

Area Name

The name of the area being summarized. If one area is preloaded more than once, the information on each preload is presented in a separate line.

Share Level

The Database Share Level (SHARELVL), either 0, 1, 2 or 3.

Start Time HH.MM.SS.TH

The start time for preloading the area. If there is no START monitor record, **.*.*.*.* is shown.

End Time HH.MM.SS.TH

The end time for preloading the area. If there is no END monitor record, **.*.*.*.* is shown.

EIapse Time Sc.Mil.Mic

The elapsed time for preloading the area. If there is no START or END record, ***.*.*.*.* is shown.

No.of CI Read

The number of CIs read to the data space from DASD when the area was preloaded. If there is no END monitor record, 0 is shown.

VSO I/O Activities for SHARELVL 0 and 1

This section provides information on I/O activities in the DEDB VSO area for Database Share Levels 0 or 1.

Area Name

The name of the area whose activity is being summarized.

Share Level

The Database Share Level (SHARELVL), either 0 or 1. VSO uses data spaces.

VSO Reads

The number of CIs read to the buffer from the data space.

VSO Writes

The number of CIs written to the data space from the buffer at the sync point.

DASD Reads

The number of CIs read to the data space from DASD when the area was not preloaded.

DASD Writes

The number of CIs written to DASD from the data space.

Castouts Scheduled

The number of schedules to the VSO output router.

VSO I/O Activities for SHARELVL 2 and 3

This section provides information on I/O activities in the DEDB VSO area for Database Share Levels 2 or 3.

Area Name

The name of the area whose activity is being summarized.

Share Level

The Database Share Level (SHARELVL), either 2 or 3. VSO uses the coupling facility.

Lookaside

Buffer Lookaside is active (YES) or not active (NO) for this area.

CF Reads

The number of CIs read to the buffer from the coupling facility.

CF Writes

The number of CIs written to the coupling facility from the buffer at the sync point.

Read Hits

The number of times the buffer was found in the pool.

Valid Reads

The number of times the buffer found in the pool was valid.

DASD Reads

The number of CIs read to the coupling facility from DASD when the area was not preloaded.

DASD Writes

The number of CIs written to DASD from the coupling facility.

Castouts Scheduled

The number of schedules to the VSO output router.

VSO Write IWAIT

This report is the same as the Fast Path OTHREAD Analysis DEDB Write IWAIT report, except that only DEDB areas using VSO are reported here.

ADSname

The data set name of the area whose activity is being summarized.

Share Level

The Database Share Level (SHARELVL), either 0, 1, 2 or 3.

VSO

Always YES.

IWAITs

The number of IWAITs.

Elap/IWAIT Sc.Mil.Mic

The average elapsed time per IWAIT.

Max Value Sc.Mil.Mic

The maximum IWAIT elapsed time.

Pct Tot IWAITs

The number of IWAITs as a percentage of the total number of IWAITs reported here. (The total of this column should be 100%; any difference results from rounding.)

Pct Tot IWT Elp

The IWAIT elapsed time as a percentage of the total IWAIT elapsed time for the IWAITs reported here.

CI Write Count

The number of CIs written at DEDB WRITE:

CI/IWAIT

The average number of CIs written per IWAIT.

Max Value

The maximum number of CIs written per IWAIT.

CF I/O Wait

This section summarizes the use of the VSO coupling facility structures.

CF Structure Name

The name of the coupling facility structure.

Read

Read IWAIT Activity.

Found Count

The number of CIs read successfully from the CF.

Elap/IWAIT Sc.Mil.Mic

The average elapsed time for CF Read IWAITs.

Max Value Sc.Mil.Mic

The maximum elapsed time for a CF Read IWAIT.

Not Found

The number of times a CF Read request failed because the CI entry was not found.

Write

Write IWAIT Activity.

CI Count

The number of CIs written to the CF.

Elap/IWAIT Sc.Mil.Mic

The average elapsed time for CF Write IWAITs.

Max Value Sc.Mil.Mic

The maximum elapsed time for a CF Write IWAIT.

Castout

Castout I/O Activity.

CI Writes

The number of CIs written out during castout operations.

Elapsed/CI Sc.Mil.Mic

The average elapsed time for the castout operations.

Max Value Sc.Mil.Mic

The maximum elapsed time for a castout operation.

Castout

This report details in a chronological log every VSO Area castout operation performed.

Area Name

The name of the area whose activity is being reported.

Share Level

The Database Share Level (SHARELVL), either 0, 1, 2 or 3.

Start Time HH.MM.SS.TH

The start of castout operation.

End Time HH.MM.SS.TH

The end of castout operation.

EIapse Time Sc.Mil.Mic

The elapsed time of castout operation.

CI Writes

The number of CIs written to DASD during castout.

Structure Name 1

The primary CF Structure name that contains the VSO CIs.

EIapse Time Sc.Mil.Mic

The elapsed time of I/O operations with CF structure for this castout.

Structure Name 2

The (optional) duplex structure name that contains the VSO CIs.

EIapse Time Sc.Mil.Mic

The elapsed time of I/O operations with CF structure for this castout.

Chapter 29. Monitor Data Analysis report

This report is a formatted presentation of the data in the monitor trace records. It provides a valuable aid to your analysis of the other IMS PA reports.

Monitor Record Trace report

The Monitor Record Trace report formats the records on the monitor input file to produce a chronological listing of the data. The Monitor Record Trace can be used to understand the flow of internal IMS events (and the information that is recorded by IMS), retrieve more information from your monitor records not available from the standard reports and diagnosing problems with your IMS subsystem.

Monitor records: This report is derived from all the monitor record types.

Options

To obtain the report, select the **Monitor Record Trace** in a Monitor Report Set.

Specify a DDname for the output data set for the report, and the maximum number of pages of output.

Optionally, nominate which record codes to include in the report by specifying an Object List or single monitor record code.

Content

This is an example of the Monitor Record Trace report. Monitor record formats are defined in IMS macro DFSLOG4E. This Trace report formats the records according to that definition.

Report from 11Jun2023 12.57.40.76		IMS 15.4.0		IMS Performance Analyzer 4.5				Report to 11Jun2023 12.57.40.76			
				Monitor Record Trace							
Phys/Logical Record Number 1/1		Co de	Description	Time	Fl ag	Li ne	St at	Rs Cd	Regn	ITASK	Extension Data
90		90	Monitor Start	HHMMSSTHMIJU 125740760000	4F	E2	80	00	0000	00000172	*** Start of Monitor *** MVS=9B MVSF=01 IMSR=1540 CFIG=38 SRLV=53 MN1F=09 MN4F=80 SECS= 0 WSAP= 0 PSTS= 255 SIDN= 13 *** Local SIDS *** 10 29 31 32 33 34 35 36 37 38 51 80 266
...		209/948	06 IFP Sch Start	125815886112	4F	00	81	00	0001	000001DD	
		949	16 PSB Blk Ld IW St	125816016289	4F	00	81	00	0001	000001DD	NAME="DH41SK02" BLKZ= 0 FUNC="DMB "
		950	17 PSB Blk Ld IW Ed	125816020275	4F	00	81	00	0001	000001DD	
...		965	07 IFP Sch End	125818438211	4F	00	81	00	0001	000001DD	PSBN="DDLTRN14" TRAN=" " QCNT= 0
		210/966	58 IRC10 Start	125818716116	4F	00	81	00	0001	0000021E	DQCT= 1 JOBN="IFPI1X1 " DBN="I/O PCB " FUN="GU " SLG=01
...		274/1095	38 IFP Msg IWAIT St	125818716502	4F	00	81	00	0001	0000021E	
		1096	39 IFP Msg IWAIT Ed	125841940459	4F	00	81	00	0001	0000021E	
		1097	47 BALG Dequeued	125841940483	4F	00	81	00	0001	0000021E	PSB="DDLTRN14" TRAN="TXCDRN14" MQT= 1
		1098	59 IRC10 End	125841940567	4F	00	81	00	0001	0000021E	QLN= 0 QFL=40
		1099	58 IRC10 Start	125841946006	4F	00	81	00	0001	0000021E	LEV=" " STC=" " SEG=" " SLG=I/O PCB
		1100	57 DEDB Read IWAIT	125841982501	4F	00	81	00	0001	0000021E	DBN="DEDBDD01" FUN="GHU " SLG=04
		1101	59 IRC10 End	125841982787	4F	00	81	00	0001	0000021E	ADN="DD01AR0 " ELP= 35837
...		1113	95 FP Lock Activity	125842068229	4F	00	81	00	0001	0000021E	LEV="01" STC=" " SEG="A1111111" SLG=DEDB
											ARN="DD01AR0 " RID= 1 SLV=02 SHR=80
											FLS=A1 FL2=00 RBA=00005800
											IWE= 0 ELP= 41617
...		275/1118	43 FP Buf Activity	125842090789	4F	00	00	00	0001	0000021E	TRAN=" " REQ= 4 UPD= 3
											STE= 1 STN= 1 NBA= 3
											OBA= 0 IWT= 0 ELP= 0
											ACT= 0 WAR= 0 BUF= 2
...		276/1119	87 OTHREDA Activity	125842207187	4F	00	00	00	0000	00000006	
...		625/1970	09 IFP Term End	125905251893	4F	00	81	00	0001	000003C8	
...		657/2037	50 Checkpoint Start	125930444093	4F	00	81	00	0000	0000001C	
		2038	51 Checkpoint End	125930898774	4F	00	81	00	0000	0000001C	
...		659/2046	91 Monitor End	125930443665	4F	C5	80	00	0000	00000033	*** End of Monitor ***
Code	Description	Count									
06	IFP Sch Start	1									
07	IFP Sch End	1									
09	IFP Term End	1									
14	Sched IWAIT Sta	4									
15	Sched IWAIT End	4									
16	PSB Blk Ld IW St	12									
17	PSB Blk Ld IW Ed	12									
...											
38	IFP Msg IWAIT St	3									
39	IFP Msg IWAIT Ed	3									
...											
43	FP Buf Activity	27									
47	BALG Dequeued	2									
50	Checkpoint Start	2									
51	Checkpoint End	1									
57	DEDB Read IWAIT	51									
58	IRC10 Start	306									
59	IRC10 End	306									
60	DL/I Call Start	70									
61	DL/I Call End	70									
...											
72	DEDB OTHREDA IWT	16									
87	OTHREDA Activity	17									
90	Monitor Start	10									
91	Monitor End	10									
95	FP Lock Activity	40									
Total		2055									

Figure 228. Monitor Record Trace report

Phys/Logical Record Number

The **Physical Record Number** is the relative number of the record in the monitor file. Physical monitor records can contain multiple logical monitor records, each with their own code and extension. IMS PA deblocks the physical monitor records and presents them as Logical records. The **Logical Record Number** is the relative number of the logical record in the report.

Code

Monitor record code (SL4ECODE)

Description

Monitor record code description

Time

Record time stamp, precise to microseconds (SL4ETIME or SL4EXTIM)

Flag

Tracing options flag (SL4EFLAG)

Line

Line number/Code/Extension number (SL4ELINE)

Stat

Logging status flag (SL4ESTAT)

Rs Cd

Reason Code (SL4ERSNC)

Regn

Region PST number (SL4EPSTN)

ITASK

ITASK number (SL4ETASK)

Extension Data

Monitor record code specific extension data (SL4EXTN)

Part 4. IMS Connect reports

You can use IMS Performance Analyzer to analyze IMS Connect events that have been recorded in an IMS Connect Extensions journal data set. IMS Connect Extensions is an IBM tool that provides instrumentation for IMS Connect. The tool collects real-time data about IMS Connect events, which it then regularly archives.

IMS Performance Analyzer provides a comprehensive set of reports from the IMS Connect performance and accounting data collected by IMS Connect Extensions. The reports provide a summary and detailed analysis of IMS Connect transaction transit time, resource usage and resource availability.

Using Form-based combined reporting, IMS Performance Analyzer can process IMS Connect Extensions journals together with IMS logs to help you to:

- Pinpoint TCP/IP performance problems.
- Analyze event flow through IMS Connect and IMS.
- Audit TCP/IP security.

Report categories

The IMS Performance Analyzer ISPF dialog presents the menu of IMS Connect reports in a tree structure that groups them by functional category.

Form-based Transaction Transit reports

Form-based reports give you flexibility in transaction transit reporting. By using Report Forms, you can tailor the format and content of your reports, requesting just the fields of interest, the format of the data, and the order of the columns. You can create Form-based extracts and load them into Db2 tables.

Like the standard Transaction Transit Reports, the Form-based Transaction Transit reports provide performance detail about every transaction processed by IMS Connect using event information collected by IMS Connect Extensions.

- Connect Transit List
- Connect Transit Summary
- IMS Connect Transaction Index

Fixed-format Transaction Transit reports

These reports provide performance statistics to measure the performance of your IMS Connect transactions. Transaction Transit (response) time is broken down into its components; Input, Processing (by OTMA), Acknowledgement from the client and Output. They can help identify any bottlenecks in transaction flow, and are used for monitoring system performance, gathering diagnostic information, and tuning IMS.

- Connect Transit Analysis
- Connect Transit Log
- Connect Transit Extract

Resource Usage reports

These reports contain detailed and summary information on the use and availability of various IMS Connect resources including TCP/IP Ports and Tpipes.

- Port Usage
- Resume Tpipe
- ACK/NAK
- Exception Events

- Gap Analysis

Trace reports

The Transit Event Trace report provides a list of transactions, detailing every event in the life of each transaction: when it started and all associated events in the order they occurred.

There is also a category containing Connect Global Options. This is where you can specify options that apply globally to all or many reports in the Report Set.

IMS Connect Extensions event collection

To understand the IMS Connect reports in IMS Performance Analyzer, you need to understand IMS Connect and the event data collected by IMS Connect Extensions.

For the list of IMS Connect event records reported by IMS Performance Analyzer, see [Chapter 40, “IMS Connect records,”](#) on page 501.

IMS Connect Extensions for z/OS enhances and augments the services of IMS Connect. A primary service provided by IMS Connect Extensions is to record details of incoming transaction requests as IMS Connect processes them. Records are collected as specific IMS Connect processing events occur (for example, exit read and exit write). These event records are recorded in Journal data sets, then optionally archived for later reporting and analysis.

The following figure shows event collection by IMS Connect Extensions with enhanced reporting and analysis by IMS Performance Analyzer and IMS Problem Investigator.

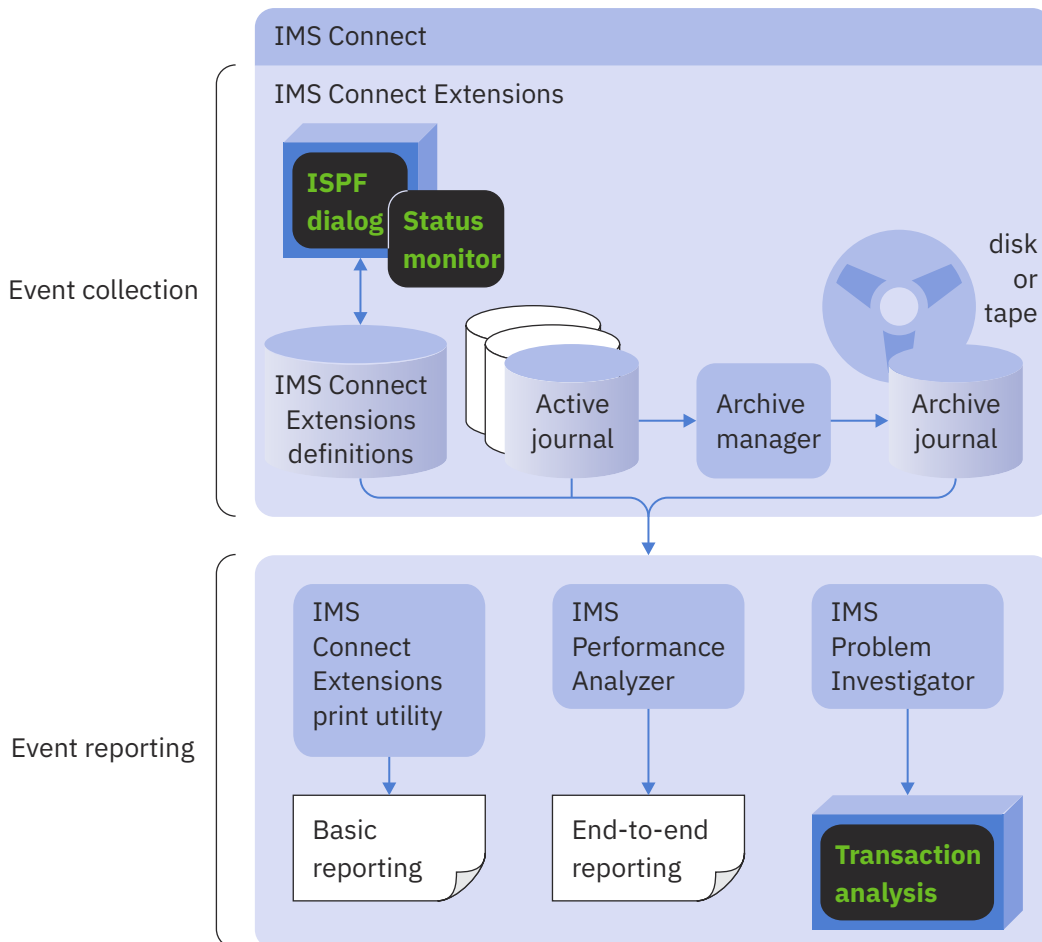


Figure 229. IMS Connect Extensions event collection with reporting by IMS Performance Analyzer and IMS Problem Investigator

The event records provide performance, response time and throughput information, for example:

- Performance and response time information for IMS, IMS Connect and user message exits
- Availability information for IMS data stores and TCP/IP ports
- Throughput information for different transactions types; for example, conversational, non-conversational and send only
- Resource availability

IMS Connect Extensions is continuously collecting events as incoming message requests are processed. The number and type of event records collected varies depending on the collection level specified for the IMS Connect system.

To collect IMS Connect event data for reporting, you need to ensure that IMS Connect Extensions Event Collection is active and that you specify a collection level that is appropriate to the type of reports that you want to produce. See [“Collection levels” on page 508](#) for a description of the collection levels. [“Required event records for IMS PA reports” on page 508](#) summarizes how the collection level affects the IMS Performance Analyzer reports.

Event records are initially written to an Active Journal data set on DASD, and then optionally copied (archived) to the Archive Journal data set (on tape or DASD). This is performed by the IMS Connect Extensions Archive Manager.

IMS Performance Analyzer produces reports from both Archive and Active journal data sets.

IMS Performance Analyzer is capable of producing combined IMS log and IMS Connect reports by merging input from the IMS log and IMS Connect Extensions journals to provide an end-to-end picture of IMS Connect transactions. Note that any program switch transactions in a combined report will not show any Connect data.

Chapter 30. Form-based IMS Connect Transaction Transit reports

IMS Performance Analyzer form-based reporting allows you to personalize the format and content of combined IMS and IMS Connect Transaction Transit reports and extracts to meet your individual requirements. By reporting against a group of IMS and IMS Connect systems, you can get a complete end-to-end transit picture of your transactions from IMS Connect through to IMS and back.

For combined IMS and IMS Connect reporting, you can select fields from all the IMS Connect and associated IMS fields available to IMS PA. This is done using Report Forms in the dialog or the **FIELDS** operand in batch commands.

List and Summary reports are available to run against IMS and Connect systems and their Log and Journal files. You can request multiple reports in a single job and single pass of the data. They enable comprehensive, flexible analysis of transaction transit information giving you a good insight into different facets of response tuning.

Refer to the [Chapter 42, “Glossary of Report Form field names,” on page 515](#) for a description of the data fields available for Form-based reporting.

Form-based IMS Connect Transaction Transit List report

The IMS Performance Analyzer form-based IMS Connect Transaction Transit List report is a detailed list of transaction transit records in transaction completion sequence.

You can tailor the format and content of the reports and extracts by specifying Report Forms, a report filter, the option to include only the first or all output messages, the minimum transaction Completion Level, the data Precision, what Digit Grouping to use, and the Selection Criteria for filtering the input records. Additional extract options are delimiters, field labels, the format of numeric fields, and whether to include time zone information in timestamps.

For combined reporting, only IMS Connect and the associated IMS transactions for which full end-to-end data is available are reported.

Options

To obtain an IMS Connect Transit Form-based List report or extract, select the Transaction Transit (Form-based) **List** report in a Connect Report Set and specify the report options.

For a complete description of options available, refer to the *IMS Performance Analyzer for z/OS: User's Guide*.

Content: Default

The default Connect or Combined Transit List report can be requested with the **IMSPACEX LIST** command. The order of transactions in the report is based on when they end, and not when they start.

IMSPACEX	LIST
IMSPACEX	EXECUTE

This produces the same result as the following command in which you can see the defaults explicitly specified:

```

IMSPACEX      LIST(
                DDNAME(LIST0001),
                SECGROUP,
                COMPLVLC(2),
                STARTLVL(2),
                COMPLVL(3),
                PRECISION(6),
                FIELDS(STARTCON(TIME),
                        TRANCODE,
                        TARGDS,
                        PORT,
                        RESPCON,
                        PREOTMA,
                        INREAD,
                        READEXIT,
                        SAFTIME,
                        PROCOTMA,
                        CONFIRM,
                        POSTOTMA,
                        XMITEXIT,
                        FAILED))
IMSPACEX      EXECUTE

```

The following figure shows the default report format.

IMS Performance Analyzer List Report															
LIST0001 Printed at 14:18:02 23Jan2020				Data from 15.44.05 20Feb2019											
Page 1															
CON Tran	Trancode	Target	CON	Resp	PreOTMA	ReadSock	ReadExit	SAF	Call	OTMAproc	Confirm	PostOTMA	XmitExit	Failure	
Start		Datator	Port	Time	Time	In Time	Time		Time	Time	Time	Time	Time	Reason	
15.44.05.631452	IVTNV	IFDF	3101	0.071631	0.000380	0.000051	0.000085	-	0.070494	-	-	0.000756	0.000025		
15.44.05.747410	IVTNV	IFDF	3101	0.012674	0.000171	0.000021	0.000038	-	0.012195	-	-	0.000307	0.000016		
15.44.05.786119	IVTNV	IFDF	3101	0.001863	0.000101	0.000030	0.000038	-	0.001535	-	-	0.000226	0.000016		
15.44.05.817077	IVTNV	IFDF	3101	0.002528	0.000157	0.000021	0.000029	-	0.002170	-	-	0.000200	0.000016		
15.44.05.935005	IVTNV	IFDF	3101	0.006132	0.000572	0.000021	0.000035	-	0.005316	-	-	0.000243	0.000013		
15.44.05.963018	IVTNV	IFDF	3101	0.002220	0.000162	0.000020	0.000025	-	0.001808	-	-	0.000248	0.000026		
15.44.05.985724	IVTNV	IFDF	3101	0.001462	0.000153	0.000021	0.000025	-	0.001107	-	-	0.000201	0.000012		
15.44.06.011796	IVTNV	IFDF	3101	0.002615	0.000154	0.000021	0.000033	-	0.002003	-	-	0.000457	0.000016		
15.44.06.045296	IVTNV	IFDF	3101	0.003261	0.000149	0.000021	0.000030	-	0.002841	-	-	0.000269	0.000016		
15.44.06.065870	IVTNV	IFDF	3101	0.001702	0.000102	0.000017	0.000025	-	0.001407	-	-	0.000192	0.000013		
15.44.06.084357	IVTNV	IFDF	3101	0.002003	0.000116	0.000018	0.000020	-	0.001668	-	-	0.000218	0.000012		
15.44.08.095130	IVTNV	IFDF	3101	0.290196	0.000546	0.000029	0.000046	-	0.037126	0.001982	-	0.000427	0.000042		
15.44.11.113952	IVTNV	IFDF	3101	0.001082	0.000534	0.000021	0.000046	-	-	-	-	0.000013	-	SESSION	
15.44.11.143038	DSPALLI	IFDF	3102	0.000799	0.000162	0.000021	0.000030	-	-	-	-	0.000474	-	SESSION	
15.44.11.166755	PART	IFDF	3103	0.001219	0.000607	0.000047	0.000055	-	-	-	-	0.000004	-	SESSION	
15.44.17.247366	IVTNV	IFDF	3101	0.357766	0.000704	0.000046	0.000055	-	0.102228	0.254827	-	0.000525	0.000038		
15.44.17.304706	DSPALLI	IFDF	3101	0.734971	0.001416	0.000050	0.000046	-	0.480388	0.002632	-	0.000556	0.000043		
15.44.17.332984	PART	IFDF	3101	1.137244	0.000764	0.000024	0.000029	-	0.884453	0.001312	-	0.000572	0.000088		
:															

Figure 230. Form-based Connect Transit List report (default)

Refer to the Chapter 42, “Glossary of Report Form field names,” on page 515 for the field names, descriptions, and column headings. Field descriptions are also available from the dialog using option 2 **Report Forms**. Edit or view a form, then enter line action **H** for help information on any field. The field help information is also available from the form field prompt list.

Sample forms

A set of sample list Report Forms is provided with IMS Performance Analyzer to demonstrate how Form-based IMS Connect and combined Transaction Transit reports can be tailored to meet your specific requirements.

For a complete list of samples supplied with IMS Performance Analyzer, see “IMS Connect reports” on page 33.

Form-based IMS Connect Transaction Transit Summary report

The IMS Performance Analyzer form-based IMS Connect Transaction Transit Summary provides a summary of transaction performance.

You can tailor the format and content of the reports and extracts by specifying Report Forms, a report filter, the Time Interval for summarizing activity over time, the Totals Level to include the grand total and optional sub-totals, the minimum transaction Start Level and Completion Level, the data Precision and Transaction Mix, what Digit Grouping to use, and the Selection Criteria for filtering the input records.

Additional extract options are delimiters, field labels, the format of numeric fields, and whether to include time zone information in timestamps.

Options

To obtain an IMS Connect Transit Form-based Summary report or extract, select the Transaction Transit (Form-based) **Summary** report in a Connect Report Set and specify the report options.

The level of summarization can be varied depending on the number of key fields. You can specify up to 8 key fields to summarize and sort by, and you can request up to 7 levels of sub-totaling. See the example in [“Form-based Transaction Transit Summary reports”](#) on page 55.

If you specify NOTOTALS, no totals are printed. TOTALS(0) provides only the grand total, no sub-totals. TOTALS(1) to TOTALS(7) provides the grand total and subtotals to the corresponding key level. The grand total line is labeled **Total** or **T*** if the column is narrow.

For a complete description of options available, refer to the *IMS Performance Analyzer for z/OS: User's Guide*.

Content: Default

The default report can be requested with the **IMSPACEX SUMMARY** command.

```
IMSPACEX      SUMMARY
IMSPACEX      EXECUTE
```

This produces the same result as the following command in which you can see the defaults explicitly specified.

```
IMSPACEX      SUMMARY(
                DDNAME(SUMM0001),
                SECGROUP,
                TOTALS(0),
                INTERVAL(00:01:00),
                COMPLVLC(2),
                STARTLVL(2),
                COMPLVL(3),
                PRECISION(6,2),
                FIELDS(TRANCODE(ASCEND),
                      TRANCNT,
                      RESPCON(AVE),
                      PREOTMA(AVE),
                      INREAD(AVE),
                      READEXIT(AVE),
                      SAFTIME(AVE),
                      PROCOTMA(AVE),
                      CONFIRM(AVE),
                      POSTOTMA(AVE),
                      XMITEEXIT(AVE)))
IMSPACEX      EXECUTE
```

The following report is the default format.

IMS Performance Analyzer Summary Report												
SUMM0001 Printed at 09:31:31 02Sep2020			Data from 15.44.05 20Feb2019 to 15.44.42 20Feb2019									
Page 1												
Trancode	Tran Count	Avg CON Time	Avg Resp Time	Avg PreOTMA Time	Avg ReadSock In Time	Avg ReadExit Time	SAF	Avg Call Time	Avg OTMAproc Time	Avg Confirm Time	Avg PostOTMA Time	Avg XmitExit Time
DSPALLI	5	0.294296	0.000787	0.000030	0.000035	-		0.480171	0.002105	0.000284	0.000041	
IVTNO	10	0.237940	0.025170	0.000032	0.000057	-		0.011078	0.001771	0.000310	0.000037	
IVTNV	19	0.058646	0.000436	0.000026	0.000039	-		0.021116	0.087237	0.000280	0.000023	
PART	5	0.457775	0.000712	0.000028	0.000036	-		0.887895	0.002906	0.000331	0.000072	
Total	39	0.186001	0.006859	0.000028	0.000043	-		0.106159	0.019060	0.000295	0.000032	

Figure 231. Form-based Connect Transit Summary report (default)

Refer to Chapter 42, “Glossary of Report Form field names,” on page 515 for the field names, descriptions, and column headings. Field descriptions are also available from the dialog using option **2 Report Forms**. Edit or view a form, then enter line action H for help information on any field. The field help information is also available from the form field prompt list.

Sample forms

A set of sample summary Report Forms is provided with IMS Performance Analyzer to demonstrate how Form-based IMS Connect and combined Transaction Transit reports can be tailored to meet your specific requirements.

For a complete list of samples supplied with IMS Performance Analyzer, see [“IMS Connect reports” on page 33](#).

IMS Connect transaction index

The IMS Connect transaction index is a specialized extract file created by IMS Performance Analyzer where each record in the index represents an IMS transaction and contains summarized information from the IMS Connect Extensions journal about that transaction. After creating an IMS Connect transaction index with IMS Performance Analyzer, you can then use it in IMS Problem Investigator to diagnose problem transactions.

To learn more about how to generate an IMS Connect transaction index, see *Creating an IMS Connect transaction index* in the IMS Performance Analyzer User's Guide.

Content: OTMA workloads

V2R5M0 Report	IMS V15.4.0	Page 1	IMS Problem Investigator - Log
+0004	Code... CA20 Connect Transaction		
+01FC	STCK... D5B5DE73D0264488	LSN.... 0000000000000001	Record... 1
	Date... 2019-02-20 Wednesday	Time... 14.39.26.859876.283	
+0000	LL..... 020C	ZZ..... 0000	Type..... CA
20	Ver..... 04		Subtype....
+0030	Base..... Base section		
+0030	TASKid.... 0105	CollectTask +1	CEXTECLTask +5
'4'	TranType... 80		CompLvlC...
+0038	Key..... Connect Identification key		
+0038	HWSname... 'HWS MVP4'	LogonTK.... D5B5DE73CFFEF643	OTMASSN.... +1
+004C	InputTK.... 0000000000000000	EVIDfirst.. 3C	EVIDprev...
48	Aflag1..... 11		
+005B	Aflag2..... 05	Pflag1..... 20	Pflag2..... 30
0.00'			TOValue.... '
+005F	TranStart.. '2019-02-20-14.39.26.859876'	TraceStart.	
'14.39.26.859876'	NAKSC..... 0000		
+008A	Port..... +3101	Socket..... +4	Eflag1..... 73
+0090	SVTData.... SVT/IRM Data		Eflag2..... CC
+0090	Trancode... 'CEXTCONV'	Userid.... 'CEX001'	OriginDS... 'IFDE'
'IFDE'	ClientID... 'IPICVCL1'		TargetDS...
+00B8	Tpipe..... '3101'	XMLadapter. '	RetCode.... 00000000
00000000			RSNCode....
+00E8	Tmember.... 'XCFMIFDE'		AltLterm... '
'	ReadExit... 'HWSSMPL1'		ReRoute....
+00F8	SyncFlag... 21	SockFlag... 00	DSIDFlag... 10
00	RCIDcode... 00		ClientFlag.
+00FD	IRMTimer... 00	SenseCode.. 0000	IPaddress.. '172.17.69.25
'	PortDepth.. +1		
+01EC	RTPmsgct... +0	CliACKct... +1	CliNAKct... +0
			OTMANAKct.. +0
+0110	Events..... Transaction Event Time section		
+0110	StartTime.. 14.39.26.859876	ExitTime... 14.39.27.013446	
+0128	OTMAinTime. 14.39.27.013608	OTMAoutTime 14.39.27.011500	
+0140	RdSockTime. 14.39.27.013438	TriggerTime 14.39.27.013613	
+0160	Timezone... Time zone offset fields		
+0160	LSOffset... 0	LDTOffset.. +08.00.00.000000	
+0170	Transit.... Transaction Transit accounting section		
+0170	OTMAdelay.. 0	InputElap.. 0.000312	RdSockElap. 0.000043
0.000153	RXMLxElap.. 0		READxElap..
+0198	SAFelap.... 0	OTMAelap... 0.151312	XMITxElap.. 0.000029
0.001548	CONFelap... 0.002108		RdACKelap..
+01C0	TrACKelap.. 0	RTPelap.... 0	OutputElap. 0.000004
0.153737			RespTime...

Figure 232. IMS Problem Investigator: Viewing detailed information in an IMS Connect transaction index CA20 record for OTMA workloads

Content: Open Database workloads

V2R5M0 Report	IMS V15.4.0	Page 1	IMS Problem Investigator - Log
+0004	Code... CA20 Connect Transaction		
+02DC	STCK... D8135861BD9CCFAE	LSN.... 0000000000000001	Record... 1
	Date... 2020-06-16 Tuesday	Time... 04.26.20.460492.979	
+0000	LL..... 02EC	ZZ..... 0000	Type..... CA
20	Ver..... 04		Subtype....
+0030	Base..... Base section		
+0030	TASKid.... 0106	CollectTask +1	CEXTECLTask +6
'4'	TranType... 40		CompLvlC...
+0038	Key..... Connect Identification key		
+0038	HWSname.... 'V220DB1'	LogonTK.... D8135861BB603C47	OTMASSN.... +0
+004C	InputTK.... 0000000000000000	EVIDfirst.. 3C	EVIDprev....
48	Aflag1..... 01		
+005B	Aflag2..... 01	Pflag1..... 28	Pflag2..... 3C
0.00'			TOValue.... '
+005F	TranStart.. '2020-06-16-04.26.20.460492'	TraceStart.	
'04.26.20.460492'	NAKSC..... 0000		
+008A	Port..... +48855	Socket..... +3	Eflag1..... 24
+0090	SVTData.... SVT/IRM Data		Eflag2..... 84
+0090	Trancode... '*OpenDB'	Userid..... 'CEX001'	OriginDS... 'ODBA'
	ClientID... 'ODBEDE41'		TargetDS...
+00B8	Tpipe.....	XMLadapter..	RetCode.... 00000000
00000000			RSNCode....
+00E8	Tmember....		AltLterm... '
	ReadExit... '		ReRoute....
+00F8	SyncFlag... 00	SockFlag... 00	DSIDFlag... 00
00	RCIDcode... 00		ClientFlag.
+00FD	IRMTimer... 00	SenseCode.. 0000	IPaddress.. '172.17.69.25
'	PortDepth.. +1		
+01EC	RTPmsgct... +0	CliACKct... +0	CliNAKct... +0
			OTMANAKct.. +0
+0110	Events..... Transaction Event Time section		
+0110	StartTime.. 04.26.20.460492	SAFtime.... 04.26.20.471471	
+0140	RdSockTime. 04.26.20.611301	TriggerTime 04.26.20.611310	
+0160	Timezone... Time zone offset fields		
+0160	LSOffset... 0	LDTOffset.. +08.00.00.000000	
+0170	Transit.... Transaction Transit accounting section		
+0170	OTMADelay.. 0	InputElap.. 0	RdSockElap. 0.000029
0	RXMLxElap.. 0		READxElap..
+0198	SAFeLap.... 0.000246	OTMAelap... 0	XMITxElap.. 0
0.017107	CONFelap... 0		RdACKelap..
+01C0	TrACKelap.. 0	RTPelap.... 0	OutputElap. 0
0.150817			RespTime...
+020C	ODBSection. ODBM section		
+020C	ODBFlag1... 00	ODBSVRCOD.. 04	ODBSECCHK.. 00
+0210	ODBCorrtoken.....	2414C81024173CE0584C139BBA000000	ODBODBMname
'DFJ10D			
+0230	ODBIn_Alias 'ODBA'	ODBIn_PSBname..... 'DFSIVP1'	
ODBOut_Alias.....	'ODBA'		
+0240	ODBOut_ODBMname.....		ODBBeginAllocPSB..... 04.26.20.477999
+0254	ODBEndAllocPSB.....	04.26.20.512071	ODBBeginDeallocPSB..... 04.26.20.610954
+0264	ODBEndDeallocPSB.....	04.26.20.611276	ODBMsgSent. 04.26.20.610972
+0274	ODBMsgReceived.....	04.26.20.611273	ODBBeginCommitUOW..... 04.26.20.604849
+0284	ODBEndCommitUOW.....	04.26.20.605663	ODBBeginCommitUOW..... 0.034072
+0294	ODBDeallocPSBElap.....	0.000322	ODBMsgElapsed..... 0.034252
+02A4	DLISection. DLI Call section		
+02A8	DLIFunction 'RETR'	DLICount... +7	DLIRows.... +0
02	DLISVRCOD.. 04		DLIUOWDisp.
+02BC	DLIPCBname. 'PCB01'	DLIDatabase 'IVPDB1'	DLIMsgElapsed..... 0.033815
+02D4	DLIUOWElapsed.....	0.000814	

Figure 233. IMS Problem Investigator: Viewing detailed information in an IMS Connect transaction index CA20 record for ODBM workloads

Chapter 31. Fixed-format IMS Connect Transaction Transit reports

IMS Performance Analyzer fixed-format IMS Connect Transaction Transit reports provide performance statistics to measure the performance of your IMS Connect transactions. They can help identify any bottlenecks in transaction flow, and are used for monitoring system performance, gathering diagnostic information, and tuning IMS.

Transaction Transit (response) time is broken down into its components; Input, Processing (by OTMA), Acknowledgement from the client and Output.

IMS Connect Transaction Transit Analysis report

The IMS Connect Transit Analysis report provides a summary of IMS Connect OTMA transaction performance. Performance data can be summarized by one or two sort keys including Time of Day, Transaction Code, User ID, IMS data store (original and target), Port number, and Connect Client ID. Performance statistics are provided as averages, and optionally, peak percentiles. For example, you can use IMS Performance Analyzer to report on the elapsed time within which 90% of transactions completed.

Log records: The Transit Analysis report is derived from IMS Connect event records 3C, 3D, 3E, 3F, 40, 41, 42, 47, 48, 49. This report requires IMS Connect Extensions to collect event data at collection level 3 or 4. Otherwise:

- If collection level 2, the report is produced but with Input READ Socket and SAF zero.
- If collection level 0 or 1, the report displays the message:

No observations in report period

Table 23. IMS Connect Transit Analysis report: event records processed

Code (hex)	Event description	Collection level
3C	Prepare READ Socket	2
3D	Message Exit called for READ, XMIT, EXER	2
3E	Message Exit returned from READ, XMIT, EXER	1
3F	Begin SAF security request	3
40	End SAF security request	3
41	Message sent to OTMA	2
42	Message received from OTMA	2
47	Session Error	1
48	Trigger Event	2
49	READ Socket	3

Options

To obtain an IMS Connect Transit Analysis report, select the Transaction Transit **Analysis** report in a Connect Report Set and specify report options.

The command is:

```

IMSPACEX      ANALYSIS(
               [BY(order1)|
               BY(order1,order2),]          default BY(TRANCODE)
               [DDNAME(ddname),]           default ANAL0001,ANAL0002,...
               [INTERVAL(hh:mm:ss),]       default 00:01:00 (1 minute)
               [PEAK(nnn),]                50-100%, default no peak
               [INCL(TRANCODE(list))|EXCL(TRANCODE(list)),]
               [INCL(USERID(list))|EXCL(USERID(list)),]
               [INCL(DATASTORE(list))|EXCL(DATASTORE(list)),]
               [INCL(CLIENT(list))|EXCL(CLIENT(list)),]
               [INCL(PORT(list))|EXCL(PORT(list)),]
               [INCL(SOCKET(list))|EXCL(SOCKET(list))])
IMSPACEX      EXECUTE

```

You can request multiple Analysis reports in the one job. The default DDname is ANALnnnn where nnnn is 0001 to 9999.

The sort order of each report is according to the order of the fields in the BY operand. The sort fields are the first one or two columns of the report, and can be any one or two of the following fields:

TRANCODE

Transaction Code (default)

TIME

Time Interval

CLIENTID

Connect Client ID

DSORIG

Originating Datastore

DSTARG

Target Datastore

PORT

TCP/IP Port Number

USERID

User ID

Selection Criteria can be specified to filter the input data on one or more of the following:

- Transaction Code
- User ID
- Target Datastore (IMS ID)
- Connect Client ID
- TCP/IP Port Number
- Socket Number

For each report, you can also specify:

- The time interval if you have requested that the report be summarized by TIME. The default interval is 00:01:00 (1 minute).
- The peak percentile transit time, between 50 and 100%. If specified, both averages and peak percentiles are reported. The default is to omit PEAK so that only averages are reported.

Content

This is an example of a Transit Analysis report from IMS Connect event data.

The report was produced by the command:

```

IMSPACEX      ANALYSIS(
               BY(
               TRANCODE,
               TIME),

```

```

DDNAME (ANAL0001),
INTERVAL (01:00:00),
PEAK (80),
INCL (TRANCODE (CEBTRAN5, DSPALLI, IVTCV))
EXECUTE
IMSPACEX

```

IMS Performance Analyzer													
IMS Connect Transit Analysis - DVPCFGDA													
From 01Apr2023 16.30.06.98 To 21Apr2023 13.55.10.56													
Page 1													
Transact Code	Time	Message Count	Response Time	Pre-OTMA	READ	Input Sock	READ Ex	SAF	-Process-OTMA	Confirm	Output Post-OTMA	XMIT Ex	Rate Time /Sec Outs NAK
DSPALLI	16.57.00	40	Avg 627.906	351.026	345.913	0.115	0.000	179.675	0.000	97.205	0.134	1	0 0
			80% 851.963	461.978	454.183	0.140	0.000	316.649	0.000	202.327	0.272		
	16.58.00	60	Avg 739.120	405.811	397.993	0.205	0.000	224.447	0.000	108.861	0.176	1	0 0
			80% 1.029.203	538.471	527.321	0.742	0.000	435.416	0.000	206.930	0.525		
	15.00.00	1	Avg 379.674	303.223	302.479	0.131	0.000	74.694	0.000	1.755	0.125	0	1 0
DSPALLI	15.01.00	10	Avg 379.674	303.223	302.479	0.131	0.000	74.694	0.000	1.755	0.125		
			80% 289.210	255.102	254.592	0.133	0.000	29.588	0.000	4.519	0.116	0	0 2
			80% 309.454	278.241	277.839	0.168	0.000	33.428	0.000	8.854	0.149		
	Subtotal	111	Avg 655.272	371.567	365.446	0.166	0.000	189.409	0.000	94.296	0.155	2	1 2
			80% 929.141	495.318	485.849	0.561	0.000	370.394	0.000	192.971	0.424		
DSPINV	16.57.00	30	Avg 480.970	301.331	299.460	0.213	0.000	169.187	0.000	10.451	0.148	1	0 2
			80% 610.752	337.667	334.985	0.694	0.000	266.476	0.000	24.619	0.238		
	16.58.00	70	Avg 764.766	357.845	345.964	0.112	0.000	273.601	0.000	133.319	0.121	1	0 0
			80% 1.087.110	552.226	533.146	0.146	0.000	475.206	0.000	291.942	0.165		
	15.00.00	1	Avg 427.369	332.736	331.765	0.203	0.000	86.633	0.000	7.998	0.148	0	4 2
DSPINV	15.01.00	10	Avg 427.369	332.736	331.765	0.203	0.000	86.633	0.000	7.998	0.148		
			80% 282.230	250.199	249.740	0.105	0.000	29.774	0.000	2.256	0.121	0	1 1
			80% 304.595	274.617	274.140	0.119	0.000	34.776	0.000	3.137	0.126		
	Subtotal	111	Avg 641.553	332.647	324.599	0.139	0.000	221.730	0.000	87.175	0.128	2	5 5
			80% 941.738	490.798	476.417	0.391	0.000	401.265	0.000	222.969	0.187		
Total		222	Avg 648.413	352.107	345.022	0.152	0.000	205.569	0.000	90.735	0.142	0	6 7
			80% 935.149	494.731	482.808	0.483	0.000	385.939	0.000	209.199	0.337		

Figure 234. IMS Connect Transit Analysis report: BY (TRANCODE, TIME), PEAK (80)

The first one or two columns in the report correspond to your specified ordering operands:

Transact Code

Transaction Code. Reported when BY (TRANCODE) is specified. It is the default if the **BY** operand is omitted.

When the input message is a command and not a transaction, a mnemonic prefixed by ***CMD** is reported in place of the Transaction Code. The mnemonics and their associated command and OTMA indicator name are:

*CMD

A bucket for commands that are not any of the following.

*CMD_BID

Client Bid. OMCTLBID

*CMD_AVL

Server Available. OMCTLAVL

*CMD_RSN

Resynch. OMCTLRSN

*CMD_SPA

Suspend Input all Tpipes. OMCTLSPA

*CMD_RSA

Resume Input all Tpipes. OMCTLRSA

*CMD_SPN

Suspend Input named Tpipe. OMCTLSPN

*CMD_RSM

Resume Input named Tpipe. OMCTLRSM

*CMD_RTP

Resume Output named Tpipe. OMCTLRTP

*CMD_RHQ

Resume Output for Single Tpipe. OMCTLRHQ

***CMD_RCV**

Recover. OMCTLRVC

***CMD_PRP**

Prepare. OMCTLPRP

***CMD_CMM**

Commit. OMCTLCMM

***CMD_RBK**

Rollback. OMCTLRBK

***CMD_FGT**

Forget. OMCTLFGT

For more information on the commands, refer to the *IBM IMS Connect Guide and Reference*.

Time

Time Interval. Reported when BY (TIME) is specified. Transit time is summarized for each time interval, for example every 15 minutes. The default is 00:01:00 (1 minute).

Client ID

Connect Client ID. Reported when BY (CLIENTID) is specified.

Origin Datastor

Originating destination IMS data store. Reported when BY (DSORIG) is specified.

Target Datastor

Target destination IMS data store. Reported when BY (DSTARG) is specified.

Port Number

TCP/IP Port number. Reported when BY (PORT) is specified.

User ID

User ID. Reported when BY (USERID) is specified.

Transit (or response) elapse time is broken down into its components and summarized as an average (Avg) and optionally, peak percentile (nnn%). One or two rows of information are presented:

Avg

Average value. This is always reported.

nnn% Peak Transit Time

A statistical estimate, based on a normal distribution, that nnn% (between 50% and 100% as specified by you) of all transactions in the category being reported have transit times less than the reported value.

The peak percentile values are statistical estimates only, so care should be taken when interpreting the values if the transaction volume is low.

The **Total** row shows peak percentile values that are themselves statistical estimates, rather than the sum of the component estimates.

Peak percentiles are reported only if requested.

All times are in microseconds.

The following fields appear in the report after the two ordering fields:

Message Count

The number of transaction input messages processed.

Response Time

The elapsed time from when the transaction input message enters IMS Connect (Read Prepare) to when the transaction terminates (Trigger event).

Input**Pre-OTMA**

Total Input time. The elapsed time from when the transaction input message enters IMS Connect (Read Prepare) to when the transaction is sent to IMS (OTMA) for processing.

Read Sock

The elapsed time taken for IMS Connect to read the incoming message, from when the transaction input message enters IMS Connect (Read Prepare) to when IMS Connect has completed reading the message (final Read Socket).

READ Ex

The elapsed time the input message spent being processed by the READ Message Exit.

For Sync Level NONE transactions, the READ Message Exit is called once for the input message.

For Sync Level CONFIRM transactions, the READ Message Exit is called twice, initially for the input message and a second time for the ACK response from the client.

SAF

The accumulated elapsed time spent in all SAF calls for the message.

Process**OTMA**

The elapsed time OTMA spent processing the transaction, from when the message is sent to IMS (OTMA) to when the response is received back from OTMA.

Transaction messages are sent to OTMA for processing. In addition, for Sync Level CONFIRM transactions, the ACK response from the client is also sent to OTMA for processing.

Output**Confirm**

For Sync Level CONFIRM transactions only, the elapsed time from when OTMA completed processing the input message to when the ACK response from the client is sent back to OTMA.

Post-OTMA

For Sync Level NONE transactions, the elapsed time from when OTMA completed processing the input message to when the transaction terminates (Trigger event).

For Sync Level CONFIRM transactions, the elapsed time from when OTMA completed processing the ACK response to when the transaction terminates (Trigger event).

XMIT Ex

The elapsed time output messages (responses) spent being processed by the XMIT Message Exit.

Rate/Sec

The number of messages processed by IMS Connect per second.

The **Total Rate/Sec** is calculated by dividing the Total Message Count by the report elapsed time (the From-To period in the report heading).

Time Outs

The number of times IMS Connect timed-out while waiting for the message to be processed by OTMA.

NAK

Total number of messages that had a negative response from either IMS OTMA or the client.

Content: BY (TIME) example

This report was produced by the command:

```
IMSPACEX      ANALYSIS(
                BY (TIME),
                DDNAME (ANAL0001),
                INTERVAL (00:15:00))
IMSPACEX      EXECUTE
```

IMS Performance Analyzer													
IMS Connect Transit Analysis - DVPCFGDA													
From 15Mar2023 10.48.30.65 To 15Mar2023 12.17.12.19													
Page 1													
Time	Message	Response	Input		Process		Output		Rate		Time	NAK	
15Mar	Count	Time	Pre-OTMA	READ Sock	READ Ex	SAF	OTMA	Confirm	Post-OTMA	XMIT Ex	/Sec	Outs	
10.45.00	98	Avg 2.668.618	46.477	45.823	0.353	0.000	829.553	1.792.240	1.703.379	0.256	0	0	8
11.00.00	60	Avg 428.757	179.695	178.613	0.186	0.000	89.847	73.244	33.342	0.134	0	8	4
11.15.00	30	Avg 424.602	71.608	70.240	0.200	0.000	0.000	0.779	0.565	0.114	0	8	0
11.30.00	27	Avg 1.291.387	253.199	252.602	0.230	0.000	11.878	224.508	1.626	0.218	0	27	8
11.45.00	75	Avg 1.199.803	246.214	245.440	0.415	0.000	13.154	227.254	1.518	0.207	0	73	21
12.00.00	94	Avg 593.221	89.251	82.086	0.202	0.000	17.649	365.749	303.489	0.110	0	5	1
12.15.00	25	Avg 1.016.233	232.182	231.775	0.205	0.000	13.873	688.295	506.278	0.128	0	8	2
Total	409	Avg 1.237.187	139.318	137.050	0.277	0.000	220.049	622.863	514.160	0.175	0	129	44

Figure 235. Connect Transit Analysis report: BY (TIME)

Content: BY (CLIENTID, DSTARG) example

This report was produced by the command:

```
IMSPACEX      ANALYSIS(
                BY(CLIENTID,DSTARG),
                DDNAME(ANAL0002),
                INTERVAL(00:15:00))
IMSPACEX      EXECUTE
```

IMS Performance Analyzer															
IMS Connect Transit Analysis - DVPCFGDA															
From 15Mar2023 10.48.30.65 To 15Mar2023 12.17.12.19															
Client ID	Target Datasor	Message Count		Response Time	Input				-Process-		Output		Rate /Sec	Time Outs	NAK
					Pre-OTMA	READ Sock	READ Ex	SAF	OTMA	Confirm	Post-OTMA	XMIT Ex			
TRNOP006	IMD4	2	Avg	259.985	0.705	0.311	0.248	0.000	30.518	226.902	1.860	0.193	0	0	0
TRNOP007	IMD3	2	Avg	667.735	260.606	260.122	0.258	0.000	131.641	272.141	3.346	0.241	0	0	1
TRNOP008	IMD3	1	Avg	537.350	228.360	227.749	0.331	0.000	25.482	281.333	2.173	0.245	0	0	0
	IMD4	1	Avg	990.646	294.847	294.442	0.251	0.000	430.527	263.518	1.753	0.233	0	0	1
TRNOP008	Subtotal	2	Avg	763.998	261.604	261.096	0.291	0.000	228.005	272.426	1.963	0.239	0	0	1
TRNSK001	IMD4	1	Avg	292.900	241.819	241.306	0.145	0.000	48.537	0.000	2.543	0.116	0	0	0
TRNSK002	IMD3	3	Avg	310.502	257.745	257.244	0.214	0.000	51.339	0.000	1.417	0.098	0	0	0
TRNSK003	IMD3	1	Avg	591.995	285.888	285.412	0.189	0.000	43.675	260.697	1.733	0.303	0	0	0
TRNSK005	IMD3	1	Avg	277.551	221.995	220.755	0.131	0.000	49.637	0.000	5.919	0.121	0	0	0
TRRBS001	IMD3	44	Avg	1.011.679	245.818	245.076	0.551	0.000	12.067	272.726	1.527	0.210	0	44	13
TRRBS002	IMD4	62	Avg	1.354.974	248.101	247.405	0.222	0.000	12.715	207.611	1.531	0.210	0	62	18
TRRBS021	IMD3	2	Avg	232.667	212.318	211.900	0.118	0.000	18.615	0.000	1.733	0.050	0	0	0
TRRBS022	IMD4	2	Avg	233.323	213.182	212.749	0.127	0.000	18.407	0.000	1.733	0.120	0	0	0
TRSBS001	IMD3	25	Avg	328.068	61.946	60.240	0.189	0.000	0.000	1.238	0.414	0.104	0	6	0
TRSBS002	IMD4	35	Avg	290.775	71.526	70.180	0.182	0.000	0.000	0.450	0.766	0.089	0	7	1
Total		409	Avg	1.237.187	139.318	137.050	0.277	0.000	220.049	622.863	514.160	0.175	0	129	44

Figure 236. Connect Transit Analysis report: BY (CLIENTID, DSTARG)

Content: BY (TRANCODE) example

This report is from IMS Connect event data which IMS Connect Extensions collected at Collection Level 2. Observe that the Input READ Socket and SAF columns are zero. The report was produced by the command:

```
IMSPACEX      ANALYSIS(BY (TRANCODE) , DDNAME(ANAL0001))
IMSPACEX      EXECUTE
```

IMS Performance Analyzer													
IMS Connect Transit Analysis - DVPCFGDA													
From 15Mar2023 09.13.03.24 To 25Mar2023 12.20.02.83													
Page 1													
Transact Code	Message Count	Response Time	Pre-OTMA	Input READ Sock	READ Ex	SAF	-Process-OTMA	Confirm	Output Post-OTMA	XMIT Ex	Rate /Sec	Time Outs	NAK
*CMD_RHQ	21	Avg 5.990.001	226.647	0.000	0.251	0.000	0.000	0.533	2.706	0.193	0	18	0
*CMD_RTP	6	Avg 1.117.467	255.573	0.000	0.628	0.000	0.000	1.142	5.182	0.389	0	6	0
DSPALLI	27	Avg 208.306	127.263	0.000	0.139	0.000	56.717	21.429	1.078	0.097	0	0	0
DSPINV	3	Avg 457.838	284.210	0.000	0.161	0.000	171.497	0.000	2.131	0.125	0	0	0
DVPTRAN2	3	Avg 303.374	249.602	0.000	0.140	0.000	46.403	0.000	3.863	0.214	0	1	0
DVPTRAN5	11	Avg 605.844	174.973	0.000	0.284	0.000	30.407	453.993	343.915	0.121	0	1	1
IIVTCV	43	Avg 889.961	105.796	0.000	0.266	0.000	42.839	740.959	601.134	0.119	0	0	2
IIVTNO	50	Avg 809.099	238.666	0.000	0.278	0.000	36.246	313.807	2.017	0.201	0	49	22
PART	27	Avg 516.720	226.470	0.000	0.158	0.000	240.555	32.505	7.364	0.094	0	1	0
Total	191	Avg 1.255.192	187.709	0.000	0.243	0.000	66.329	282.826	157.416	0.152	0	76	25

Figure 237. Connect Transit Analysis report: BY (TRANCODE) for Collection Level 2 event data

IMS Connect Transaction Transit Log report

The IMS Connect Transit Log report provides performance details about every OTMA transaction processed by IMS Connect using event records captured in the IMS Connect Extensions journal. The order of transactions in this IMS Performance Analyzer report is based on when they end, and not when they start.

Log records: The Transit Log report is derived from IMS Connect event records 3C, 3D, 3E, 3F, 40, 41, 42, 47, 48, 49. This report requires IMS Connect Extensions to collect event data at collection level 3 or 4. Otherwise:

- If collection level 2, the report is produced but with Input READ Socket and SAF zero.
- If collection level 0 or 1, the report displays the message:

No observations in report period

Table 24. Connect Transit Log report: event records processed

Code (hex)	Event description	Collection level
3C	Prepare READ Socket	2
3D	Message Exit called for READ, XMIT, EXER	2
3E	Message Exit returned from READ, XMIT, EXER	1
3F	Begin SAF security request	3
40	End SAF security request	3
41	Message sent to OTMA	2
42	Message received from OTMA	2
47	Session Error	1
48	Trigger Event	2
49	READ Socket	3

Options

To obtain an IMS Connect Transit Log report, select the Transaction Transit **Log** report in a Connect Report Set and specify the report options.

The command is:

```

IMSPACEX      LOG(
[DDNAME(ddname),]          default LOG
[NOADDIDENT|ADDIDENT,]
[INCL(TRANCODE(list))|EXCL(TRANCODE(list)),]
[INCL(USERID(list))|EXCL(USERID(list)),]
[INCL(DATASTORE(list))|EXCL(DATASTORE(list)),]
[INCL(CLIENT(list))|EXCL(CLIENT(list)),]
[INCL(PORT(list))|EXCL(PORT(list)),]
[INCL(SOCKET(list))|EXCL(SOCKET(list))])
IMSPACEX      EXECUTE

```

For each input message, Transaction Code, Target Datastore and Port Number are always reported. Optionally, you can request the additional identification details User ID, Originating Datastore and Client ID.

Selection Criteria can be specified to filter the input data on one or more of the following:

- Transaction Code
- User ID
- Target Datastore (IMS ID)
- Connect Client ID
- TCP/IP Port Number
- Socket Number

The report output is written to the data set specified by the Report Output DDname. The default is LOG.

Content

The following figure shows an example of a Transaction Transit Log report applicable to IMS Connect event data.

The report was produced by the command:

```

IMSPACEX      LOG
IMSPACEX      EXECUTE

```

or

```

IMSPACEX      LOG(NOADDIDENT)
IMSPACEX      EXECUTE

```

IMS Performance Analyzer IMS Connect Transit Log - DVPCFGDA Log from 15Mar2023 10.48.46.40													Page 9
Start Time HH.MM.SS.Thmiju	Transact Code	Target DataStor	Port Number	Response Time	Pre-OTMA	Input READ Sock	READ Ex	SAF	-Process- OTMA	Confirm	Output Post-OTMA	XMIT Ex	E
10.48.46.407783	DVPTRANS	IMD3	8801	631.340	1.198	0.507	0.243	0.000	60.516	569.538	0.087	0.105	-
10.48.47.455008	DVPTRANS	IMD3	8801	641.975	0.839	0.388	0.161	0.000	43.400	597.644	0.090	0.117	-
10.48.48.403977	DVPTRANS	IMD3	8801	638.017	0.725	0.357	0.232	0.000	15.356	620.419	1.516	0.228	-
10.49.06.240175	IVTCV	IMD3	8801	294.089	0.743	0.249	0.199	0.000	75.222	218.048	0.075	0.116	-
10.49.06.837155	IVTCV	IMD3	8801	712.028	0.745	0.392	0.235	0.000	101.217	610.034	0.030	0.122	-
10.49.07.549765	IVTCV	IMD3	8801	2.668	0.523	0.234	0.088	0.000	0.749	0.000	1.394	0.045	N
10.49.20.627624	IVTCV	IMD3	8801	553.921	238.108	237.703	0.292	0.000	21.185	294.595	0.033	0.112	-
10.49.21.486274	IVTCV	IMD3	8801	610.756	0.835	0.435	0.229	0.000	10.200	599.644	0.075	0.058	-
10.49.22.401900	IVTCV	IMD3	8801	623.785	0.644	0.296	0.215	0.000	9.954	613.111	0.075	0.052	-
10.49.23.026219	IVTCV	IMD3	8801	2.618	0.599	0.251	0.044	0.000	0.736	0.000	1.282	0.104	N
10.49.46.989823	IVTCV	IMD3	8801	467.398	0.729	0.250	0.292	0.000	199.231	267.405	0.032	0.117	-
10.49.47.762563	IVTCV	IMD3	8801	693.966	0.743	0.298	0.221	0.000	23.973	669.201	0.047	0.113	-
10.49.48.457862	IVTCV	IMD3	8801	3.024	0.914	0.485	0.216	0.000	0.712	0.000	1.397	0.045	N
10.50.17.644034	DVPTRANS	IMD3	8801	2.696.652	302.567	302.003	0.344	0.000	86.355	2.307.654	0.075	0.110	-
10.50.21.110778	DVPTRANS	IMD3	8801	4.877.428	301.982	301.597	0.236	0.000	13.110	4.562.304	0.031	0.053	-
10.50.32.297230	DVPTRANS	IMD3	8801	1.417.832	0.756	0.370	0.231	0.000	15.107	1.401.937	0.030	0.115	-
10.50.34.118110	DVPTRANS	IMD3	8801	1.232.251	298.323	297.938	0.237	0.000	118.086	815.810	0.030	0.114	-
10.50.35.648306	DVPTRANS	IMD3	8801	1.096.759	290.238	289.867	0.237	0.000	15.997	789.034	1.488	0.222	-
10.51.07.119390	IVTCV	IMD4	8801	0.43	0.728	0.256	0.325	0.000	23.758	0.43	0.031	0.116	-
10.51.50.571677	IVTCV	IMD4	8801	3.716.608	263.082	262.695	0.237	0.000	35.675	3.417.819	0.031	0.116	-
10.51.56.334200	IVTCV	IMD4	8801	3.909.816	274.131	273.661	0.236	0.000	9.148	3.626.459	0.076	0.113	-
10.52.20.858335	IVTCV	IMD4	8801	0.39	1.394	0.875	0.170	0.000	53.750	0.39	0.114	0.117	-
10.52.59.441817	IVTCV	IMD4	8801	2.775	0.614	0.349	0.091	0.000	0.639	0.000	1.521	0.125	N
10.53.45.866715	IVTCV	IMD4	8801	4.574.039	234.843	234.080	0.202	0.000	17.106	4.322.012	0.075	0.120	-
10.53.51.460258	IVTCV	IMD4	8801	5.251.295	287.001	286.615	0.237	0.000	11.615	4.952.646	0.031	0.116	-
10.53.57.984824	IVTCV	IMD4	8801	3.492.361	249.933	249.562	0.237	0.000	10.261	3.232.127	0.038	0.113	-
10.54.02.589463	IVTCV	IMD4	8801	0.17	279.892	279.423	0.175	0.000	9.628	0.17	0.031	0.122	-
10.54.19.707582	IVTCV	IMD4	8801	4.655.497	0.587	0.323	0.149	0.000	60.187	4.594.646	0.075	0.057	-
10.54.25.861547	IVTCV	IMD4	8801	2.533.462	213.115	212.744	0.159	0.000	22.475	2.297.771	0.100	0.114	-
10.54.29.446920	IVTCV	IMD4	8801	2.289.139	252.184	251.796	0.258	0.000	9.482	2.025.988	1.484	0.160	-

Figure 238. Connect Transit Log report: NOADDIDENT

The following figure shows an example of a Transaction Transit Log report applicable to IMS Connect event data, and was produced by the following command:

```
IMSPACEX
IMSPACEX LOG(ADDIDENT)
EXECUTE
```

IMS Performance Analyzer IMS Connect Transit Log - DVPCFGDA Log from 01Apr2023 16.30.06.98													Page 1
Start Time HH.MM.SS.Thmiju	Transact /User ID	DataStor Targ/Org	Port/ ClientID	Response Time	Pre-OTMA	Input READ Sock	READ Ex	SAF	-Process- OTMA	Confirm	Output Post-OTMA	XMIT Ex	E
16.30.06.980931	DVP	IMD4	3008	342.609	223.962	223.098	0.115	0.000	116.820	0.000	1.826	0.115	-
16.30.17.434397	PART	IMD4	3008	294.391	270.927	270.553	0.054	0.000	21.807	0.000	1.657	0.114	-
16.30.18.473496	DVP	IMD4	3008	264.422	240.549	240.088	0.115	0.000	22.214	0.000	1.658	0.114	-
16.30.19.488718	PART	IMD4	3008	254.594	231.325	230.868	0.054	0.000	21.392	0.000	1.876	0.123	-
16.30.20.479263	DVP	IMD4	3008	279.771	252.025	251.580	0.056	0.000	26.009	0.000	1.736	0.130	-
16.57.15.932101	PART	IMD3	3008	359.903	253.588	253.060	0.108	0.000	104.542	0.000	1.771	0.058	-
16.57.15.933085	DVP	IMD3	3008	382.867	253.933	253.578	0.109	0.000	127.192	0.000	1.742	0.118	-
16.57.17.027190	DSPALLI	IMD3	3008	322.100	259.058	258.091	0.106	0.000	61.133	0.000	1.908	0.124	-
16.57.17.026938	AXS	IMD3	3008	359.538	265.055	262.039	0.113	0.000	92.711	0.000	1.771	0.124	-
16.57.17.026227	DSPALLI	IMD3	3008	396.272	267.414	266.786	0.113	0.000	126.155	0.000	2.701	0.124	-
16.57.17.025709	AXS	IMD3	3008	431.862	269.526	268.924	0.108	0.000	159.996	0.000	2.340	0.128	-
16.57.17.023985	DSPALLI	IMD3	3008	471.160	273.394	272.234	0.109	0.000	196.012	0.000	1.752	0.124	-
16.57.17.025061	AXS	IMD3	3008	509.480	274.056	273.428	0.051	0.000	233.595	0.000	1.828	0.123	-

Figure 239. Connect Transit Log report: ADDIDENT

In the report heading, **Log from** is the time stamp of the first record reported.

The Log report provides transaction details and various processing times. For each input message, Transaction Code, Target Datastore, and Port Number are always reported. If ADDIDENT is specified, the additional identification details User ID, Originating Datastore and Client ID are printed on a second line due to page width constraints. The column headings change to accommodate the dual use of the column.

The report is divided into four main sections. From left to right, section 1 provides transaction identification details such as time, transaction code, target datastore and port number, and total response time. Section 2 provides transaction pre-OTMA (Input) processing times. Section 3 provides OTMA processing time (including IMS processing). Section 4 provides post-OTMA (Output) processing times.

The transaction identification details are:

Start Time

Input message arrival time (Read Prepare time).

Transact Code

Transaction Code. Column heading is **Transact** when ADDIDENT is specified.

User ID

User ID. This is reported only if ADDIDENT is specified.

Target DataStor

Target destination datastore. The Datastore (IMS) to which IMS Connect sent this transaction for processing. Column heading is **Datastor Targ** when ADDIDENT is specified.

DataStor Org

Originating destination datastore. The Datastore (IMS) to which IMS Connect was originally going to send this transaction for processing. This is reported only if ADDIDENT is specified.

Port Number

The Port number from which the transaction was received. Column heading is **Port** when ADDIDENT is specified.

ClientID

The IMS Connect Client ID. This is reported only if ADDIDENT is specified.

Transit (or response) elapse time is broken down into its components.

All times are in microseconds.

Response Time

The elapsed time from when the transaction input message enters IMS Connect (Read Prepare) to when the transaction terminates (Trigger event).

Response time is displayed in microseconds. However, if the time exceeds 9.999.999 microseconds, it is displayed in hours, minutes and seconds in hh:mm:ss format.

Input

Pre-OTMA

Total Input time. The elapsed time from when the transaction input message enters IMS Connect (Read Prepare) to when the transaction is sent to IMS (OTMA) for processing.

Read Sock

The elapsed time taken for IMS Connect to read the incoming message, from when the transaction input message enters IMS Connect (Read Prepare) to when IMS Connect has completed reading the message (final Read Socket).

READ Ex

The elapsed time the input message spent being processed by the READ Message Exit.

For Sync Level NONE transactions, the READ Message Exit is called once for the input message.

For Sync Level CONFIRM transactions, the READ Message Exit is called twice, initially for the input message and a second time for the ACK response from the client.

SAF

The accumulated elapsed time spent in all SAF calls for the message.

Process

OTMA

The elapsed time OTMA spent processing the transaction, from when the message is sent to IMS (OTMA) to when the response is received back from OTMA.

Transaction messages are sent to OTMA for processing. In addition, for Sync Level CONFIRM transactions, the ACK response from the client is also sent to OTMA for processing.

Output

Confirm

For Sync Level CONFIRM transactions only, the elapsed time from when OTMA completed processing the input message to when the ACK response from the client is sent back to OTMA.

Post-OTMA

For Sync Level NONE transactions, the elapsed time from when OTMA completed processing the input message to when the transaction terminates (Trigger event).

For Sync Level CONFIRM transactions, the elapsed time from when OTMA completed processing the ACK response to when the transaction terminates (Trigger event).

XMIT Ex

The elapsed time output messages (responses) spent being processed by the XMIT Message Exit.

E

Error indicator:

T

= Time Out

R

= Rejected (by READ Message Exit)

N

= NAK

IMS Connect Transaction Transit Extract

The IMS Connect Transit Extract provides performance details about every OTMA transaction processed by IMS Connect. You can request a List or Summary Extract, or both. The List Extract provides similar details to the Connect Transit Log report, while the Summary Extract summarizes these details over a specified time interval. The extract data produced by IMS Performance Analyzer is suitable for importing into Db2 or third-party tools from where you can run queries or produce reports and graphs.

Sample Db2 jobs are supplied in the SIPI SAMP library to help you:

- Sample Load jobs IPICLLOD and IPICSL0D
- Sample DDL jobs IPICLDDL and IPICSDDL

Refer also to the section on Db2 Queries in the *IMS Performance Analyzer for z/OS: User's Guide*.

Log records: The Connect Transit extracts are derived from IMS Connect event records 3C, 3D, 3E, 3F, 40, 41, 42, 47, 48, 49, 4A. The extract requires IMS Connect Extensions to collect event data at collection level 3 or 4. Otherwise:

- If collection level 2, the extract data set is produced but with Input READ Socket, SAF and Acknowledgement zero.
- If collection level 0 or 1, the Extract Recap report displays the message:

No observations in report period

Table 25. Connect Transit Extract: event records processed

Code (hex)	Event description	Collection level
3C	Prepare READ Socket	2
3D	Message Exit called for READ, XMIT, EXER	2
3E	Message Exit returned from READ, XMIT, EXER	1

Table 25. Connect Transit Extract: event records processed (continued)

Code (hex)	Event description	Collection level
3F	Begin SAF security request	3
40	End SAF security request	3
41	Message sent to OTMA	2
42	Message received from OTMA	2
47	Session Error	1
48	Trigger Event	2
49	READ Socket	3
4A	WRITE Socket	3

Options

To specify the extract options, select the Transaction Transit **Extract** in the IMS Connect Report Set.

The command for the Connect Transit Extract is:

```

IMSPACEX      TRANEXTR(
               [DDNAME(ddname),]          default TRANEXTR
               [LIST,]
               [SUMMARY,]
               [EXTENDED,]
               [INTERVAL(hh:mm:ss),]      default 00:15:00 (15 minutes)
               [INCL(TRANCODE(list))|EXCL(TRANCODE(list)),]
               [INCL(USERID(list))|EXCL(USERID(list)),]
               [INCL(DATASTORE(list))|EXCL(DATASTORE(list)),]
               [INCL(CLIENT(list))|EXCL(CLIENT(list)),]
               [INCL(PORT(list))|EXCL(PORT(list)),]
               [INCL(SOCKET(list))|EXCL(SOCKET(list))])
IMSPACEX      EXECUTE

```

Selection Criteria can be specified to filter the input data on one or more of the following:

- Transaction Code
- User ID
- Target Datastore (IMS ID)
- Connect Client ID
- TCP/IP Port Number
- Socket Number

The Recap report output is written to the data set specified by the Report Output DDname. The default is TRANEXTR.

The List Extract, if requested, is written to the data set with DDname IPICTRLS. The default allocation attributes for a new data set are taken from the Total Transit Traffic specification in your Reporting Allocation Settings in Profile Options.

The Summary Extract, if requested, is written to the data set with DDname IPICTRSU. The default allocation attributes for a new data set are taken from the Summary Extract specification in your Reporting Allocation Settings in Profile Options.

The Summary Extract requires a time interval by which you want the data summarized. The default is 00:15:00 (15 minutes).

Content: List Extract

In the Connect List Extract, transaction transit activity is listed in a similar way to the Connect Transit Log report. The List Extract record layout is defined by the assembler macro IPICEXLI in the SIPIMAC library.

CTLLIST			CEX Transaction List Record
CTLDATE	CL10	Tran Date	'yyyy-mm-dd'
CTLDATES	CL1	Separator	'-'
CTLTIME	CL14	Tran Time	'hh.mm.ss.thmiju'
CTLTC	CL8	Transaction Code	
CTLUSID	CL8	User ID	
CTLDORG	CL8	Datastore (Original)	
CTLDSTGT	CL8	Datastore (Target)	
CTLCLID	CL8	Client ID	
CTLTPIPE	CL8	TPIPE name	
CTLPORT	CL5	Port Number	
CTLREJE	CL1	R = Transaction rejected	
CTLIMO	CL1	T = Transaction timeout	
CTLFAIL	CL1	F = Transaction failed	
CTLCLACK	CL1	A = Client sent ACK	
CTLCLNAK	CL1	N = Client sent NAK	
CTLOTNAK	CL1	O = OTMA NAK	
CTLRTPIP	CL1	N = RESUME TPIPE NOAUTO command	
		A = RESUME TPIPE AUTO command	
		S = RESUME TPIPE SINGLE command	
			Transit Elapsed times (microseconds)
CTLELIN	XL8	Pre-OTMA	
CTLELRD	XL8	Input READ Socket	
CTLELRX	XL8	Message Exit READ	
CTLELSF	XL8	SAF	
CTLELPR	XL8	Processing by OTMA	
CTLELXX	XL8	Message Exit XMIT	
CTLELAR	XL8	Acknowledgement READ Socket	
CTLELCF	XL8	Transaction Confirm	
CTLELOT	XL8	Post-OTMA	
CTLELRS	XL8	Response time	
			Transaction counters
CTLCACK#	XL2	Client ACK count	
CTLCNAK#	XL2	Client NAK count	
CTLONAK#	XL2	OTMA NAK count	
CTLRTPI#	XL4	Resume Tpipe message count	
CTLPTDEP	XL4	Port depth	
CTLNAKSC	XL2	OTMA NAK Sense Code	
CLTIMOV	CL3	Timeout value	
CLTIRM	XL1	Timeout value (raw)	
CLTIMOC	CL8	Timeout value (character)	
CLTIPADR	CL39	IP Address	

Figure 240. Record format of Connect Transit List extract

Many of the fields in the extract record are reported in the Connect Transit Analysis and Log reports. Refer to the report contents section of those two reports for a description of the common fields.

The following fields are in the extract record, but not in the Transit Analysis or Log reports:

CTLELAR

READ Socket Acknowledgment. The total elapsed time for all READ Socket Events issued after the response from OTMA has been sent to the client, in other words, the time taken to READ the Acknowledgement from the client.

CTLRTPI#

Resume Tpipe message count. The number of messages returned from OTMA in response to the Resume Tpipe commands.

CTLPTDEP

Port depth. The number of concurrently open Sockets on the Port from which the transaction was received. This field can be used to monitor the Socket usage at the time individual transactions were received by IMS Connect.

CTLNAKSC

OTMA NAK Sense Code. This field contains the Sense Code returned by OTMA when it issues a NAK. The OTMA sense codes for NAK messages are listed in [Figure 270 on page 510](#). For more information, refer to the section "OTMA Sense Codes for NAK Messages" in the *IMS Open Transaction Manager Access Guide and Reference*.

CTLTIMOV

Transaction OTMA timeout value. This is the timeout value used by IMS Connect to time out a transaction that does not return from OTMA. This value is only displayed when the transaction had timed-out as indicated by field CTLIMO being set to T. For an explanation of timeout values, refer to the *IBM IMS Connect Guide and Reference*, SC18-7260.

CTLTIRM

Timeout value (raw format). IMS request message timer value, IRM_TIMER. For an explanation, refer to *IMS Connectivity in an On Demand Environment: A Practical Guide to IMS Connectivity*, SG24-6794.

CTLTIMOC

Timeout value. CTLTIRM value in character format.

CTLIPADR

IP address.

Content: Summary Extract

In the Connect Summary Extract, transaction transit activity is summarized by time interval. The Summary Extract record layout is defined by the assembler macro IPICXSU in the SIPIMAC library.

The extract record has the following format:

CTSSUMM	CEX Transaction Summary Record		
CTSDATE	CL10	Tran Date	'yyyy-mm-dd'
CTSDATES	CL1	Separator	'-'
CTSTIME	CL8	Tran Time	'hh.mm.ss'
CTSTC	CL8	Tran Code	
CTSINTVL	XL8	Time Interval (seconds)	
Transit Elapsed times (microseconds)			
CTSELIN	XL8	Pre-OTMA	Total
CTSELIN2	XL8	Pre-OTMA	Sum-of-Squares
CTSELRD	XL8	Input READ Socket	Total
CTSELRD2	XL8	Input READ Socket	Sum-of-Squares
CTSELRX	XL8	Message Exit READ	Total
CTSELRX2	XL8	Message Exit READ	Sum-of-Squares
CTSELSF	XL8	SAF	Total
CTSELSF2	XL8	SAF	Sum-of-Squares
CTSELPR	XL8	Processing by OTMA	Total
CTSELPR2	XL8	Processing by OTMA	Sum-of-Squares
CTSELXX	XL8	Message Exit XMIT	Total
CTSELXX2	XL8	Message Exit XMIT	Sum-of-Squares
CTSELAR	XL8	Acknowledgement READ Socket	Total
CTSELAR2	XL8	Acknowledgement READ Socket	Sum-of-Squares
CTSELCF	XL8	Transaction Confirm	Total
CTSELCF2	XL8	Transaction Confirm	Sum-of-Squares
CTSELOT	XL8	Post-OTMA	Total
CTSELOT2	XL8	Post-OTMA	Sum-of-Squares
CTSELRS	XL8	Response time	Total
CTSELRS2	XL8	Response time	Sum-of-Squares
CTSTRAN#	XL4	Transaction count	
CTSREJE#	XL4	Rejected count	
CTSTIMO#	XL4	Timeout count	
CTSFAIL#	XL4	Failed count	
CTSCACK#	XL4	Client ACK count	
CTSCNAK#	XL4	Client NAK count	
CTSONAK#	XL4	OTMA NAK count	
CTSRTPI#	XL4	Resume Tpipe message count	
CTSPDAVG	XL4	Average Port depth	
CTSPDMAX	XL4	Maximum Port depth	
CTSPDMIN	XL4	Minimum Port depth	

Figure 241. Record format of Connect Transit Summary extract

Many of the fields in the extract record are reported in the Connect Transit Analysis and Log reports. Refer to the report contents section of those two reports for a description of the common fields.

The following fields are in the extract record, but not in the Transit Analysis or Log reports:

CTSELAR

READ Socket Acknowledgment. The total elapsed time for all READ Socket Events issued after the response from OTMA has been sent to the client, in other words, the time taken to READ the Acknowledgment from the client.

CTSRTPI#

Resume Tpipe message count. The number of messages returned from OTMA in response to the Resume Tpipe commands.

CTSPDAVG

Average Port Socket Depth. The average Port Socket depth. This is the number of concurrently open Sockets on the Port when the transaction was received, for all Ports from which the transaction was received.

CTSPDMAX

Maximum Port Socket Depth. The highest Port Socket depth. This is the number of concurrently open Sockets on the Port when the transaction was received, of any Port from which the transaction was received.

CTSPDMIN

Minimum Port Socket Depth. The lowest Port Socket depth. This is the number of concurrently open Sockets on the Port when the transaction was received, of any Port from which the transaction was received.

Sums-of-Squares are used to calculate standard deviation and peak percentiles.

For more information about running SQL Queries against the extract data, see the samples in the SIPIAMP sample library.

Content: Recap

This is an example of the Recap report produced at the end of IMS Connect List and Summary extract processing.

The List and Summary extracts were requested by a command and data set specification such as the following:

```
//* IMS Connect List Extract File
//IPICTRL DD DSN=IPID.TREXLST1,
//          DISP=(NEW,CATLG),
//          UNIT=SYSDA,SPACE=(CYL,(5,5),RLSE)
//* IMS Connect Summary Extract File
//IPICTRSU DD DSN=IPID.TREXSUM1,
//           DISP=(NEW,CATLG),
//           UNIT=SYSDA,SPACE=(CYL,(1,1),RLSE)
//*
          IMSPACEX      TRANEXTR(
                          DDNAME(TRANEXTR),
                          LIST,
                          SUMMARY,
                          INTERVAL(01:00:00))
          IMSPACEX      EXECUTE
```

IMS Performance Analyzer IMS Connect Transit Extract Recap - SECJCHSK

List	Extract Data Set:	IPID.TREXLST1
	Record Count :	1,455
	Start :	2021-03-16-12.05.06.31793
	END :	2021-03-23-10.23.22.47862
Summary	Extract Data Set:	IPID.TREXSUM1
	Record Count :	72
	Start :	2021-03-16-12.00.00
	END :	2021-03-23-10.00.00
	Interval :	01:00:00

Figure 242. Connect Transit Extract Recap report

Chapter 32. IMS Connect Resource Usage reports

The IMS Connect Resource Usage reports in IMS Performance Analyzer show detailed and summary information on the use and availability of various IMS Connect resources including TCP/IP Ports and Tpipes.

IMS Connect Port Usage Report

The IMS Connect Port Usage report provides a summary of the TCP/IP ports used by the IMS Connect system. For each port, average statistics are provided for port depth, message processed count, and ACCEPT, READ and WRITE Socket counts. IMS Performance Analyzer provides peak percentile statistics for Input READ and ACK/NAK READ Socket counts.

Log records: The IMS Connect Port Usage report is derived from IMS Connect event records 0B, 3C, 42, 47, 48, 49, 4A. The report requires IMS Connect Extensions to collect event data at collection level 3 or 4. Otherwise:

- If collection level 2, the report is produced but with WRITE Count and Length zero. READ Count and Length accumulates both Prepare READ Socket (record 3C) and READ Socket (record 49). However, if collection level 2, READ Count and Length shows only Prepare READ Socket (3C) since READ Socket (49) is not collected at this level.
- If collection level 0 or 1, the report displays the message:

No observations in report period

Table 26. Connect Port Usage report: event records processed

Code (hex)	Event description	Collection level
0B	End ACCEPT Socket	3
3C	Prepare READ Socket	2
42	Message received from OTMA	2
47	Session Error	1
48	Trigger Event	2
49	READ Socket	3
4A	WRITE Socket	3

Options

To specify the report options, select the Resource Usage **Port Usage** report in an IMS Connect Report Set. The command for the Connect Port Usage report is:

```
IMSPACEX      PORT(
               [DDNAME(ddname),]          default PORT
               [INTERVAL(hh:mm:ss),]      default 00:01:00 (1 minute)
               [PEAK(nnn),]                50-100%, default 90%
               [INCL(PORT(list))|EXCL(PORT(list))])
IMSPACEX      EXECUTE
```

The report output is written to the data set specified by the Report Output DDname. The default is PORT. Selection Criteria can be specified for TCP/IP Port Number.

You can also specify:

- The time interval if you want to summarize by time interval. This is optional. If you specify INTERVAL without specifying the time interval, the default interval is 00:01:00 (1 minute).
- The peak percentile, between 50 and 100%. The default is 90%.

Content

The following figure shows an example of the Connect Port Usage report.

The report was produced by the command:

```
IMSPACEX      PORT(
               DDNAME(PORT) ,
               PEAK(90))
IMSPACEX      EXECUTE
```

IMS Performance Analyzer													
IMS Connect Port Usage - DVPCFGDA													
From 08Mar2023 08.47.44.11 To 25Mar2023 12.20.02.83 Page 1													
Port	-- Depth --	Message	ACCEPT	READ	Input	READ	ACK/NAK	READ	WRITE				
	Avg	Count	Count	Count	Average	90% Peak	Average	90% Peak	Count	Len			
8801	11	26	1010	443	3681	32	668.505	1.888.699	773.304	4.310.637	910	128	
8802	33	83	2500	2514	7412	6	1.072.717	2.006.237	0.000	0.000	2500	91	
8803	0	0	0	14	0	0	0.000	0.000	0.000	0.000	0	0	
8804	0	0	0	14	0	0	0.000	0.000	0.000	0.000	0	0	
8805	0	0	0	14	0	0	0.000	0.000	0.000	0.000	0	0	
8806	0	0	0	14	0	0	0.000	0.000	0.000	0.000	0	0	
8807	0	0	0	14	0	0	0.000	0.000	0.000	0.000	0	0	
8808	0	0	0	14	0	0	0.000	0.000	0.000	0.000	0	0	
8809	0	0	0	14	0	0	0.000	0.000	0.000	0.000	0	0	

Figure 243. Connect Port Usage report

The following figure provides another example of the Connect Port Usage report, summarized by time interval. It was produced by the following command:

```
IMSPACEX      PORT(
               PEAK(90) ,
               INTERVAL(00:30:00))
IMSPACEX      EXECUTE
```

IMS Performance Analyzer													
IMS Connect Port Usage - DVPCFGDA													
From 15Mar2023 09.13.03.24 To 15Mar2023 12.17.31.35 Page 1													
Time	Port	-- Depth --	Message	ACCEPT	READ	Input	READ	ACK/NAK	READ	WRITE			
15Mar		Avg	Count	Count	Count	Average	90% Peak	Average	90% Peak	Count	Len		
09.00.00	8801	0	0	145	0	145	9	271.292	758.455	0.000	0.000	0	0
09.30.00	8801	0	6	86	11	202	29	261.551	603.822	491.318	725.573	31	94
10.00.00	8801	10	13	104	108	502	34	297.231	413.940	299.271	543.689	157	161
	8802	0	0	0	4	0	0	0.000	0.000	0.000	0.000	0	0
10.30.00	8801	15	23	179	51	887	34	1.126.722	2.371.758	1.330.005	7.364.750	206	97
	8802	0	0	0	2	0	0	0.000	0.000	0.000	0.000	0	0
11.00.00	8801	18	23	93	93	372	36	319.420	504.425	358.919	846.734	103	278
	8802	0	0	0	3	0	0	0.000	0.000	0.000	0.000	0	0
	8809	0	0	0	3	0	0	0.000	0.000	0.000	0.000	0	0

Figure 244. Connect Port Usage report, summarized by time

In the report heading, **From** is the time stamp of the first record reported and **To** is the time stamp of the last record reported.

The IMS Connect Port Usage report provides useful information regarding the Port utilization within a HWS system. Broken down by Interval (optional) and Port number, the report shows the following:

Time

Report interval time. Optional, and will not be displayed if INTERVAL is not specified, in which case the data is summarized for the whole of the report period.

Port

Port number.

The following fields appear in the report after the two ordering fields:

Depth Avg

The average number of Sockets currently open against this Port at any one time.

Depth Max

The maximum number of Sockets currently open against this Port at any one time.

Message Count

Number of input messages processed.

ACCEPT Count

Number of ACCEPT Socket commands issued.

READ Count

Number of READ Socket commands issued.

READ Len

Average length of data received by READ Socket commands.

Input READ Average

Average time for READ Socket commands for input messages.

Input READ nn% Peak

Peak percentile time for READ Socket commands. The peak values are statistical estimates only, based on a normal distribution, so care should be taken when interpreting the values if the transaction volume is low.

ACK/NAK READ Average

Average time for acknowledgment READ Socket commands.

ACK/NAK READ nn% Peak

Peak percentile time for acknowledgment READ Socket commands. The peak values are statistical estimates only, based on a normal distribution, so care should be taken when interpreting the values if the transaction volume is low.

WRITE Count

Number of WRITE Socket commands.

WRITE Len

Average length of data sent by WRITE Socket commands.

IMS Connect Resume Tpipe report

The IMS Connect Resume Tpipe report provides a summary of RESUME TPIPE command activity. The standard version of the report provides command statistics, including command count, and a breakdown by command type: Auto (with timeout), No Auto and Single. Command statistics produced by IMS Performance Analyzer include count of commands issued, IMS messages received, Negative responses (Tpipe queue empty), NAK and timeout interval. The extended version of this IMS Performance Analyzer report supports all of the different resume tpipe types and options.

Log records: The IMS Connect Resume Tpipe report is derived from IMS Connect event records 3D, 3E, 41, 42. The report requires IMS Connect Extensions to collect event data at collection level 2, 3 or 4. Otherwise, if collection level is 0 or 1, the report displays the message:

No observations in report period

Table 27. Connect Resume Tpipe report: event records processed

Code (hex)	Event description	Collection level
3D	Message Exit called for READ, XMIT, EXER	2

Table 27. Connect Resume Tpipe report: event records processed (continued)

Code (hex)	Event description	Collection level
3E	Message Exit returned from READ, XMIT, EXER	1
41	Message sent to OTMA	2
42	Message received from OTMA	2

Options

To specify the report options, select the Resource Usage **Resume Tpipe** report in an IMS Connect Report Set.

The command for the Connect Resume Tpipe report is:

```
IMSPACEX      TPIPE(
                [DDNAME(ddname),]
                [INTERVAL(00:01:00),]
                FORMAT1|FORMAT2,
                [INCL|EXCL(TPIPE(tpipe1,tpipe2,...))])
IMSPACEX      EXECUTE
```

Selection criteria can be specified for Tpipe.

The report output is written to the data set specified by the Report Output DDname. The default is TPIPE.

For the standard report, but not the extended report, you can also specify the time interval if you want to summarize over time. The default interval is 00:01:00 (1 minute).

FORMAT1 produces the standard report, which is the default option. FORMAT2 produces the extended report.

Content: Standard (FORMAT1)

The following figure shows an example of the Connect Resume Tpipe: standard format report.

The report was produced by the command:

```
IMSPACEX      TPIPE(
                DDNAME(TPIPE),
                FORMAT1)
IMSPACEX      EXECUTE
```

IMS Performance Analyzer 4.5															
IMS Connect Resume Tpipe - DVPCFGDA															
From 15Mar2023 10.48.30.65 To 15Mar2023 12.17.12.19															
Noauto								Auto							
Tpipe	Count	NResp	Fail	Avg	Msg	Max	Avg	Count	NResp	Fail	Avg	Msg	Max	Avg	Timeout
							Timeout								
CEX30001	1	0	0	2	2	0.25	0.00	0	0	0	0	0	0	0.00	0.00
CEX30002	0	0	0	0	0	0.00	0.00	0	0	0	0	0	0	0.00	7.00
CEX40001	1	0	0	2	2	0.25	0.00	0	0	0	0	0	0	0.00	0.00
CEX40002	1	1	0	0	0	3.00	0.00	0	0	0	0	0	0	0.00	0.00
TXRBS001	5	0	0	1	2	0.25	0.25	3	2	0	0	2	2	3.41	0.25
TXRBS002	17	2	0	0	2	0.45	0.00	1	0	0	2	2	2	5.00	0.00
TXSBS001	2	0	0	4	7	0.25	0.25	3	0	0	2	3	3	0.25	0.83
TXSBS002	2	0	1	3	5	0.25	0.25	5	0	0	2	5	5	0.25	0.60

Figure 245. Connect Resume Tpipe standard report

The following figure provides another example of the Connect Resume Tpipe standard report, summarized by time interval. It was produced by the following command:

```
IMSPACEX      TPIPE(
               DDNAME(TPIPE),
               INTERVAL(00:01:00),
               FORMAT1)
IMSPACEX      EXECUTE
```

IMS Performance Analyzer 4.5																		
IMS Connect Resume Tpipe - DVPCFGDA																		
From 15Mar2023 09.25.43.79 To 15Mar2023 12.20.02.83																		
Page 1																		
Time 15Mar	Tpipe	----- Noauto -----						----- Auto -----						----- Single -----				
		Count	NResp	Fail	Avg	Max	Avg Timeout	Count	NResp	Fail	Avg	Max	Avg Timeout	Count	NResp	Fail	Avg Timeout	
09.25.00	TRRBS001	1	0	0	2	2	0.25	0	0	0	0	0	0.00	0	0	0	0.00	
09.26.00	TRRBS001	0	0	0	0	0	0.00	0	0	0	0	0	0.00	2	0	0	0.25	
09.27.00	TRRBS002	2	0	0	2	2	0.25	0	0	0	0	0	0.00	0	0	0	0.00	
	CEX30001	1	0	0	2	2	0.25	0	0	0	0	0	0.00	0	0	0	0.00	
	TRRBS001	1	0	0	2	2	0.25	0	0	0	0	0	0.00	0	0	0	0.00	
	TRRBS002	0	0	0	0	0	0.00	1	0	0	2	2	0.25	0	0	0	0.00	
09.28.00	CEX40002	0	0	0	0	0	0.00	0	0	0	0	0	0.00	1	1	0	7.00	
	TRRBS001	0	0	0	0	0	0.00	2	1	0	1	2	5.00	0	0	0	0.00	
10.14.00	TRRBS001	1	0	0	2	2	0.25	0	0	0	0	0	0.00	0	0	0	0.00	
10.15.00	TRRBS001	1	0	0	2	2	0.25	0	0	0	0	0	0.00	0	0	0	0.00	
10.16.00	TRRBS002	0	0	0	0	0	0.00	0	0	0	0	0	0.00	2	0	0	0.25	
	CEX40001	1	0	0	2	2	0.25	0	0	0	0	0	0.00	0	0	0	0.00	
10.24.00	CEX40001	1	0	0	2	2	0.25	0	0	0	0	0	0.00	0	0	0	0.00	
10.25.00	TRRBS001	1	0	0	2	2	0.25	2	1	0	1	2	5.00	0	0	0	0.00	
10.26.00	16034180	1	1	0	0	0	2.00	0	0	0	0	0	0.00	0	0	0	0.00	
	CEX40002	1	1	0	0	0	3.00	0	0	0	0	0	0.00	1	1	0	7.00	
11.36.00	TRRBS002	1	0	0	1	1	0.25	0	0	0	0	0	0.00	0	0	0	0.00	

Figure 246. Connect Resume Tpipe standard report, summarized by time

In the report heading, **From** is the time stamp of the first record reported and **To** is the time stamp of the last record reported.

The Resume Tpipe standard report provides statistics on the execution of all Resume Tpipe commands issued during the reporting interval. The report is sorted by Tpipe name within optional interval and provides statistics for No Auto, Auto and Single Resume Tpipe commands.

The report provides the following information for each Tpipe:

Time

Report interval time segment. Optional, and will not be displayed if INTERVAL is not specified, in which case the data is summarized for the whole of the report period.

Tpipe

Tpipe name.

If this report includes a Tpipe name that you do not recognize, it is probably due to the Client ID and Tpipe name not being set in the command. In this case, the READ Message Exit will generate a random number for the Client ID, which will also be used as the Tpipe name. An example of this can be seen in the sample report in [Figure 246 on page 459](#) at 10:25:00 with the Tpipe name of 16034180.

Noauto / Auto / Single

Resume Tpipe Noauto, Auto, and Single command statistics.

Count

The number of commands issued.

NResp

The number of commands that timed out without receiving any response messages.

Fail

The number of commands that failed due to NAK, session errors or other error conditions.

Msg Avg

The average number of messages received per command (not applicable to Single).

Msg Max

The highest number of messages received for any command (not applicable to Single).

Avg Timeout

The average timeout for all commands in *mm.ss.th*.

Content: Extended (FORMAT2)

The extended format report supports all of the different resume tpipe types and options, and the IMS parallel resume tpipe option. However, the extended format report does not support reporting by time interval.

The following figure shows an example of the Connect Resume Tpipe: extended format report.

The report was produced by the command:

```
IMSPACEX      TPIPE(
               DDNAME(TPIPE),
               FORMAT2)
IMSPACEX      EXECUTE
```

IMS Performance Analyzer 4.5 IMS Connect Resume Tpipe - HWSVDP4												
From 210ct2023 10.48.22.85 To 210ct2023 10.49.03.08												
											Page	1
Tpipe	Remote Client Session Token	Rtpipe Type	Session Type	Rtpipe Cmds	Msgs Received	Client NACKs	ICON NACKs	Rtpipe CANCELS	Timeout Count	Average TO Value	--- Timeouts --- No Msg Max Msgs	----
IPIBCT01	AB4B62715EAD2A86	TPIPE	TRAN	1	2	0	0	1	0			
IPIBCT02	AB4B62748C62BA84	TPIPE	TRAN	1	4	0	0	1	0			
IPIBCT03	AB4B6276B78E7C84	SINGLE	TRAN	1	1	0	0	1	0			
	AB4B6274BCC25704	SINGLE	TRAN	1	1	0	0	1	0			
	AB4B627327ED5186	SINGLE	TRAN	1	1	0	0	1	0			
IPIBCT04	AB4B624D00DA7384	SGL WAIT	TRAN	1	1	0	0	1	0			
	AB4B625D0653D286	SGL WAIT	TRAN	1	1	0	0	1	0			
	AB4B629D70320284	SGL WAIT	TRAN	1	1	0	0	1	0			
IPIBCT05	AB4B62310C7F5C84	AUTO	TRAN	1	3	0	0	1	0			
IPIBCT06	AB4B62870240FA04	NOAUTO	TRAN	1	3	0	0	1	0			
HWS\$DEF	AB4B628874294C84	TPIPE	TRAN	1	2	0	0	1	0			
REROUTED	AB4B628BD3DF9B04	TPIPE	TRAN	1	2	0	0	1	0			

Tpipe

The name of the OTMA tpipe that the resume tpipe receives messages from. If the tpipe name is the same for the next session, the name is not repeated, so a blank value in this field means the tpipe name is the same as the previous one.

Remote Client Session Token

The session key of the client that issued the resume tpipe request.

Rtpipe Type

The type of resume tpipe issued by the client, and the options for how it is to retrieve messages from the target tpipe.

Table 28. Resume Tpipe Types	
Rtpipe Type	Meaning
SGL WAIT	Retrieve a single asynchronous message. If no message is available, wait for a message to arrive.
SGL WAIT SYNC	Retrieve a single synchronous message. If no message is available, wait for a message to arrive.
SGL WAIT BOTH	Retrieve a single message, regardless of whether it is synchronous or asynchronous. If no message is available, wait for a message to arrive.
SINGLE	Retrieve a single asynchronous message. If no messages are available, do not wait.
SINGLE SYNC	Retrieve a single synchronous message. If no messages are available, do not wait.

<i>Table 28. Resume Tpipe Types (continued)</i>	
Rtpipe Type	Meaning
SGL MSG BOTH	Retrieve a single message, regardless of whether it is asynchronous or synchronous. If no messages are available, do not wait.
AUTO	Retrieve asynchronous messages immediately when they arrive on the tpipe queue. Only asynchronous messages are retrieved.
AUTO SYNC	Retrieve synchronous messages immediately when they arrive on the tpipe queue. Only synchronous messages are retrieved.
AUTO BOTH	Retrieve messages immediately when they arrive on the tpipe queue, regardless of whether the messages are synchronous or asynchronous.
NOAUTO	Retrieve asynchronous messages in the tpipe queue only when the command is issued.
NOAUTO SYNC	Retrieve synchronous messages in the tpipe queue only when the command is issued.
NOAUTO BOTH	Retrieve messages in the tpipe queue only when the command is issued, regardless of whether the messages are synchronous or asynchronous.
TPIPE	This is the basic or default type, which is equivalent to NOAUTO. It retrieves asynchronous messages in the tpipe queue only when the command is issued.
UNKNOWN TYPE	The type of resume tpipe cannot be determined.

Rtpipe Cmds

The number of resume tpipe commands issued by the remote client during the session.

Msgs Received

The total number of messages received during the session.

Client NACKs

For the session, the number of messages received by the resume tpipe to which the remote client responded with a negative acknowledgment (NAK) response.

ICON NACKs

The number of messages received by the resume tpipe where the remote client failed to provide a response so IMS Connect responded for the client with a NAK response. The reason for the client's failure to respond is usually that the client session is no longer available.

Rtpipe CANCELS

The number of times the client sent a cancellation request for a resume tpipe request, that is the number of times a resume tpipe request contained IRM flag IRM_F3_CANCID.

Timeout Count

The number of timeouts received during the life of the session. Rtpipe type and Session Type have a large influence on this value. If a resume tpipe command has a timer value of 'wait forever', this value will always be 0.

Note: A timeout received for an ACK or NAK message is not counted, because a timeout for ACK or NAK is normal.

Average TO Value

If any timeouts occurred, this is the average timeout value for all of those timeouts. Normally, only one timeout value is used for the session. If no timeouts are observed during the session, Average TO Value is blank.

Timeouts No Msg

The number of times that no response was returned before the resume tpipe ended because of a timeout. If no timeouts occurred, Timeouts No Msg is blank.

Timeouts Max Msgs

The maximum number of concurrent messages that were returned by the resume tpipe request before the request ended with a timeout. If no timeouts occurred, Timeouts Max Msgs is blank.

IMS Connect ACK/NAK report

The IMS Connect ACK/NAK report provides a summary of acknowledgment activity for transactions that use Sync Level=CONFIRM. Positive acknowledgment (ACK) and negative acknowledgment (NAK) statistics are reported by IMS Performance Analyzer for each transaction code. NAK is further broken down as negative acknowledgment from either OTMA (NAK sense code) or from the Client.

Log records: The IMS Connect ACK/NAK report is derived from IMS Connect event records 3D, 41, and 42, and requires IMS Connect Extensions to collect event data at collection level 2, 3 or 4. If the IMS Connect Extensions collection level is 0 or 1, the report displays the message:

No observations in report period

Table 29. Connect ACK/NAK report: event records processed

Code (hex)	Event description	Collection level
3D	Message Exit called for READ, XMIT, EXER	2
41	Message sent to OTMA	2
42	Message received from OTMA	2

Options

To specify the report options, select the Resource Usage **ACK/NAK** report in an IMS Connect Report Set.

The command for the Connect ACK/NAK report is:

```
IMSPACEX  ACKN(
           DDNAME(ACKNAK),
           INTERVAL(00:01:00),
           INCL|EXCL(TRANCODE(tran1,tran2,...)),
           INCL|EXCL(USERID(userid1,userid2,...)),
           INCL|EXCL(DATASTORE(imsid1,imsid2,...)),
           INCL|EXCL(CLIENT(clientid1,clientid2,...)),
           INCL|EXCL(PORT(portnum1,portnum2,...)),
           INCL|EXCL(SOCKET(socnum1,socnum2,...))
IMSPACEX  EXECUTE
```

Selection Criteria can be specified to filter the input data on one or more of the following:

- Transaction Code
- User ID
- Target Datastore (IMS ID)
- Connect Client ID
- TCP/IP Port Number
- Socket Number

The report output is written to the data set specified by the Report Output DDname. The default is ACKNAK.

You can also specify the time interval if you want to summarize the details over time. The default interval is 00:01:00 (1 minute).

Content

The Connect ACK/NAK report is shown in the following examples.

This report was produced by the command:

```
IMSPACEX      ACKN
IMSPACEX      EXECUTE
```

IMS Performance Analyzer									
IMS Connect ACK/NAK - DVPCFGDA									
From 15Mar2023 10.48.30.65 To 15Mar2023 12.17.12.19									
Page 1									
Transact	Target	Confirm	ACK		Client NAK		OTMA NAK		
Code	Datstor	Count	Count	Avg Elaps	Count	Avg Elaps	Count	Sense Code	
*CMD_RHQ	IMD3	16	16	1.890	0	0.000	0		
*CMD_RHQ	IMD4	22	22	0.419	0	0.000	0		
*CMD_RTP	IMD3	16	16	0.336	0	0.000	0		
*CMD_RTP	IMD4	18	17	0.367	1	7.388	0		
DSPALLI	IMD3	4	3	270.434	1	275.011	0		
DSPALLI	IMD4	1	0	0.000	1	263.518	0		
DVPTRANS	IMD3	13	12	1.111.570	1	600.739	0		
DVPTRANS	IMD4	2	1	379.666	0	0.000	1	24	Previous conversation still in progress
IVTCV	IMD3	79	74	600.214	1	594.968	4	24	Previous conversation still in progress
IVTCV	IMD4	79	77	2.157.328	0	0.000	2	24	Previous conversation still in progress
IVTNO	IMD3	46	24	322.746	22	234.673	0		
IVTNO	IMD4	46	27	291.475	19	292.862	0		
PART	IMD3	2	2	270.814	0	0.000	0		
PART	IMD4	4	4	253.487	0	0.000	0		

Figure 247. Connect ACK/NAK report

The following figure shows another example of the Connect ACK/NAK report, summarized by time. It was produced by the command:

```
IMSPACEX      ACKN(
IMSPACEX      DDNAME(ACKNAK),
IMSPACEX      INTERVAL(00:30:00))
IMSPACEX      EXECUTE
```

IMS Performance Analyzer									
IMS Connect ACK/NAK - DVPCFGDA									
From 01Apr2023 11.57.06.98 To 01Apr2023 15.17.58.84									
Page 1									
Time	Transact	Target	Confirm	ACK		Client NAK		OTMA NAK	
19Apr	Code	Datstor	Count	Count	Avg Elaps	Count	Avg Elaps	Count	Sense Code
12.00.00	PART	IMD3	1	0	0.000	0	0.000	1	1A Message cancelled due to IMS error
12.30.00	PART	IMD3	3	3	2.641.491	0	0.000	0	
13.00.00	*CMD_RHQ	IMD3	10	10	0.491	0	0.000	0	
	*CMD_RHQ	IMD4	10	10	0.323	0	0.000	0	
	*CMD_RTP	IMD3	8	8	0.293	0	0.000	0	
	*CMD_RTP	IMD4	8	8	0.361	0	0.000	0	
	DSPALLI	IMD3	1	1	271.069	0	0.000	0	
	DSPALLI	IMD4	1	1	217.887	0	0.000	0	
	DVPTRANS	IMD3	2	0	0.000	2	255.411	0	
	IVTCV	IMD3	12	12	539.974	0	0.000	0	
	IVTCV	IMD4	24	24	532.329	0	0.000	0	
	IVTNO	IMD3	39	23	295.765	16	283.045	0	
	IVTNO	IMD4	40	22	289.355	18	275.520	0	
	PART	IMD3	1	1	264.872	0	0.000	0	
	PART	IMD4	3	3	262.159	0	0.000	0	
13.30.00	*CMD_RTP	IMD4	4	4	0.373	0	0.000	0	
14.00.00	*CMD_RHQ	IMD3	10	10	0.395	0	0.000	0	
	*CMD_RHQ	IMD4	7	7	0.386	0	0.000	0	
	*CMD_RTP	IMD3	20	20	0.361	0	0.000	0	
	*CMD_RTP	IMD4	2	2	0.436	0	0.000	0	
	IVTNO	IMD3	17	9	285.427	8	279.122	0	
	IVTNO	IMD4	21	9	290.922	12	220.995	0	
14.30.00	DVPTRANS	IMD3	3	2	417.480	1	596.575	0	
	DVPTRANS	IMD4	3	2	409.241	1	596.693	0	
15.00.00	*CMD_RHQ	IMD3	4	4	0.395	0	0.000	0	
	*CMD_RHQ	IMD4	4	4	45.767	0	0.000	0	
	*CMD_RTP	IMD3	6	6	0.358	0	0.000	0	
	*CMD_RTP	IMD4	6	6	0.337	0	0.000	0	
	DVPTRANS	IMD3	8	6	2.568.341	2	1.631.982	0	
	DVPTRANS	IMD4	9	7	895.849	2	1.152.072	0	
	ID=EXAMP	IMD3	3	0	0.000	0	0.000	3	1A Message cancelled due to IMS error
	ID=EXAMP	IMD4	3	0	0.000	0	0.000	3	1A Message cancelled due to IMS error

Figure 248. Connect ACK/NAK report, summarized by time

Time

Report interval time. Optional, and will not be displayed if INTERVAL is not specified, in which case the data is summarized for the whole of the report period.

Transact Code

Transaction Code.

Target Datastor

The target datastore.

Confirm Count

The total number of Sync Level=CONFIRM transactions.

ACK Count

The total number of transactions that completed with a positive acknowledgment (ACK).

ACK Avg Elaps

The average time for ACK to be received from the Client.

Client NAK Count

The total number of transactions where the client returned a NAK response.

Client NAK Avg Elaps

The average time for NAK to be received from the client.

OTMA NAK Count

The total number of transactions that completed with a negative acknowledgment (NAK) due to a problem in OTMA.

OTMA NAK Sense Code

The sense code returned in the NAK from OTMA. The OTMA sense codes for NAK messages are listed in "OTMA NAK sense codes" on [page 510](#). For more information, refer to the section "OTMA Sense Codes for NAK Messages" in the *IMS Open Transaction Manager Access Guide and Reference*.

IMS Connect Exception Events report

The IMS Connect Exception Events report provides details about events that cause transactions to fail or that signal critical resources are no longer available. This IMS Performance Analyzer report comes in two formats: List and Summary. The List report provides a list of all exception events in chronological order. The Summary report provides a recap of each exception event encountered and a count of the number of times it occurred.

The following exception events are reported:

```

10 Datastore Available failed
11 Datastore Un-Available
12 TMember joins XCF group failed
13 TMember leaves XCF group
2D Datastore status (Severe, Warning, Normal)
3E Exit failed (return code ≥ 4)
  - READ, XMIT or EXER
41 Client sent NAK to OTMA (Client)
42 Msg from OTMA response is NAK (OTMA)
  OTMA NAK Sense Codes:
    01 OTMA sign-on not established
    02 Client cannot send/receive messages
    03 State-data or XCF length error
    04 Bad correlator
    05 Multi-segment message duplicated
    06 Bad XCF return code
    07 Maximum (255) clients reached
    08 Client-bid security request failed
    09 Invalid OTMA command
    0A OTMA data message not allowed
    0B Invalid message type
    0C Unknown response type
    0D Nonexistent Tpipe for continuation
    0E Unable to create Tpipe
    0F Tpipe is stopped
    10 No State data
    11 Commit message was not to terminate
    12 Prefix (4KB) too large
    13 Hash table size not set
    14 Second client-bid sent, first still active
    15 Hash table storage allocation failed
    16 Client not active
    17 Invalid SYNC level
    18 Invalid Tpipe name
    19 Invalid Client name
    1A Message cancelled due to IMS error
    1B IMS is shut down
    1C Invalid Commit Mode
    1D User data too long (1K)
    1E Server user data too long (256)
    1F Sequence number mis-match
    20 No Application data
    21 No Chain flag
    22 Tpipe not found
    23 Sequence number invalid
    24 Previous conversation still in progress
    25 RESYNC Protocol violation
    26 RESYNC Dequeue failed
    27 RESYNC RSN reset failed
    2C Invalid Commit Mode
    2D SYNC/Commit levels incompatible
    2E SYNC level/Context ID incompatible
    2F Unable to express context interest
45 OTMA time-out
47 Session error
55 RRS Abort

```

Figure 249. IMS Connect exception events

Log records: The Connect Exception Events report is derived from IMS Connect event records 10, 11, 12, 13, 2D, 3E, 41, 42, 45, 47, 55. The report requires IMS Connect Extensions to collect event data at collection level 3 or 4. Otherwise, if collection level 0, 1 or 2, the report is produced with just the record types that are available.

Table 30. Connect Exception report: event records processed

Code (hex)	Event description	Collection level
10	Datastore available	0
11	Datastore unavailable	0
12	TMEMBER joins XCF Group	0
13	TMEMBER leaves XCF Group	0

Table 30. Connect Exception report: event records processed (continued)

Code (hex)	Event description	Collection level
2D	Datastore status	1
3E	Message Exit returned from READ, XMIT, EXER	1
41	Message sent to OTMA	2
42	Message received from OTMA	2
45	OTMA Timeout	1
47	Session Error	1
55	End RRS COMMIT/ABORT	3

Options

To specify the report options, select the Resource Usage **Exception Events** report in an IMS Connect Report Set.

The command for the Connect Exception Events report is:

```
IMSPACEX    EXCEPT(
              [DDNAME(ddname),]          default EXCEPT
              [LIST,]
              [SUMMARY]
IMSPACEX    EXECUTE
```

The report output is written to the data set specified by the Report Output DDname. The default is EXCEPT.

Request the List report, Summary report, or both. The Summary report is the default.

Content: List

The following figure shows an example of the IMS Connect Exception Events List report produced by IMS Performance Analyzer.

The report was produced by the command:

```
IMSPACEX    EXCEPT(
              LIST,
              DDNAME(EXCEPT))
IMSPACEX    EXECUTE
```

IMS Performance Analyzer IMS Connect Exception List						
Report from 01Feb2019 01.44.48.28				Page 1		
Event Time	System	ID	Description	Information		
01.44.48.284146	HWS07B	2D	Datastore status - Normal	Tmember=IMSCI07B	DS=DS01I07B	Status=0003
01.44.48.294179	HWS07B	2D	Datastore status - Normal	Tmember=IMSCI07A	DS=DS01I07A	Status=0003
01.44.48.303758	HWS07B	2D	Datastore status - Normal	Tmember=IMSCI07A	DS=CBFEI07A	Status=0003
01.44.48.311959	HWS07B	2D	Datastore status - Normal	Tmember=IMSCI07B	DS=CBFEI07B	Status=0003
01.48.46.144179	HWS07B	10	Datastore Available failed	RC=0008	RSN=E3E5	DS=IMSCI07C
01.48.46.145001	HWS07B	2D	Datastore status - Normal	Tmember=IMSCI07C	DS=DS01I07C	Status=0003
01.48.46.146219	HWS07B	10	Datastore Available failed	RC=0008	RSN=E3E5	DS=IMSCI07C
01.48.46.146877	HWS07B	2D	Datastore status - Normal	Tmember=IMSCI07C	DS=CBFEI07C	Status=0003
02.04.57.923259	HWS07B	47	Session error	Key=D59E00ADB41E04C2	Type=READ	02.04.57.923242
02.27.32.679366	HWS07B	47	Session error	Key=D59E05B9B8392C1	Type=READ	02.27.32.679348
02.50.39.941422	HWS07B	47	Session error	Key=D59E0AE358BB0AC4	Type=READ	02.50.39.941405
02.52.19.795155	HWS07B	47	Session error	Key=D59E0B42CC24EFC3	Type=READ	02.52.19.795138
02.52.39.806713	HWS07B	47	Session error	Key=D59E0B573BAABEC3	Type=READ	02.52.39.806697
02.53.58.348115	HWS07B	47	Session error	Key=D59E0BA18B1D16C1	Type=READ	02.53.58.348086
:						

Figure 250. IMS Performance Analyzer: IMS Connect Exception Events List report

In the report heading, **From** is the time stamp of the first record reported on that page.

The report contains the following information:

Event Time

Time that the exception event occurred.

ID, Description

Record ID and description of the exception event.

Information

Information from the exception record identifying the reason for the exception.

Start Time

Time that the transaction started, usually the 3C event, to allow correlation with the Transit Log report.

Content: Summary

The following figure shows an example of the IMS Connect Exception Events Summary report produced by IMS Performance Analyzer.

The report was produced by the command:

```
IMSPACEX      EXCEPT(
IMSPACEX      SUMMARY,
IMSPACEX      DDNAME(EXCEPT))
IMSPACEX      EXECUTE
```

IMS Performance Analyzer IMS Connect Exception Summary - HWS07B			
From 01Feb2019 01.44.48.28 To 01Feb2019 14.30.24.30			Page 3
ID	Description	Total	
10	Datastore Available failed	2	
2D	Datastore status - Normal	6	
3E	Exit failed - EXER	3	
41	Client send NAK to OTMA	1	
45	OTMA time-out	73	
47	Session error	293	
:			

Figure 251. IMS Performance Analyzer: IMS Connect Exception Events Summary report

Example: OTMA flood control notification

The IMS Connect Exception Events List and Summary reports can be used to reveal OTMA flood control notifications.

IMS Performance Analyzer IMS Connect Exception List Report from 31Oct2021 10.58.44.49 Information						Page 1	Start Time
Event Time	System	ID	Description				
10.58.44.491376	RXRS01	2D	Datastore status - Normal	Tmember=XCFMIADH	DS=IMSA	Status=0003	
10.58.44.491414	RXRS01	2D	Datastore status - Normal	Tmember=XCFMIADH	DS=IMSC	Status=0003	
10.58.44.491461	RXRS01	2D	Datastore status - Normal	Tmember=XCFMIADH	DS=IMS1	Status=0003	
10.58.44.491494	RXRS01	2D	Datastore status - Normal	Tmember=XCFMIADH	DS=IMSD	Status=0003	
10.58.46.393755	RXRS01	47	Session error	Key=C33932C0B0AABF40	Type=READ		10.58.46.393708
10.59.06.258067	RXRS01	47	Session error	Key=C33932D30B06C442	Type=READ		10.59.06.258052
11.08.58.546326	RXRS01	45	OTMA time-out	Key=C3393505A1FE3123	T0V=29		11.08.56.545431
11.09.01.554064	RXRS01	45	OTMA time-out	Key=C33935087FEF3563	T0V=29		11.08.59.551498
11.10.10.706948	RXRS01	45	OTMA time-out	Key=C339354A72EB4D42	T0V=29		11.10.08.706422
11.10.13.712224	RXRS01	45	OTMA time-out	Key=C339354D51301702	T0V=29		11.10.11.711103
11.10.14.717599	RXRS01	2D	Datastore status - Warning	Tmember=XCFMIADH	DS=IMSC	Status=0002	
11.10.16.717683	RXRS01	45	OTMA time-out	Key=C33935502F10CA83	T0V=29		11.10.14.716413
11.10.19.761752	RXRS01	47	Session error	Key=C3393555F3679B20	Type=READ		11.10.19.761740
11.10.19.765351	RXRS01	47	Session error	Key=C3393505A1FE3123	Type=READFAIL		11.10.19.763609
11.17.55.146245	RXRS01	45	OTMA time-out	Key=C33937055FC7C220	T0V=29		11.17.53.144694
11.17.56.152306	RXRS01	2D	Datastore status - Severe	Tmember=XCFMIADH	DS=IMSC	Status=0001	
11.17.58.151722	RXRS01	45	OTMA time-out	Key=C33937083DEB0943	T0V=29		11.17.56.149327
11.17.59.156126	RXRS01	42	Msg from OTMA response is NAK	Key=C339370B1B7D7401	DS=XCFMIADH	Tpipe=7901	11.17.59.155186
11.18.00.161388	RXRS01	42	Msg from OTMA response is NAK	Key=C339370C108CE320	DS=XCFMIADH	Tpipe=7901	11.18.00.159982
11.18.01.167143	RXRS01	42	Msg from OTMA response is NAK	Key=C339370D061D4862	DS=XCFMIADH	Tpipe=7901	11.18.01.166216
11.18.02.171974	RXRS01	42	Msg from OTMA response is NAK	Key=C339370DFBEEFB62	DS=XCFMIADH	Tpipe=7901	11.18.02.171351
11.18.02.173659	RXRS01	47	Session error	Key=C339370EF0DF1941	Type=READ		11.18.02.173646
11.18.02.179455	RXRS01	47	Session error	Key=C339369868312A63	Type=READFAIL		11.18.02.178011

Figure 252. IMS Performance Analyzer: An IMS Connect Exception Events List report that reveals OTMA flood control notifications

Log record 2D Datastore Status can report one of the following values:

Normal (Status=0003)

The status of the datastore is normal and it is available for work

Warning (Status=0002)

The datastore is partly degraded.

Severe (Status=0001)

No work is possible.

N/A (Status=0000)

The status is unknown or unavailable.

The following Summary report provides a tally of events in the List report.

IMS Performance Analyzer IMS Connect Exception Summary - RXRS01 From 31Oct2021 10.58.44.49 To 31Oct2021 11.25.48.75				Page 3
ID	Description	Total		
2D	Datastore status - Severe	1		
2D	Datastore status - Warning	1		
2D	Datastore status - Normal	5		
42	Msg from OTMA response is NAK	4		
45	OTMA time-out	67		
47	Session error	479		

Figure 253. IMS Performance Analyzer: An IMS Connect Exception Events Summary report that reveals OTMA flood control notifications

IMS Connect Gap Analysis report

The IMS Connect Gap Analysis report searches for time periods where IMS Connect Extensions journal records are not being cut, potentially highlighting an external system event that may have caused IMS

Connect to slow down. You can adjust this IMS Performance Analyzer report by specifying your desired gap threshold.

Log records: The IMS Connect Gap Analysis report is derived from all IMS Connect records.

Options

To specify the report options, select **Gap Analysis** in the **Resource Usage Reports** category in an IMS Connect Report Set.

The command for the Connect Gap Analysis report is:

```
IMSPACEX      GAP (
               [THRESHOLD(s.thmiju),]          default 5 seconds
               [DDNAME(ddname),]                default GAPS
               [FROM(date,time),]
               [TO(date,time)])
```

The THRESHOLD defines the maximum elapsed time tolerated between records.

The report output is written to the data set specified by the Report Output DDname.

Content

The IMS Connect Gap Analysis report is shown in the following examples.

This report was produced by the command:

```
IMSPACEX      GAP
IMSPACEX      EXECUTE
```

IMS Performance Analyzer Connect Gap Analysis							Page	1
Data from:	11.27.44.75	05Jan2021						
ID	Time	System	Elapsed	File	LSN	Code		
01	11.27.44.754378	HWSDVP4		CEX01001	0000000000000357	A042		
	11.31.03.317055	HWSDVP4	198.562677	CEX01001	0000000000000358	A00B		
02	11.31.04.452604	HWSDVP4		CEX01001	0000000000000393	A048		
	11.32.22.513427	HWSDVP4	78.060823	CEX01001	0000000000000394	A00B		
03	11.32.22.558075	HWSDVP4		CEX01001	00000000000003B7	A048		
	11.32.29.498754	HWSDVP4	6.940679	CEX01001	00000000000003B8	A00B		
04	11.32.29.552002	HWSDVP4		CEX01001	00000000000003DB	A048		
	11.32.35.353008	HWSDVP4	5.801006	CEX01001	00000000000003DC	A00B		
05	11.32.35.940236	HWSDVP4		CEX01001	0000000000000417	A048		
	11.32.41.496950	HWSDVP4	5.556714	CEX01001	0000000000000418	A00B		
06	11.32.41.810143	HWSDVP4		CEX01001	000000000000043B	A048		
	11.32.48.408659	HWSDVP4	6.598516	CEX01001	000000000000043C	A00B		
07	11.32.48.452941	HWSDVP4		CEX01001	000000000000045F	A041		
	11.32.56.336764	HWSDVP4	7.883823	CEX01001	0000000000000460	A00B		
08	11.32.56.923920	HWSDVP4		CEX01001	000000000000049B	A048		
	11.33.02.249826	HWSDVP4	5.325906	CEX01001	000000000000049C	A00B		
09	11.33.02.542073	HWSDVP4		CEX01001	00000000000004BF	A048		
	11.33.08.381770	HWSDVP4	5.839697	CEX01001	00000000000004C0	A00B		
10	11.33.08.430478	HWSDVP4		CEX01001	00000000000004E3	A048		
	11.33.14.390950	HWSDVP4	5.960472	CEX01001	00000000000004E4	A00B		
11	11.33.20.740175	HWSDVP4		CEX01001	0000000000000573	A048		
	11.33.25.754299	HWSDVP4	5.014124	CEX01001	0000000000000574	A00B		
12	11.33.26.634734	HWSDVP4		CEX01001	00000000000005C7	A048		
	11.34.04.696980	HWSDVP4	38.062246	CEX01001	00000000000005C8	A00B		
13	11.34.05.319027	HWSDVP4		CEX01001	00000000000005DE	A048		
	11.34.11.104625	HWSDVP4	5.785598	CEX01001	00000000000005DF	A00B		
14	11.34.11.363457	HWSDVP4		CEX01001	00000000000005F5	A048		
	11.34.46.938543	HWSDVP4	35.575086	CEX01001	00000000000005F6	A00B		
15	11.34.55.623323	HWSDVP4		CEX01001	0000000000000633	A048		
	11.38.51.335787	HWSDVP4	235.712464	CEX01001	0000000000000634	A00B		
16	11.38.52.240990	HWSDVP4		CEX01001	0000000000000660	A048		
	11.39.12.909529	HWSDVP4	20.668539	CEX01001	0000000000000661	A00B		
17	11.39.13.058722	HWSDVP4		CEX01001	000000000000068D	A048		
	11.40.57.181321	HWSDVP4	104.122599	CEX01001	000000000000068E	A00B		
18	11.40.57.319216	HWSDVP4		CEX01001	00000000000006BA	A048		
	11.41.18.684265	HWSDVP4	21.365049	CEX01001	00000000000006BB	A00B		
19	11.41.18.821691	HWSDVP4		CEX01001	00000000000006E7	A048		
	11.41.58.776159	HWSDVP4	39.954468	CEX01001	00000000000006E8	A00B		
20	11.41.58.895777	HWSDVP4		CEX01001	0000000000000714	A048		
	11.44.54.009340	HWSDVP4	175.113563	CEX01001	0000000000000715	A00B		
21	11.44.54.010422	HWSDVP4		CEX01001	000000000000071B	A041		
	11.46.22.891509	HWSDVP4	88.881087	CEX01001	000000000000071C	A045		
22	11.46.22.892020	HWSDVP4		CEX01001	0000000000000722	A048		
	11.49.15.112911	HWSDVP4	172.220891	CEX01001	0000000000000723	A00B		
23	11.49.15.113532	HWSDVP4		CEX01001	0000000000000729	A041		
	11.50.43.993680	HWSDVP4	88.880148	CEX01001	000000000000072A	A045		
24	11.50.43.994182	HWSDVP4		CEX01001	0000000000000730	A048		
	11.52.13.451767	HWSDVP4	89.457585	CEX01001	0000000000000731	A011		
25	11.52.13.451808	HWSDVP4		CEX01001	0000000000000732	A042		
	11.52.47.517609	HWSDVP4	34.065801	CEX01001	0000000000000733	A042		
26	11.52.47.517609	HWSDVP4		CEX01001	0000000000000733	A042		
	12.00.32.648129	HWSDVP4	465.130520	CEX01001	0000000000000734	A011		

Figure 254. IMS Connect Gap Analysis report

Chapter 33. IMS Connect Trace reports

The IMS Connect Trace reports in IMS Performance Analyzer provide detailed analyses of individual IMS Connect event records. Trace reports are typically used to investigate point in time performance problems because they provide all available information. To focus on the desired problem area or to minimize the size of the report, specify date/time range and/or Selection Criteria.

IMS Connect Transit Event Trace report

The IMS Connect Transit Event Trace report provides a list of transactions, each with detailed information about every event in the life of that transaction. At a glance, this IMS Performance Analyzer report allows you to see when a transaction starts, followed by all the events associated with the transaction in the order they occurred.

Log records: The IMS Connect Transit Event Trace report is derived from all the message related event records. The report requires IMS Connect Extensions to collect event data at collection level 4. Otherwise:

- If collection level 3, the report is produced without level 4 fields.
- If collection level 2, the report is produced without level 3 and 4 fields.
- If collection level 0 or 1, the report displays the message:

No observations in report period

For a list of the message related event records, see [Chapter 40, “IMS Connect records,” on page 501](#).

Options

To specify the report options, select the **Transit Event Trace** report in an IMS Connect Report Set.

The command for the Connect Transit Event Trace report is:

```
IMSPACEX      TRACE(
                [DDNAME(ddname),]          default TRACE
                [INCL(TRANCODE(list))|EXCL(TRANCODE(list)),]
                [INCL(USERID(list))|EXCL(USERID(list)),]
                [INCL(DATASTORE(list))|EXCL(DATASTORE(list)),]
                [INCL(CLIENT(list))|EXCL(CLIENT(list)),]
                [INCL(PORT(list))|EXCL(PORT(list)),]
                [INCL(SOCKET(list))|EXCL(SOCKET(list))])
IMSPACEX      EXECUTE
```

Selection Criteria can be specified to filter the input data on one or more of the following:

- Transaction Code
- User ID
- Target Datastore (IMS ID)
- Connect Client ID
- TCP/IP Port Number
- Socket Number

The report output is written to the data set specified by the Report Output DDname. The default is TRACE.

Content

The following fields appear in the report.

Start/+Relative

For the start or resumption of a transaction/command, the starting time of day is reported, in hh.mm.ss.thmiju format. For other transaction events, the elapsed time relative to the start of the transaction is reported, in +h.mm.ss.thmiju format.

Elapsed

The starting event of the transaction/command is identified with *Start*. The elapsed time (in microseconds) since the previous event, in s.thm.iju format. When too much trace data has been collected, IMS Performance Analyzer flushes (prints) the trace data for the incomplete transaction. The resumption of the transaction is identified with *Resume*.

ID and Description

The record ID and associated description of the event. Refer to the *IMS Connect Extensions for z/OS: User's Guide* for an explanation of IMS Connect events.

Information

Information about the event. This information is recorded in the event record for that event type. Note that identification information about the transaction is not reported until the "3E Message Exit return for READ" event. This is because the Read Message Exit can alter most of the identifying characteristics of the transaction.

For ***Start*** (the Starting event), additional information is reported:

Key=

The Event Key (STCK Token) for the transaction.

Depth=

Port depth. The number of active sockets open on this Port when the transaction started.

Error=

This is reported if an error occurred processing the transaction, for example a NAK, bad return code or timeout.

Trace output varies depending on the type of transaction.

Remember: Input logs provided to IMS Performance Analyzer may contain sensitive information. Be sure to secure any reports that you generate as you would the input log data itself.

IMS Connect Transit Trace report: Non-conversational transaction with Sync Level=NONE

The following IMS Performance Analyzer example report shows an IMS Connect Transit Trace for non-conversational transaction with Sync Level=NONE.

Start/+Relative	Elapsed	ID Description	Information
11.05.05.216870	*Start*	3C Prepare Read Socket	Key=BAEB9BCE665D5380 Depth=1 Port=8801 Sock=1
+0.232473	232.473	49 Read Socket	Port=8801 Sock=1
(2) +0.232862	0.388	49 Read Socket	Port=8801 Sock=1
+0.232951	0.089	3D Message Exit called for READ	Exit=HWSSMPL0
+0.233083	0.131	3E Message Exit return for READ	RC=00 RSN=00 IP=172.17.69.58 DSOrg=IMD4 DSTarg=IMD3 TC=PART Commit Mode=0 Synch Level=NONE Socket Type=Transaction
(3) +0.233324	0.241	41 Message sent to OTMA	TPipe=8801 MSG=Transaction
+0.268991	35.666	42 Message received from OTMA	TPipe=8801 MSG=Data Sense=0000
(4) +0.269048	0.057	42 Message received from OTMA	TPipe=8801 MSG=Commit Conf CONFIRM=Committed Sense=0000
+0.269294	0.246	46 De-allocate Session	RSN=COMT
+0.269388	0.094	3D Message Exit called for XMIT	Exit=HWSSMPL0
+0.269504	0.115	3E Message Exit return for XMIT	RC=00 RSN=00
+0.270171	0.666	4A Write Socket	Port=8801 Sock=1
+0.270382	0.211	0C Begin Close Socket	Port=8801 Sock=1
+0.270889	0.506	0D End Close Socket	Port=8801 Sock=1
(5) +0.271035	0.145	48 Trigger event	Trigger=CLOSE

Figure 255. IMS Connect Transit Trace report for non-conversational transaction with Sync Level=NONE

The **Transit times for SyncLevel=NONE** are:

Read Socket

The elapsed time spent processing Read Socket requests. In this example, Read Socket elapsed time is calculated as:

```
(2) - *Start* = 0.232862 seconds
```

Input

The elapsed time prior to the transaction message being sent to OTMA for processing. In the example, Input time is calculated as:

```
(3) - *Start* = 0.233324 seconds
```

OTMA

The elapsed time OTMA spent processing the transaction message. In the example, OTMA time is calculated as:

```
(4) - (3) = 0.035724 seconds
```

Output

The elapsed time after the transaction message has been processed by OTMA to the end Trigger event. In the example, Output time is calculated as:

```
(5) - (4) = 0.001987 seconds
```

Response

The total elapsed time spent processing the transaction message, from the starting Read Prepare to the end Trigger event. In the example, Response time is calculated as:

```
(5) - *Start* = 0.271035 seconds
```

IMS Connect Transit Trace report: Non-conversational transaction with Sync Level=CONFIRM

The following IMS Performance Analyzer example report shows an IMS Connect Transit Trace for non-conversational transaction with Sync Level=CONFIRM.

Start/+Relative	Elapsed	ID Description	Information
11.08.21.065957	*Start*	3C Prepare Read Socket	Key=BAEB9C892D12FF80 Depth=1 Port=8801 Sock=1
(2) +0.000264	0.264	49 Read Socket	Port=8801 Sock=1
+0.000289	0.024	3D Message Exit called for READ	Exit=HWSSMPL0
+0.000507	0.218	3E Message Exit return for READ	RC=00 RSN=00 IP=172.17.69.58 DSOrig=IMD3 DSTarg=IMD4 TC=PART
(3) +0.000684	0.176	41 Message sent to OTMA	Commit Mode=0 Synch Level=CONFIRM Socket Type=Transaction
(4) +0.021744	21.060	42 Message received from OTMA	TPipe=8801 MSG=Transaction
+0.022091	0.347	3D Message Exit called for XMIT	TPipe=8801 MSG=Data Sense=0000
+0.022210	0.118	3E Message Exit return for XMIT	Exit=HWSSMPL0
(5) +0.023116	0.906	4A Write Socket	RC=00 RSN=00
+0.026614	3.497	49 Read Socket	Port=8801 Sock=1
+0.283315	256.701	49 Read Socket	Port=8801 Sock=1
(6) +0.284262	0.946	49 Read Socket	Port=8801 Sock=1
+0.284291	0.029	3D Message Exit called for READ	Port=8801 Sock=1
+0.284408	0.117	3E Message Exit return for READ	Exit=HWSSMPL0
(7) +0.284674	0.265	41 Message sent to OTMA	RC=00 RSN=00 IP=172.17.69.58 DSOrig=IMD3 DSTarg=IMD4 TC=PART
(8) +0.287880	3.206	42 Message received from OTMA	Commit Mode=0 Synch Level=CONFIRM Socket Type=Transaction
+0.288124	0.243	46 De-allocate Session	TPipe=8801 MSG=Response RESP=ACK
+0.288158	0.034	3D Message Exit called for XMIT	TPipe=8801 MSG=Commit Conf CONFIRM=Committed Sense=0000
+0.288263	0.104	3E Message Exit return for XMIT	RSN=COMT
+0.288792	0.529	4A Write Socket	Exit=HWSSMPL0
+0.288902	0.110	0C Begin Close Socket	RC=00 RSN=00
+0.289378	0.475	0D End Close Socket	Port=8801 Sock=1
(9) +0.289409	0.030	48 Trigger event	Port=8801 Sock=1
			Trigger=CLOSE

Figure 256. IMS Connect Transit Trace report for non-conversational transaction with Sync Level=CONFIRM

The Transit times for SyncLevel=CONFIRM are:

Read Socket

The elapsed time spent processing Read Socket requests. In this example, Read Socket elapsed time is calculated as:

$$(2) - *Start* + (6) - (5) = 0.261410 \text{ seconds}$$

Input

The elapsed time prior to the transaction message being sent to OTMA for processing. In the example, Input time is calculated as:

$$(3) - *Start* = 0.000684 \text{ seconds}$$

OTMA

The elapsed time OTMA spent processing the transaction message, In the example, OTMA time is calculated as:

$$[(4) - (3)] + [(8) - (7)] = 0.024266 \text{ seconds}$$

Confirm

The elapsed time after the transaction message has been processed by OTMA to the time when OTMA is sent the acknowledgment from the Client. In the example, Confirm time is calculated as:

$$(7) - (4) = 0.262930 \text{ seconds}$$

Output

The elapsed time after the response has been acknowledged by OTMA to the end Trigger event. In the example, Output time is calculated as:

$$(9) - (8) = 0.001529 \text{ seconds}$$

Response

The total elapsed time spent processing the transaction message, from the starting Read Prepare to the end Trigger event. In the example, Response time is calculated as:

$$(9) - *Start* = 0.289409 \text{ seconds}$$

IMS Connect Transit Trace report: Conversational transaction with Sync Level=CONFIRM

The following IMS Performance Analyzer example report shows an IMS Connect Transit Trace for a conversational transaction with Sync Level=CONFIRM. Each conversation is terminated with a CONV

Trigger event. Subsequent transactions within the conversation re-use the same Event Key (STCK Token) until the conversation ends with a CLOSE Trigger event.

Start/+Relative	Elapsed	ID Description	Information
10.48.44.439308	*Start*	3C Prepare Read Socket	Key=BAEB98270EBC5C00 Depth=1 Port=8801 Sock=2
+0.231140	231.140	49 Read Socket	Port=8801 Sock=2
(2) +0.232164	1.023	49 Read Socket	Port=8801 Sock=2
+0.232247	0.082	3D Message Exit called for READ	Exit=HWSSMPL0
+0.232382	0.134	3E Message Exit return for READ	RC=00 RSN=00 IP=172.17.69.58 DSOrig=IMD3 DSTarg=IMD3 TC=DVPTRAN5 Commit Mode=0 Synch Level=CONFIRM Socket Type=Transaction TPipe=8801 MSG=Transaction Exit=HWSSMPL0
(3) +0.233365	0.983	41 Message sent to OTMA	RC=00 RSN=00
(4) +0.378869	145.504	42 Message received from OTMA	Port=8801 Sock=2
+0.379405	0.535	3D Message Exit called for XMIT	Port=8801 Sock=2
+0.392986	13.581	3E Message Exit return for XMIT	Port=8801 Sock=2
+0.393705	0.719	4A Write Socket	Port=8801 Sock=2
+0.398958	5.252	49 Read Socket	Port=8801 Sock=2
+0.636919	237.961	49 Read Socket	Port=8801 Sock=2
+0.637439	0.519	49 Read Socket	Port=8801 Sock=2
+0.637520	0.081	3D Message Exit called for READ	Exit=HWSSMPL0
+0.637636	0.115	3E Message Exit return for READ	RC=00 RSN=00 IP=172.17.69.58 DSOrig=IMD3 DSTarg=IMD3 TC=DVPTRAN5 Commit Mode=0 Synch Level=CONFIRM Socket Type=Transaction TPipe=8801 MSG=Response RESP=ACK
+0.638673	1.036	41 Message sent to OTMA	Trigger=CONV
+0.638705	0.032	48 Trigger event	Key=BAEB98270EBC5C00 Depth=1 Port=8801 Sock=2
10.48.48.403977	*Start*	3C Prepare Read Socket	Port=8801 Sock=2
+0.000357	0.357	49 Read Socket	Exit=HWSSMPL0
+0.000385	0.028	3D Message Exit called for READ	RC=00 RSN=00 IP=172.17.69.58 DSOrig=IMD3 DSTarg=IMD3 TC=DVPTRAN5 Commit Mode=0 Synch Level=CONFIRM Socket Type=Transaction TPipe=8801 MSG=Data Sense=0000
+0.000499	0.114	3E Message Exit return for READ	Exit=HWSSMPL0
+0.000725	0.225	41 Message sent to OTMA	RC=00 RSN=00
+0.014572	13.847	42 Message received from OTMA	Port=8801 Sock=2
+0.028225	13.652	3D Message Exit called for XMIT	Port=8801 Sock=2
+0.028351	0.126	3E Message Exit return for XMIT	Port=8801 Sock=2
+0.029211	0.859	4A Write Socket	Port=8801 Sock=2
+0.334659	305.448	49 Read Socket	Port=8801 Sock=2
+0.634250	299.591	49 Read Socket	Port=8801 Sock=2
+0.634544	0.293	49 Read Socket	Port=8801 Sock=2
+0.634632	0.088	3D Message Exit called for READ	Exit=HWSSMPL0
+0.634750	0.118	3E Message Exit return for READ	RC=00 RSN=00 IP=172.17.69.58 DSOrig=IMD3 DSTarg=IMD3 TC=DVPTRAN5 Commit Mode=0 Synch Level=CONFIRM Socket Type=Transaction TPipe=8801 MSG=Response RESP=ACK
+0.634991	0.240	41 Message sent to OTMA	TPipe=8801 MSG=Commit Conf CONFIRM=Committed Sense=0000
+0.636500	1.509	42 Message received from OTMA	RSN=COMT
+0.636664	0.163	46 De-allocate Session	Exit=HWSSMPL0
+0.636757	0.093	3D Message Exit called for XMIT	RC=00
+0.636860	0.102	3E Message Exit return for XMIT	
RSN=00			
+0.637404	0.543	4A Write Socket	Port=8801 Sock=2
+0.637513	0.109	0C Begin Close Socket	Port=8801 Sock=2
+0.637986	0.472	0D End Close Socket	Port=8801 Sock=2
+0.638017	0.030	48 Trigger event	Trigger=CLOSE

Figure 257. IMS Connect Transit Trace report for conversational transaction with Sync Level=CONFIRM

IMS Connect Transit Trace report: Transaction where Client returned NAK

The following IMS Performance Analyzer example report shows an IMS Connect Transit Trace for a negative acknowledgment from the OTMA client to IMS Connect and back.

Start/+Relative	Elapsed	ID Description	Information
10.55.00.374669	*Start*	3C Prepare Read Socket	Key=BAEB998A344C1B80 Error=Client NAK Depth=1 Port=8801 Sock=1
+0.000295	0.295	49 Read Socket	Port=8801 Sock=1
+0.000368	0.072	3D Message Exit called for READ	Exit=HWSSMPL0
+0.000420	0.052	3E Message Exit return for READ	RC=00 RSN=00 IP=172.17.69.58 DSOrig=IMD3 DSTarg=IMD3 TC=IVTCV Commit Mode=0 Synch Level=CONFIRM Socket Type=Transaction TPipe=8801 MSG=Data Sense=0000
+0.000636	0.215	41 Message sent to OTMA	Exit=HWSSMPL0
+0.025960	25.324	42 Message received from OTMA	RC=00 RSN=00
+0.026227	0.267	3D Message Exit called for XMIT	Port=8801 Sock=1
+0.026343	0.115	3E Message Exit return for XMIT	Port=8801 Sock=1
+0.026971	0.627	4A Write Socket	Port=8801 Sock=1
+0.333724	306.753	49 Read Socket	Port=8801 Sock=1
+0.620193	286.468	49 Read Socket	Port=8801 Sock=1
+0.620559	0.366	49 Read Socket	Port=8801 Sock=1
+0.620587	0.027	3D Message Exit called for READ	Exit=HWSSMPL0
+0.620706	0.118	3E Message Exit return for READ	RC=00 RSN=00 IP=172.17.69.58 DSOrig=IMD3 DSTarg=IMD3 TC=IVTCV Commit Mode=0 Synch Level=CONFIRM Socket Type=Transaction TPipe=8801 MSG=Response RESP=NAK
+0.620929	0.223	41 Message sent to OTMA	Trigger=CONV
+0.620979	0.049	48 Trigger event	

Figure 258. IMS Connect Transit Trace report for transaction where Client returned NAK back to Connect then OTMA

IMS Connect Transit Trace report: Transaction where OTMA returned NAK

The following IMS Performance Analyzer example report shows an IMS Connect Transit Trace for a negative acknowledgment from OTMA due to sense code 0024 (previous conversation still in progress).

Start/+Relative	Elapsed	ID Description	Information
10.48.31.165843	*Start*	3C Prepare Read Socket	Key=BAEB9819E8B6BB80 Error=OTMA NAK Depth=1 Port=8801 Sock=1
+0.000275	0.275	49 Read Socket	Port=8801 Sock=1
+0.000366	0.091	3D Message Exit called for READ	Exit=HWSSMPL0
+0.000414	0.047	3E Message Exit return for READ	RC=00 RSN=00 IP=172.17.69.58 DSOrig=IMD3 DSTarg=IMD4 TC=DVPTRANS
			Commit Mode=0 Synch Level=CONFIRM Socket Type=Transaction
+0.000719	0.305	41 Message sent to OTMA	TPipe=8801 MSG=Data
+0.001408	0.689	42 Message received from OTMA	TPipe=8801 RESP=NAK Sense=0024
+0.001635	0.227	3D Message Exit called for XMIT	Exit=HWSSMPL0
+0.001741	0.105	3E Message Exit return for XMIT	RC=00 RSN=00
+0.002251	0.510	4A Write Socket	Port=8801 Sock=1
+0.002344	0.092	0C Begin Close Socket	Port=8801 Sock=1
+0.002715	0.371	0D End Close Socket	Port=8801 Sock=1
+0.002746	0.030	48 Trigger event	Trigger=CLOSE

Figure 259. IMS Connect Transit Trace report for transaction where OTMA returned NAK due to sense code 0024

IMS Connect Transit Trace report: Resume named Tpipe command with timeout

The following IMS Performance Analyzer example report shows an IMS Connect Transit Trace for a Resume Tpipe with timeout.

Start/+Relative	Elapsed	ID Description	Information
10.10.58.677647	*Start*	3C Prepare Read Socket	Key=BAEB8FB642018240 Depth=1 Port=8801 Sock=2
+0.249148	249.148	49 Read Socket	Port=8801 Sock=2
+0.249456	0.308	49 Read Socket	Port=8801 Sock=2
+0.249530	0.073	3D Message Exit called for READ	Exit=HWSSMPL0
+0.249649	0.118	3E Message Exit return for READ	RC=00 RSN=00 IP=172.17.69.58 DSOrig=IMD4 DSTarg=IMD4 Commit Mode=0 Synch Level=CONFIRM Socket Type=Transaction TPipe=TRBS002 MSG=Command CMD=Resume named Tpipe O/P
+0.249899	0.250	41 Message sent to OTMA	Exit=HWSSMPL0
+0.255023	5.124	3D Message Exit called for XMIT	RC=00 RSN=00
+0.255126	0.103	3E Message Exit return for XMIT	Port=8801 Sock=2
+0.255670	0.543	4A Write Socket	Port=8801 Sock=2
+0.259258	3.588	49 Read Socket	Port=8801 Sock=2
+0.551047	291.789	49 Read Socket	Port=8801 Sock=2
+0.551391	0.343	49 Read Socket	Port=8801 Sock=2
+0.551419	0.028	3D Message Exit called for READ	Exit=HWSSMPL0
+0.551519	0.099	3E Message Exit return for READ	RC=00 RSN=00 IP=172.17.69.58 DSOrig=IMD4 DSTarg=IMD4 Commit Mode=0 Synch Level=CONFIRM Socket Type=Transaction TPipe=TRBS002 MSG=Response RESP=ACK
+0.551755	0.236	41 Message sent to OTMA	Exit=HWSSMPL0
+0.554001	2.245	3D Message Exit called for XMIT	RC=00 RSN=00
+0.554055	0.054	3E Message Exit return for XMIT	Port=8801 Sock=2
+0.554630	0.574	4A Write Socket	Port=8801 Sock=2
+0.558145	3.515	49 Read Socket	Port=8801 Sock=2
+0.862982	304.837	49 Read Socket	Port=8801 Sock=2
+0.863371	0.388	49 Read Socket	Port=8801 Sock=2
+0.863460	0.089	3D Message Exit called for READ	Exit=HWSSMPL0
+0.863516	0.055	3E Message Exit return for READ	RC=00 RSN=00 IP=172.17.69.58 DSOrig=IMD4 DSTarg=IMD4 Commit Mode=0 Synch Level=CONFIRM Socket Type=Transaction TPipe=TRBS002 MSG=Response RESP=ACK
+0.863860	0.344	41 Message sent to OTMA	Exit=HWSSMPL0
+0.867618	3.757	3D Message Exit called for XMIT	RC=00 RSN=00
+0.867737	0.118	3E Message Exit return for XMIT	Port=8801 Sock=2
+0.868241	0.504	4A Write Socket	Port=8801 Sock=2
+0.871990	3.748	49 Read Socket	Port=8801 Sock=2
+1.156950	284.959	49 Read Socket	Port=8801 Sock=2
+1.157240	0.290	49 Read Socket	Port=8801 Sock=2
+1.157313	0.072	3D Message Exit called for READ	Exit=HWSSMPL0
+1.157369	0.056	3E Message Exit return for READ	RC=00 RSN=00 IP=172.17.69.58 DSOrig=IMD4 DSTarg=IMD4 Commit Mode=0 Synch Level=CONFIRM Socket Type=Transaction TPipe=TRBS002 MSG=Response RESP=ACK
+1.157628	0.258	41 Message sent to OTMA	Exit=HWSSMPL0
+1.158987	1.358	3D Message Exit called for XMIT	RC=00 RSN=00
+1.159093	0.106	3E Message Exit return for XMIT	Port=8801 Sock=2
+1.159601	0.508	4A Write Socket	Port=8801 Sock=2
+1.162959	3.357	49 Read Socket	Port=8801 Sock=2
+1.164119	1.160	49 Read Socket	Port=8801 Sock=2
+1.164447	0.327	49 Read Socket	Port=8801 Sock=2
+1.164477	0.030	3D Message Exit called for READ	Exit=HWSSMPL0
+1.164587	0.110	3E Message Exit return for READ	RC=00 RSN=00 IP=172.17.69.58 DSOrig=IMD4 DSTarg=IMD4 Commit Mode=0 Synch Level=CONFIRM Socket Type=Transaction TPipe=TRBS002 MSG=Response RESP=ACK
+1.164810	0.223	41 Message sent to OTMA	
10.10.59.842457	*Resume*	41 Message sent to OTMA	Key=BAEB8FB642018240 Error=Time-out Depth=1 Tpipe=TRBS002 MSG=Response RESP=ACK
+1.415173	250.363	45 OTMA time-out	TOV=19
+1.415288	0.114	3D Message Exit called for XMIT	Exit=HWSSMPL0
+1.415400	0.111	3E Message Exit return for XMIT	RC=00 RSN=00
+1.416052	0.652	4A Write Socket	Port=8801 Sock=2
+1.416536	0.483	0D End Close Socket	Port=8801 Sock=2
+1.416628	0.092	48 Trigger event	Trigger=CLOSE

Figure 260. IMS Connect Transit Trace report for resume named Tpipe command with timeout

IMS Connect Transit Trace report: Open Database activity

The following IMS Performance Analyzer example report shows an IMS Connect Transit Trace for Open Database activity.

			Trace from 16Jun2020 04.26.20.46		Page	1
Start/+Relative	Elapsed	ID Description	Information			
64.26.26.460492	*Start*	3C Prepare Read Socket	Key=D8135861B8603C47 Depth=1 Port=48855 Sock=3			
+0.000017	0.017	49 Read Socket	Port=48855 Sock=3			
+0.000020	0.003	5B DRDA Command is Received	EXCSAT Name=LEON			
+0.000026	0.006	49 Read Socket	Port=48855 Sock=3			
+0.000029	0.003	49 Read Socket	Port=48855 Sock=3			
+0.000030	0.000	5B DRDA Command is Received	ACCSEC SECMEC=01			
+0.000038	0.008	5C DRDA Command is Sent	EXCSATRD			
+0.000041	0.002	5C DRDA Command is Sent	ACCSECRD SECMEC=03			
+0.000048	0.006	4A Write Socket	Port=48855 Sock=3			
+0.010612	10.564	49 Read Socket	Port=48855 Sock=3			
+0.010626	0.014	49 Read Socket	Port=48855 Sock=3			
+0.010627	0.000	5B DRDA Command is Received	SECCHK SECMEC=05 Userid=CEX001			
+0.010662	0.035	63 ODBM Security Exit Entered				
+0.010723	0.061	64 ODBM Security Exit Returned	RC=00 RSN=00			
+0.010728	0.005	3F Begin SAF event	Userid=CEX001 Request=Verify			
+0.010974	0.246	40 End SAF event	Userid=CEX001 Request=Verify RC=00 RSN=00			
+0.010978	0.003	3F Begin SAF event	Userid=CEX001 Request=Delete			
+0.010979	0.000	40 End SAF event	Userid=CEX001 Request=Delete RC=00 RSN=00			
+0.010980	0.001	5C DRDA Command is Sent	SECCHKRM SVRCOD=00 SECCHKCD=00			
+0.010994	0.013	4A Write Socket	Port=48855 Sock=3			
+0.017464	6.469	49 Read Socket	Port=48855 Sock=3			
+0.017497	0.032	49 Read Socket	Port=48855 Sock=3			
+0.017502	0.005	5B DRDA Command is Received	ACCRDB RDBname=DFSIVP1.ODBA			
+0.017506	0.003	5D An APSB Command is Received	PSB=DFSIVP1 Alias=ODBA			
+0.017510	0.003	61 ODBM Routing Exit Entered	Clientid=ODBEDE41 Alias=ODBA PSB=DFSIVP1			
+0.017549	0.039	62 ODBM Routing Exit Returned	RC=00 RSN=OK Alias=ODBA IPV4=172.17.69.25			
+0.017598	0.049	AA ODBM Send/Receive Trace				
+0.017601	0.002	69 Message is Sent to ODBM	ODBM=DFJ10D			
+0.051543	33.942	AA ODBM Send/Receive Trace				
+0.051553	0.010	6A Message is Received from ODBM	RC=00 RSN=00			
+0.051580	0.026	5E An APSB Reply is Returned	ACCRDBRM PSB=DFSIVP1			
+0.051587	0.006	5C DRDA Command is Sent	ACCRDBRM SVRCOD=00 Token=2414C81024173CE0584C139BBA000000			
+0.051628	0.041	4A Write Socket	Port=48855 Sock=3			
+0.051639	0.010	48 Trigger event	Trigger=ODBMMSG			
+0.067018	15.378	3C Prepare Read Socket	Port=48855 Sock=3			
+0.067029	0.011	49 Read Socket	Port=48855 Sock=3			
+0.067031	0.001	5B DRDA Command is Received	OPNQRY PCB=PCB01			
+0.067033	0.002	49 Read Socket	Port=48855 Sock=3			
+0.067035	0.001	49 Read Socket	Port=48855 Sock=3			
+0.067042	0.006	5B DRDA Command is Received	DLIFUNC Func=RETRIEVE			
+0.067044	0.002	49 Read Socket	Port=48855 Sock=3			
+0.067046	0.001	49 Read Socket	Port=48855 Sock=3			
+0.067047	0.000	5B DRDA Command is Received	INAIB PCB=PCB01			
+0.067049	0.002	49 Read Socket	Port=48855 Sock=3			
+0.067051	0.002	49 Read Socket	Port=48855 Sock=3			
+0.067051	0.000	5B DRDA Command is Received	RTRVFLD Offset=00 Length=28			
+0.067053	0.001	49 Read Socket	Port=48855 Sock=3			
+0.067055	0.002	49 Read Socket	Port=48855 Sock=3			
+0.067056	0.000	5B DRDA Command is Received	SSALIST Count=01 SSA=A1111111			
+0.067100	0.043	AA ODBM Send/Receive Trace				
:						

Figure 261. IMS Connect Transit Trace report for Open Database activity (partial report shown)

Part 5. OMEGAMON ATF reports

IMS Performance Analyzer complements IBM OMEGAMON for IMS on z/OS by reporting transaction and application-level accounting statistics produced by the OMEGAMON for IMS Application Trace Facility (ATF).

The analysis of the data collected by ATF can be used to:

- Identify transaction response-time components.
- Fine-tune applications.
- Understand how application programs operate.

OMEGAMON Application Tracing Facility (ATF) provides application-level accounting statistics. OMEGAMON ATF provides the following data:

- Application-level detailed monitoring:
 - DLI calls, including SSA, KFBA and IO area.
 - Db2 calls.
- DLI call times and CPU utilization (in each IMS region).

See [Chapter 41, “OMEGAMON ATF records,” on page 513](#) for the list of ATF record codes.

Report categories

The IMS Performance Analyzer ATF reports have a similar look-and-feel to the OMEGAMON online reports, providing a three-level progression for analysis: Transaction Transit List, Transaction Transit Summary, and Trace.

Transaction Transit reports

These reports provide transaction and application-level accounting.

- The Transit List report provides a list of all transaction event data in chronological sequence
- The Transit Summary report provides a statistical analysis of transaction activity

Trace reports

The Record Trace reports provides three levels of detail for application-level analysis of DLI and external subsystem (Db2 SQL and MQ adapter) calls.

Exception Transaction extract

The Exception Transaction extract is an ATF data reduction process creating a data set of transactions that generated an exception (ABEND or long response time).

There is also a category containing ATF Global Options. This is where you can specify options that apply globally to all or many reports in the ATF Report Set.

Chapter 34. ATF Transit List report

The OMEGAMON for IMS ATF Transaction Transit List report provides a chronological list of transactions with their processing and CPU times from the ATF log stream data.

Options

To specify the report options, select the Transaction Transit **List** report in an ATF Report Set.

The command for the Transit List report is:

```
IMSPAATF      LIST(
               [DDNAME(ddname),]          default LIST0001
               [FROM(date,time),]
               [TO(date,time),]
               [INCL(TRANCODE(list))|EXCL(TRANCODE(list)),]
               [INCL(USERID(list))|EXCL(USERID(list)),]
               [INCL(IMSID(list))|EXCL(IMSID(list)),]
               [INCL(PROGRAM(list))|EXCL(PROGRAM(list))])
IMSPAATF      EXECUTE
```

Selection Criteria can be specified to filter the input data on one or more of the following:

- Transaction Code
- User ID
- IMS Subsystem ID
- Program

Content

IMS Performance Analyzer OMEGAMON ATF List Report							
LIST0001 Printed at 07:59:13 14Sep2018 26Mar2018				Data from 11.37.16 Page 1			
IMS Tran Start	Trancode	Program	Jobname	Input LTERM	Total IMS Time	CPU Time	ABEND Code
11.37.16.792658	CEXTCONV	CEXTPGM	IFDEMPP3	3101	0.112350	0.014764	U0119
11.37.18.151800	CEXTNONC	CEXTPGM	IFDEMPP3	3101	0.013855	0.007875	
11.37.18.166463	CEXSCONV	CEXSPGM	IFDEMPP3	3101	0.030893	0.006572	U0119
11.37.20.449600	CEXTNONC	CEXTPGM	IFDEMPP3	3101	0.013715	0.006955	
11.37.20.463466	CEXSCONV	CEXSPGM	IFDEMPP3	3101	0.031186	0.005431	U0119
11.37.24.754122	CEXTNONC	CEXTPGM	IFDEMPP3	3101	5.044749	0.007713	
11.37.29.814535	CEXTNONC	CEXTPGM	IFDEMPP3	3101	10.01710	0.006679	
11.37.39.851778	CEXTNONC	CEXTPGM	IFDEMPP3	3101	0.004351	0.001672	
11.37.39.856314	CEXSNONC	CEXSPGM	IFDEMPP3	3101	0.009396	0.004984	
11.37.39.884517	CEXSNONC	CEXSPGM	IFDEMPP3	3101	0.004438	0.001478	
11.37.39.889105	CEXTNONC	CEXTPGM	IFDEMPP3	3101	0.007508	0.003672	
11.37.39.916449	CEXTNONC	CEXTPGM	IFDEMPP3	3101	0.002817	0.001375	
11.37.39.919395	CEXSNONC	CEXSPGM	IFDEMPP3	3101	0.007789	0.003686	
11.37.39.944744	CEXSNONC	CEXSPGM	IFDEMPP3	3101	0.003853	0.001404	
11.37.39.948747	CEXTNONC	CEXTPGM	IFDEMPP3	3101	0.019044	0.004409	
11.37.39.988251	CEXSNONC	CEXSPGM	IFDEMPP3	3101	0.009706	0.004449	
11.37.40.065649	CEXTNONC	CEXTPGM	IFDEMPP3	3101	0.038203	0.004798	U4001
11.37.49.751288	CEXTNONC	CEXTPGM	IFDEMPP3	3101	0.011483	0.007723	
:							

Figure 262. ATF Transit List report

For field descriptions, refer to OMEGAMON for IMS *Application Trace Facility Reference*.

Chapter 35. ATF Transit Summary report

The OMEGAMON for IMS ATF Transaction Transit Summary report provides a statistical analysis of transaction activity with average and maximum processing and CPU times, and number of abends from ATF log stream data.

Options

To specify the report options, select the Transaction Transit **Summary** report in an ATF Report Set.

The command for the Transit Summary report is:

```
IMSPAATF      SUMMARY(
               [TOTALS(0)|NOTOTALS,]          default TOTALS(0)
               [DDNAME(ddname),]              default SUMM0001
               [FROM(date,time),]
               [TO(date,time),]
               [INCL(TRANCODE(list))|EXCL(TRANCODE(list)),]
               [INCL(USERID(list))|EXCL(USERID(list)),]
               [INCL(IMSID(list))|EXCL(IMSID(list)),]
               [INCL(PROGRAM(list))|EXCL(PROGRAM(list))])
IMSPAATF      EXECUTE
```

Selection Criteria can be specified to filter the input data on one or more of the following:

- Transaction Code
- User ID
- IMS Subsystem ID
- Program

Also specify the summarization level:

- TOTALS(0) for grand total, no subtotals. This is the default.
- NOTOTALS for no totals.

Content

IMS Performance Analyzer OMEGAMON ATF Summary Report							
SUMM0001 Printed at 08:02:12 14Sep2018				Data from 15.22.43 02Jan2018 to 15.58.11 02Jan2018			
Page 1							
Trancode	Tran Count	Avg Total IMS Time	Max Total IMS Time	Avg CPU Time	Max CPU Time	Abend Count	
ADDINV	5	0.010541	0.018043	0.004479	0.004858	0	
ADDPART	4	0.012462	0.021438	0.004564	0.004966	0	
CEXS CONV	40	0.757982	5.014682	0.003193	0.006715	0	
CEXS NONC	5	0.007005	0.010268	0.003338	0.004958	0	
CEXT CONV	40	0.384464	10.01092	0.003618	0.012571	1	
CEXT NONC	9	1.677678	10.01064	0.003674	0.005437	1	
DLETINV	4	0.010184	0.010892	0.004884	0.004946	0	
DLETPART	3	0.011156	0.011678	0.004794	0.004940	0	
DSPALLI	24	0.010732	0.013146	0.005350	0.006563	0	
DSPINV	28	0.010842	0.023548	0.005385	0.005914	0	
IVTCV	24	0.006360	0.008950	0.002097	0.002695	0	
IVTCX	24	0.061093	0.842977	0.005554	0.015303	0	
IVTFD	11	0.019464	0.088386	0.001072	0.004612	0	
IVTFM	8	0.000654	0.000846	0.000502	0.000657	0	
IVTNO	66	0.004395	0.008297	0.001290	0.003496	0	
IVTNV	66	0.004616	0.029731	0.001199	0.003339	0	
MQATREQ1	44	0.465048	0.920729	0.073895	0.244752	0	
PART	29	0.019177	0.134055	0.004842	0.015478	0	

Figure 263. ATF Transit Summary report

Chapter 36. ATF Record Trace report

The OMEGAMON for IMS ATF Record Trace provides detailed application DLI, Db2, and MQ call analysis for selected transactions using ATF log stream data. There are three levels of trace that provide increasing level of detail: Trace Overview, Trace Detail, and Trace Detail (Expanded) with additional application call detail.

Options

To specify the report options, select the Trace Reports **Record Trace** in an ATF Report Set.

The command for the ATF Record Trace report is:

```
IMSPAATF      TRACE(
               [LEVEL(1|2|3),]           default 1
               [DDNAME(ddname),]         default TRACE001
               [MONITOR,]                 applies only to level 2 or 3
               [INCL(TRANCODE(list))|EXCL(TRANCODE(list)),]
               [INCL(USERID(list))|EXCL(USERID(list)),]
               [INCL(IMSID(list))|EXCL(IMSID(list)),]
               [INCL(PROGRAM(list))|EXCL(PROGRAM(list))])
IMSPAATF      EXECUTE
```

Important parameters for this command are:

LEVEL

Select which level to report:

LEVEL (1) - Overview: Reports each transaction with summary statistics by event type.

LEVEL (2) - Detail: Reports each transaction with detail statistics for each event type.

LEVEL (3) - Detail (Expanded): Contains LEVEL (2) details plus formatted data areas for DLI calls and statement numbers for Db2 calls.

MONITOR

With the MONITOR option specified, trace level 2 and 3 OMEGAMON ATF Trace reports contain:

- Fast Path (type X'03') and Full Function (type X'06) monitor event records.
- The Event CPU/AccumCPU column, providing the CPU time consumed by the execution of the event, and the transaction CPU time up to the completion of the event respectively.
- The level column (L) reporting the level of the monitor event. Non-monitor event types are reported as 0.
- For IBM MQ events, the MQ function name and type, program name, as well as the queue manager and queue name.
- For Db2 SQL events, the program name and statement number (Stmt#).
- Additional transaction identification and performance characteristics.

The MONITOR option does not apply to trace level 1 reports.

INCL/EXCL

Specify Selection Criteria to filter the report based on one or more of the following:

- Transaction Code
- User ID
- IMS Subsystem ID
- Program

ATF Trace Level 1: Overview

The ATF Trace level 1 "overview" report provides a chronological list of transactions, displaying for each transaction a statistical analysis of application call activity, showing call type and count, as well as total, average, and maximum call elapsed times.

IMS Performance Analyzer IMS OMEGAMON ATF Records									
OMEGAMON ATF Trace Level 1 from 12Jul2021 12.02.01.7								Page	1
=====									
Transaction	CEXTCONV	Date-Time	2021-07-12-12.02.01.755895						
PSB	CEXTPGM	Logical Terminal . .	IPI2	Transaction Class .	005				
Jobname	IADEMP3	Region ID	0001	Region Type	MPP				
UserID	IPI2	Quick Schedule . . .	NO	Primed Message . . .	NO				
Abend Code		Current SPA Size . .	00050	Message Source . . .	TERM				
Elapsed Time	0.059019	Total CPU Time . . .	0.008028	Dependent Region CPU	0.008028				
DLI CPU Time	0.001635	Db2 CPU Time	0.004144	MQ CPU Time	0.000000				
Control Region CPU .	0.000000	DLISAS Region CPU .	0.000000	Other Regions CPU . .	0.000000				
Elapsed time DL/I . .	0.003498	Elapsed time Db2 . .	0.012978	Elapsed time MQ . . .	0.000000				
=====									
Event	Type	Count	Total	Elapsed Time Average	Maximum	Total	CPU Time Average	Maximum	
DLI CALL (TM)	GU	1	0.001206	0.001206	0.001206	0.000335	0.000335	0.000335	
DLI CALL (TM)	GN	1	0.000035	0.000035	0.000035	0.000035	0.000035	0.000035	
DLI CALL (DB)	GHU	2	0.000911	0.000455	0.000849	0.000439	0.000219	0.000378	
DLI CALL (DB)	REPL	1	0.000297	0.000297	0.000297	0.000254	0.000254	0.000254	
DLI CALL (DB)	DLET	1	0.000187	0.000187	0.000187	0.000187	0.000187	0.000187	
DLI CALL (DB)	ISRT	1	0.000513	0.000513	0.000513	0.000244	0.000244	0.000244	
Db2 SQL	OPEN	1	0.000341	0.000341	0.000341	0.000275	0.000275	0.000275	
Db2 SQL	FETCH	14	0.003650	0.000260	0.002485	0.001580	0.000112	0.000643	
Db2 SQL	UPDATE	1	0.000323	0.000323	0.000323	0.000323	0.000323	0.000323	
Db2 SQL	CLOSE	1	0.000134	0.000134	0.000134	0.000091	0.000091	0.000091	
Db2 SQL	DELETE	1	0.000597	0.000597	0.000597	0.000515	0.000515	0.000515	
Db2 SQL	INSERT	1	0.000405	0.000405	0.000405	0.000368	0.000368	0.000368	
DLI CALL (TM)	ISRT	2	0.000351	0.000175	0.000240	0.000142	0.000071	0.000103	
=====									
Transaction	CEXTCONV	Date-Time	2021-07-12-12.02.02.812080						
PSB	CEXTPGM	Logical Terminal . .	IPI2	Transaction Class .	005				
Jobname	IADEMP3	Region ID	0001	Region Type	MPP				
UserID	IPI2	Quick Schedule . . .	NO	Primed Message . . .	NO				
Abend Code		Current SPA Size . .	00050	Message Source . . .	TERM				
Elapsed Time	0.307739	Total CPU Time . . .	0.006851	Dependent Region CPU	0.006851				
DLI CPU Time	0.001017	Db2 CPU Time	0.003763	MQ CPU Time	0.000000				
Control Region CPU .	0.000000	DLISAS Region CPU .	0.000000	Other Regions CPU . .	0.000000				
Elapsed time DL/I . .	0.002384	Elapsed time Db2 . .	0.012642	Elapsed time MQ . . .	0.000000				
=====									
Event	Type	Count	Total	Elapsed Time Average	Maximum	Total	CPU Time Average	Maximum	
DLI CALL (TM)	GU	1	0.000847	0.000847	0.000847	0.000026	0.000026	0.000026	
DLI CALL (TM)	GN	1	0.000033	0.000033	0.000033	0.000033	0.000033	0.000033	
DLI CALL (DB)	GHU	2	0.000828	0.000414	0.000770	0.000363	0.000181	0.000305	
DLI CALL (DB)	REPL	1	0.000168	0.000168	0.000168	0.000168	0.000168	0.000168	
DLI CALL (DB)	DLET	1	0.000155	0.000155	0.000155	0.000154	0.000154	0.000154	
DLI CALL (DB)	ISRT	1	0.000158	0.000158	0.000158	0.000158	0.000158	0.000158	
Db2 SQL	OPEN	1	0.000306	0.000306	0.000306	0.000306	0.000306	0.000306	
Db2 SQL	FETCH	14	0.005648	0.000403	0.004753	0.001486	0.000106	0.000635	
Db2 SQL	UPDATE	1	0.000336	0.000336	0.000336	0.000317	0.000317	0.000317	
Db2 SQL	CLOSE	1	0.000064	0.000064	0.000064	0.000064	0.000064	0.000064	
Db2 SQL	DELETE	1	0.000434	0.000434	0.000434	0.000372	0.000372	0.000372	
Db2 SQL	INSERT	1	0.000450	0.000450	0.000450	0.000375	0.000375	0.000375	
DLI CALL (TM)	ISRT	2	0.000196	0.000098	0.000106	0.000117	0.000058	0.000089	

Figure 264. OMEGAMON ATF Trace Level 1: Overview

ATF Trace Level 2: Detail

The ATF Trace level 2 "detail" report provides a chronological list of transactions, displaying for each transaction the application calls made by the transaction, showing call type and options, resources used, elapsed time, and return code.

IMS Performance Analyzer
IMS OMEGAMON ATF Records

OMEGAMON ATF Trace Level 2 from 10Aug2021 12.25.18.7

=====									
=									
Transaction	MQATREQ1	Date-Time	2021-08-10-12.25.18.730110						
Jobname	IADEMP3	Region ID	0005	Region Type	MPP				
Elapsed Time	0.346502	Total CPU Time	0.034430	Dependent Region CPU	0.034430				
DLI CPU Time	0.003504	Db2 CPU Time	0.011106	MQ CPU Time	0.002525				
Control Region CPU .	0.000000	DLISAS Region CPU . .	0.000000	Other Regions CPU . .	0.000000				
Elapsed time DL/I . .	0.023492	Elapsed time Db2 . . .	0.024732	Elapsed time MQ . . .	0.257480				
=====									
Time hh.mm.ss.thmiju	Relative ss.thmiju	Duration ss.thmiju	CPU Time	Description	Resources	Function Verb	Ret Code	Event	
12.25.18.730110	0	0.346502	0.000000	SUMMARY COMPLETION				1	
12.25.18.736803	+ 0.006693	0.000010	0.000008	DLI CALL (TM)	I/O PCB	GU		2	
12.25.18.736838	+ 0.006728	0.000694	0.000345	DLI CALL (DB)	DI21PART PARTROOT	GHU		3	
12.25.18.737558	+ 0.007447	0.000126	0.000126	DLI CALL (DB)	DI21PART PARTROOT	REPL		4	
12.25.18.737701	+ 0.007590	0.000155	0.000072	DLI CALL (DB)	DI21PART PARTROOT	GHU		5	
12.25.18.737873	+ 0.007762	0.000151	0.000151	DLI CALL (DB)	DI21PART PARTROOT	DLET		6	
12.25.18.738039	+ 0.007928	0.000152	0.000152	DLI CALL (DB)	DI21PART PARTROOT	ISRT		7	
12.25.18.739910	+ 0.009799	0.000651	0.000632	ESS SIGNON	DBP1			8	
12.25.18.740613	+ 0.010502	0.005701	0.004914	ESS CREATE THREAD	DBP1			9	
12.25.18.746364	+ 0.016253	0.000433	0.000390	Db2 SQL	DBP1	OPEN	+000	10	
12.25.18.746952	+ 0.016842	0.002871	0.001600	Db2 SQL	DBP1	FETCH	+000	11	
12.25.18.749964	+ 0.019853	0.000092	0.000092	Db2 SQL	DBP1	FETCH	+000	12	
12.25.18.750182	+ 0.020072	0.000065	0.000065	Db2 SQL	DBP1	FETCH	+000	13	
12.25.18.750429	+ 0.020319	0.000101	0.000100	Db2 SQL	DBP1	FETCH	+000	14	
12.25.18.750661	+ 0.020551	0.000065	0.000065	Db2 SQL	DBP1	FETCH	+000	15	
12.25.18.750891	+ 0.020780	0.000078	0.000078	Db2 SQL	DBP1	FETCH	+000	16	
12.25.18.751093	+ 0.020983	0.000064	0.000064	Db2 SQL	DBP1	FETCH	+000	17	
12.25.18.751260	+ 0.021150	0.000069	0.000067	Db2 SQL	DBP1	FETCH	+000	18	
12.25.18.751450	+ 0.021340	0.000098	0.000077	Db2 SQL	DBP1	FETCH	+000	19	
12.25.18.751666	+ 0.021556	0.001545	0.000726	Db2 SQL	DBP1	UPDATE	+000	20	
12.25.18.753360	+ 0.023250	0.000064	0.000064	Db2 SQL	DBP1	CLOSE	+000	21	
12.25.18.753528	+ 0.023417	0.001190	0.000528	Db2 SQL	DBP1	DELETE	+000	22	
12.25.18.754859	+ 0.024749	0.001332	0.000575	Db2 SQL	DBP1	INSERT	+000	23	
12.25.18.780598	+ 0.050488	0.000149	0.000110	ESS SIGNON	CSQ6			24	
12.25.18.780812	+ 0.050701	0.000282	0.000248	ESS CREATE THREAD	CSQ6			25	
12.25.18.781136	+ 0.051026	0.000023	0.000023	MQ CALL	CSQ6	CONN	00000000	26	
12.25.18.781392	+ 0.051281	0.000264	0.000264	MQ CALL	CSQ6	OPEN	00000000	27	
12.25.18.781761	+ 0.051650	0.002328	0.000521	MQ CALL	CSQ6	GET	00000000	28	
12.25.18.784188	+ 0.054077	0.251098	0.000136	MQ CALL	CSQ6	GET	00000002	29	
12.25.19.035524	+ 0.305414	0.000230	0.000184	MQ CALL	CSQ6	CLOS	00000000	30	
12.25.19.035841	+ 0.305730	0.000198	0.000198	MQ CALL	CSQ6	OPEN	00000000	31	
12.25.19.036150	+ 0.306039	0.002587	0.000526	MQ CALL	CSQ6	PUT	00000000	32	
12.25.19.038842	+ 0.308731	0.000083	0.000083	MQ CALL	CSQ6	CLOS	00000000	33	
12.25.19.049987	+ 0.319877	0.000238	0.000232	MQ CALL	CSQ6	DISC	00000000	34	
12.25.19.050369	+ 0.320258	0.000110	0.000110	DLI CALL (TM)	I/O PCB	ISRT		35	
12.25.19.050614	+ 0.320503	0.000746	0.000056	DLI CALL (DB)	DI21PART	STAT		36	
12.25.19.051614	+ 0.321504	0.000025	0.000025	DLI CALL (DB)	DI21PART	STAT		37	
12.25.19.051808	+ 0.321698	0.000021	0.000021	DLI CALL (DB)	DI21PART	STAT	GE	38	
12.25.19.053468	+ 0.323357	0.001978	0.000322	ESS COMMIT PH.1	DBP1			39	
12.25.19.055475	+ 0.325365	0.000080	0.000080	ESS COMMIT PH.1	CSQ6			40	
12.25.19.064837	+ 0.334727	0.003848	0.000747	ESS TERM THREAD	DBP1			41	
12.25.19.068726	+ 0.338615	0.004407	0.004407	ESS TERM THREAD	CSQ6			42	
12.25.19.051892	+ 0.321782	0.021302	0.002438	DLI CALL (TM)		ASRT		43	

Figure 265. OMEGAMON ATF Trace Level 2: Detail

IMS Performance Analyzer
IMS OMEGAMON ATF Records

OMEGAMON ATF Trace Level 2 from 10Aug2021 12.25.18.7

=====										
Transaction	MQATREQ1	Date-Time	2021-08-10-12.25.18.730110							
PSB	MQDTPGM	Logical Terminal . . .	IPI2	Transaction Class . .	006					
Jobname	IADEMPP3	Region ID	0005	Region Type	MPP					
UserID	IPI2	Quick Schedule . . .	NO	Primed Message . . .	YES					
Abend Code		Current SPA Size . .	N/A	Message Source . . .	TERM					
Elapsed Time	0.346502	Total CPU Time . . .	0.034430	Dependent Region CPU	0.034430					
DLI CPU Time	0.003504	Db2 CPU Time	0.011106	MQ CPU Time	0.002525					
Control Region CPU .	0.000000	DLISAS Region CPU .	0.000000	Other Regions CPU . .	0.000000					
Elapsed time DL/I . .	0.023492	Elapsed time Db2 . .	0.024732	Elapsed time MQ . . .	0.257480					
=====										
Time	Relative	Duration	Event CPU	Description	L	Resources	Function	Ret Code	Stmt#	Event
hh.mm.ss.thmiju	ss.thmiju	ss.thmiju	/AccumCPU				Verb			
12.25.18.730110	-----0	0.346502	0.000000	SUMMARY COMPLETION	-	-----	-----	-----	-----	1
12.25.18.732095	+ 0.001984	0.000000	0.000000	MPP SCHEDULING START	0					2
			0.000390							
12.25.18.736803	+ 0.006693	0.000010	0.000008	DLI CALL (TM)	0	I/O PCB	GU			3
			0.002056							
12.25.18.736838	+ 0.006728	0.000694	0.000345	DLI CALL (DB)	0	DI21PART PARTROOT	GHU			4
			0.000369							
12.25.18.737558	+ 0.007447	0.000126	0.000126	DLI CALL (DB)	0	DI21PART PARTROOT	REPL			5
			0.000151							
12.25.18.737701	+ 0.007590	0.000155	0.000072	DLI CALL (DB)	0	DI21PART PARTROOT	GHU			6
			0.000088							
12.25.18.737873	+ 0.007762	0.000151	0.000151	DLI CALL (DB)	0	DI21PART PARTROOT	DLET			7
			0.000167							
12.25.18.738039	+ 0.007928	0.000152	0.000152	DLI CALL (DB)	0	DI21PART PARTROOT	ISRT			8
			0.000166							
12.25.18.739910	+ 0.009799	0.000651	0.000632	ESS SIGNON	0	DBP1				9
			0.001866							
12.25.18.740613	+ 0.010502	0.005701	0.004914	ESS CREATE THREAD	0	DBP1				10
			0.004965							
12.25.18.746364	+ 0.016253	0.000433	0.000390	Db2 SQL	0	DBP1 MQDTPGM	OPEN	+000	00835	11
			0.000437							
12.25.18.746952	+ 0.016842	0.002871	0.001600	Db2 SQL	0	DBP1 MQDTPGM	FETCH	+000	00837	12
			0.001737							
12.25.18.749964	+ 0.019853	0.000092	0.000092	Db2 SQL	0	DBP1 MQDTPGM	FETCH	+000	00837	13
			0.000230							
12.25.18.750182	+ 0.020072	0.000065	0.000065	Db2 SQL	0	DBP1 MQDTPGM	FETCH	+000	00837	14
			0.000168							
12.25.18.750429	+ 0.020319	0.000101	0.000100	Db2 SQL	0	DBP1 MQDTPGM	FETCH	+000	00837	15
			0.000243							
12.25.18.750661	+ 0.020551	0.000065	0.000065	Db2 SQL	0	DBP1 MQDTPGM	FETCH	+000	00837	16
			0.000172							
12.25.18.750891	+ 0.020780	0.000078	0.000078	Db2 SQL	0	DBP1 MQDTPGM	FETCH	+000	00837	17
			0.000207							
12.25.18.751093	+ 0.020983	0.000064	0.000064	Db2 SQL	0	DBP1 MQDTPGM	FETCH	+000	00837	18
			0.000166							
12.25.18.751260	+ 0.021150	0.000069	0.000067	Db2 SQL	0	DBP1 MQDTPGM	FETCH	+000	00837	19
			0.000170							
12.25.18.751450	+ 0.021340	0.000098	0.000077	Db2 SQL	0	DBP1 MQDTPGM	FETCH	+000	00837	20
			0.000198							
12.25.18.751666	+ 0.021556	0.001545	0.000726	Db2 SQL	0	DBP1 MQDTPGM	UPDATE	+000	00858	21
			0.000843							
12.25.18.753360	+ 0.023250	0.000064	0.000064	Db2 SQL	0	DBP1 MQDTPGM	CLOSE	+000	00863	22
			0.000210							
12.25.18.753528	+ 0.023417	0.001190	0.000528	Db2 SQL	0	DBP1 MQDTPGM	DELETE	+000	00884	23
			0.000629							
12.25.18.754859	+ 0.024749	0.001332	0.000575	Db2 SQL	0	DBP1 MQDTPGM	INSERT	+000	00899	24
			0.000695							

Figure 266. OMEGAMON ATF Trace Level 2: Detail with MONITOR (part 1 of 2)

12.25.18.780598	+	0.050488	0.000149	0.000110	ESS SIGNON	0	CSQ6				25
12.25.18.780812	+	0.050701	0.000282	0.007028	ESS CREATE THREAD	0	CSQ6				26
12.25.18.781136	+	0.051026	0.000023	0.000248		0	CSQ6	MQDTPGM	MQCONN	00000000	27
12.25.18.781392	+	0.051281	0.000264	0.000310	MQ CALL	0	CSQ6	MQDTPGM	MQOPEN	00000000	28
12.25.18.781761	+	0.051650	0.002328	0.000063	QMGR : CSQ6	0	CSQ6	MQDTPGM	MQGET	00000000	29
12.25.18.784188	+	0.054077	0.251098	0.000264	MQ CALL : CSQ6	0	CSQ6	MQDTPGM	MQGET	00000002	30
12.25.19.035524	+	0.305414	0.000230	0.000521	QMGR : CSQ6	0	CSQ6	MQDTPGM	MQCLOS	00000000	31
12.25.19.035841	+	0.305730	0.000198	0.000604	MQ CALL : CSQ6	0	CSQ6	MQDTPGM	MQOPEN	00000000	32
12.25.19.036150	+	0.306039	0.002587	0.000136	QMGR : CSQ6	0	CSQ6	MQDTPGM	MQPUT	00000000	33
12.25.19.038842	+	0.308731	0.000083	0.000233	MQ CALL : CSQ6	0	CSQ6	MQDTPGM	MQCLOS	00000000	34
12.25.19.049987	+	0.319877	0.000238	0.000342	QMGR : CSQ6	0	CSQ6	MQDTPGM	MQDISC	00000000	35
12.25.19.050369	+	0.320258	0.000110	0.000198	MQ CALL : CSQ6	0	CSQ6	MQDTPGM	ISRT		36
12.25.19.050614	+	0.320503	0.000746	0.000283	MQ CALL (DB)	0	DI21PART	STAT			37
12.25.19.051614	+	0.321504	0.000025	0.000173	DLI CALL (DB)	0	DI21PART	STAT			38
12.25.19.051808	+	0.321698	0.000021	0.000278	DLI CALL (DB)	0	DI21PART	STAT	GE		39
12.25.19.053468	+	0.323357	0.001978	0.000021	ESS COMMIT PH.1	0	DBP1				40
12.25.19.055475	+	0.325365	0.000080	0.000168	ESS COMMIT PH.1	0	CSQ6				41
12.25.19.055679	+	0.325568	0.000830	0.000000	VSAM IWAIT START	1	DI21PART				42
12.25.19.064837	+	0.334727	0.003848	0.000137	ESS TERM THREAD	0	DBP1				43
12.25.19.068726	+	0.338615	0.004407	0.000747	ESS TERM THREAD	0	CSQ6				44
12.25.19.051892	+	0.321782	0.021302	0.001368	DLI CALL (TM)	0		ASRT			45
12.25.19.073841	+	0.343730	0.000000	0.000440	MPP TERM START	0					46
12.25.19.073894	+	0.343783	0.001569	0.000387	MPP SCHEDULING START	0					47
				0.000192							
				0.000000							
				0.000261							

Figure 267. OMEGAMON ATF Trace Level 2: Detail with MONITOR (part 2 of 2)

ATF Trace Level 3: Detail (Expanded)

The ATF Trace level 3 “expanded detail” report provides a chronological list of transactions, displaying for each transaction the application calls made by the transaction (same as level 2). In addition, detailed information about each call is provided: Segment Search Arguments, Key Feedback Area, and IO area.

IMS Performance Analyzer IMS OMEGAMON ATF Records										
OMEGAMON ATF Trace Level 3 from 12Jul2021 12.02.01.8							Page 1			
=====										
Transaction	CEXTCONV	Date-Time	2021-07-12-12.02.01.755895							
PSB	CEXTPGM	Logical Terminal . .	IPI2	Transaction Class .	005					
Jobname	IADEMPP3	Region ID	0001	Region Type	MPP					
UserID	IPI2	Quick Schedule . . .	NO	Primed Message . . .	NO					
Abend Code		Current SPA Size . .	00050	Message Source . . .	TERM					
Elapsed Time	0.059019	Total CPU Time . . .	0.008028	Dependent Region CPU	0.008028					
DLI CPU Time	0.001635	Db2 CPU Time	0.004144	MQ CPU Time	0.000000					
Control Region CPU .	0.000000	DLISAS Region CPU .	0.000000	Other Regions CPU .	0.000000					
Elapsed time DL/I .	0.003498	Elapsed time Db2 . .	0.012978	Elapsed time MQ . . .	0.000000					
=====										
Time hh.mm.ss.thmiju	Relative ss.thmiju	Duration ss.thmiju	Event CPU /AccumCPU	Description	L	Resources	Function Verb	Ret Code	Stmt#	Event
12.02.01.755895	-----0	0.059019	0.000000	SUMMARY COMPLETION	-	-----	-----	-----	-----	1
12.02.01.755895	+ 0.000000	0.001206	0.000335 0.000335	DLI CALL (TM)	0	I/O PCB	GU			2
IOArea :	+0000 00320700	0001C3C5	E7E3C3D6	D5E50000 00000000 00000000 00000000 00000000 00000000			*.....CEXTCONV.....*			
	+0020 00000000	00000000	00000000	00000000 00000000 00000000 00000000 00000000 00000000			*.....*			*
	+0040 00000000	00000000	00000000				*.....*			*
12.02.01.757133	+ 0.001237	0.000035	0.000035 0.000066	DLI CALL (TM)	0	I/O PCB	GN			3
IOArea :	+0000 00080000	C5C3C8D6	E7E3C3D6	D5E50000 00000000 00000000 00000000 00000000 00000000			*....ECHOXTCONV.....*			
	+0020 00000000	00000000	00000000	00000000 00000000 00000000 00000000 00000000 00000000			*.....*			*
	+0040 00000000	00000000	00000000				*.....*			*
12.02.01.757220	+ 0.001324	0.000849	0.000378 0.000428	DLI CALL (DB)	0	DI21PART PARTROOT	GHU			4
KFBA :	+0000 C3C5E740	E3C5E2E3	40D2C5E8	40000000 00			*CEX TEST KEY			*
IOArea :	+0000 C3C5E740	E3C5E2E3	40D2C5E8	40000000 0040F2F0 F1F14BF0 F74BF1F2 4040F0F3			*CEX TEST KEY 2021.07.12 03*			
	+0020 7AF5F47A	F3F20000	00000000	00000000 00000000 00000000 00000000 00000000 00000000			*:54:32.....*			
	+0040 00000000	00000000	00000000				*.....*			*

Figure 268. OMEGAMON ATF Trace Level 3: Detail (Expanded) with MONITOR option

Chapter 37. ATF Exception Transaction extract

The OMEGAMON for IMS ATF Exception Transaction extract produced by IMS Performance Analyzer is an ATF data reduction process. It creates a new ATF data set from ATF log stream data that contains only those records associated with transactions that generated an exception (abend or long response time).

The Exception Transaction Extract files contain exception records extracted from the OMEGAMON ATF log streams based on two criteria, ABEND and long response time. IMS Performance Analyzer extracts all the records (such as DLI, Db2, MQ) associated with an exception transaction, even though the exception is not determined until the final summary record is read. It does this by queuing records based on their IMS recovery token.

Options

To request an ATF extract, select the **Exception Transaction** Extract in the ATF Report Set and specify options.

The command to request the Exception Transaction extract is:

IMSPAATF	[ABEND,]	
	[ELAPSE(ssss)]	default 1.00 second
IMSPAATF	EXTRACT(
	FILE)	DDname ATFOUT2
*		DDname ATFRECAP for Recap report
IMSPAATF	EXECUTE	

Notes:

1. Reports can be run during the extract process, and they will honor the exception criteria ABEND and ELAPSE(ssss).
2. If no exception criteria are specified, an error message is issued and the extract does not proceed.
3. A Recap report is written to DDname **ATFRECAP** showing how many exceptions occurred.

Exception criteria: Records are selected for the ATF Exception Transaction extract based on either or both of the following exception criteria:

ABEND

A transaction has abended when either ATRPSA (pseudo abend code) or ATRABCD (system or user abend code) is non-zero in the type 04 summary record.

Elapsed time

A transaction exceeds the elapsed time threshold based on the contents of ATRELAPS (elapsed time of event) in the type 04 summary record.

Part 6. Reference

The topics in this section provide reference information for IMS Performance Analyzer.

Chapter 38. IMS Log records

The IMS log type consists of log codes for IMS log records. Not all log codes are applicable to all releases of IMS.

The log code of an IMS record matches the IMS log record type and, if applicable, subtype. For a list of IMS log record types and subtypes, see the information about IMS log records used to analyze IMS problems in *IMS Diagnosis*.

Notes for specific log codes:

CA01

IMS transaction index.

CA20

IMS Connect transaction index.

Chapter 39. Monitor records

IMS Performance Analyzer uses 1-byte hexadecimal codes to identify the monitor records that it processes.

Table 31. Monitor records processed by IMS PA

Record code (hex)	Description
01	System Configuration
02	BMP Scheduling start
03	BMP Scheduling end
04	BMP Termination start
05	BMP Termination end
06	IFP Scheduling start
07	IFP Scheduling end
08	IFP Termination start
09	IFP Termination end
10	MPP Scheduling start
11	MPP Scheduling end
12	Dependent Region start
13	MPP Termination start
14	BMP/MPP/IFP Scheduling IWAIT start
15	Scheduler IWAIT end
16	PSB Block Loader IWAIT start
17	PSB Block Loader IWAIT end
18	DMB Block Loader IWAIT start
19	DMB Block Loader IWAIT end
20	Storage IWAIT start
21	Storage IWAIT end
22	Database I/O IWAIT start
23	Database I/O IWAIT end
24	VSAM I/O IWAIT start
25	VSAM I/O IWAIT end
26	QMGR I/O IWAIT start
27	QMGR I/O IWAIT end
28	HSAM I/O IWAIT start
29	HSAM I/O IWAIT end
30	Format Buffer Pool IWAIT start
31	Format Buffer Pool IWAIT end

Table 31. Monitor records processed by IMS PA (continued)

Record code (hex)	Description
32	MFS Directory IWAIT start
33	MFS Directory IWAIT end
36	MFS Block IWAIT start
37	MFS Block IWAIT end
38	IFP Message IWAIT start
39	IFP Message IWAIT end
40	Communications start
41	Communications end
42	Transaction Originator
43	Fast Path Buffer Activities
44	MSC Message Enqueue
45	MSC Message Dequeue
46	TP Paging Request
47	BALG Dequeued
48	External Subsystem Call start
49	External Subsystem Call end
50	Checkpoint start
51	Checkpoint end
52	Write restart IWAIT start
53	Write restart IWAIT end
54	QMGR SNAPQ IWAIT start
55	QMGR SNAPQ IWAIT end
56	MSDB Write IWAIT
57	DEDB Read IWAIT
58	IRC10 start (FP Call)
59	IRC10 end (FP Call)
60	DL/I call start
61	DL/I call end
62	DLA start (DB)
63	DLA end (DB)
64	DLA start (Message)
65	DLA end (Message)
66	PI Enqueue IWAIT start
67	PI Enqueue IWAIT end
68	DEDB Lock IWAIT start

Table 31. Monitor records processed by IMS PA (continued)

Record code (hex)	Description
69	DEDB Lock IWAIT end
70	MFS Prefetch start
71	MFS Prefetch end
72	DEDB OTHREAD IWAIT
73	VSO CF Write IWAIT
74	PSB Block Loaded from 64-bit Storage Pool start
75	PSB Block Loaded from 64-bit Storage Pool end
76	DMB Block Loaded from 64-bit Storage Pool start
77	DMB Block Loaded from 64-bit Storage Pool end
78	Synchronous Callout start
79	Synchronous Callout end
80	Intent Failure
82	Pool Space Failure
83	FP Deadlock Detected
84	VSO Area Castout start
85	VSO Area Castout end
86	FF Deadlock Detected
87	OThread Activities
88	VSO Preload start
89	VSO Preload end
90	Monitor start
91	Monitor end
94	VSO CF Read IWAIT
95	FP Lock Activity
98	User SLOG
AA	Pseudo End of File

Chapter 40. IMS Connect records

IMS Connect Extensions collects event records with details of incoming transaction requests as IMS Connect processes them.

Event records recorded by IMS Connect Extensions

Event records are collected continuously as messages are processed by IMS Connect. An event record consists of an event number and data associated with the event.

Event numbers can be X'00' - X'FF' (decimal 0 - 255) and the associated data varies depending on the event number. The event number is appended to the record prefix. To browse the contents of event records, use IBM IMS Problem Investigator for z/OS.

Connect status event records

A Connect status event identifies a change in the status of your IMS Connect system. For example, a resource becoming available or unavailable, or a socket becoming accepted for input by a port task, or a journal switch. Connect status events are typically not related to the processing of input messages, but can affect their processing.

The following table lists all single event records. The IMS Connect Extensions collection level determines whether the event record is written to the IMS Connect Extensions journal.

Table 32. Connect status event records

Code (Hex)	Code (Dec)	Event description	Collection level
00	00	Control record	0
01	01	IMS Connect region initialization	0
02	02	IMS Connect region has completed termination	0
03	03	A support task (TCB) has been created	1
04	04	A support task (TCB) is terminating	1
05	05	Begin INIT API	4
06	06	End INIT API	4
07	07	Begin Bind Socket	4
08	08	End Bind Socket	4
09	09	Listen on socket	4
0A	10	Begin Accept Socket	4
0B	11	End Accept Socket	3
0E	14	Begin Message Exit INIT	1
10	16	IMS data store becomes available	0
11	17	IMS data store becomes unavailable	0
12	18	An IMS TMEMBER joins the XCF group	0
13	19	An IMS TMEMBER leaves the XCF group	0

Table 32. Connect status event records (continued)

Code (Hex)	Code (Dec)	Event description	Collection level
14	20	Begin SCI Registration	4
15	21	End SCI Registration	1
16	22	Begin SCI De-registration	4
17	23	End SCI De-registration	1
18	24	Recorder trace DCB has been opened	1
19	25	Recorder trace DCB pre-close	1
1A	26	User message exit return from INIT	1
1B	27	User message exit return from TERM	1
1C	28	Begin Secure Environment Open	1
1D	29	End Secure Environment Open	1
20	32	Begin Secure Environment Close	1
21	33	End Secure Environment Close	1
22	34	Begin Local Port Setup	3
23	35	End Local Port Setup	3
24	36	Begin RRS Connect	1
25	37	End RRS Connect	1
26	38	List In-doubt Context	1
27	39	Begin RRS Disconnect	1
28	40	End RRS Disconnect	1
29	41	Begin ODBM Registration	1
2A	42	End ODBM Registration	1
2B	43	Begin ODBM De-registration	1
2C	44	End ODBM De-registration	1
2D	45	Datastore Status Update	1
2E	46	Return From Port Exit INIT Call	1
2F	47	Return From Port Exit TERM Call	1
30	48	Begin ODBM Routing Exit INIT	1
31	49	End ODBM Routing Exit INIT	1
32	50	Begin ODBM Routing Exit TERM	1
33	51	End ODBM Routing Exit TERM	1
34	52	XML Adapter INIT Call Begin	1
35	53	XML Adapter INIT Call End	1
36	54	XML Adapter TERM Call Begin	1
37	55	XML Adapter TERM Call End	1

Table 32. Connect status event records (continued)

Code (Hex)	Code (Dec)	Event description	Collection level
38	56	OM Registration	1
39	57	OM Deregistration	1
A7	167	Internal Command Event	0

Workload-related event records

The following tables list all event records relating to message-related events, Open Database events, and IMS-to-IMS, and IMS-to-CICS TCP/IP communications.

These records cover message-related events, Open Database-related events, and IMS-to-IMS TCP/IP communications. IMS Connect Extensions uses a STCK token Event Key to associate workload-related event records with each other. This allows event records to be identified and reported in the sequence they occur.

Message-related event records: For non-persistent sockets, each incoming message is assigned a unique Event Key and every event associated with the processing of the message has the same Event Key. For persistent sockets, all messages and all their associated events for the duration of the socket are assigned the same Event Key.

Open Database requests and responses and associated calls to ODBM: All events for the duration of the socket are assigned the same Event Key.

IMS-to-IMS TCP/IP communications: All events for the duration of the link are assigned the same Event Key.

Table 33. Workload-related event records

Code (Hex)	Code (Dec)	Event description	Collection level
0C	12	Begin Close Socket	4
0D	13	End Close Socket	3
3C	60	Prepare for socket read	2
3D	61	User message exit entered for READ, XMIT, EXER, or RXML	2
3E	62	User message exit return for READ, XMIT, EXER, or RXML	1
3F	63	Begin SAF security request	3
40	64	End SAF security request	3
41	65	Message sent to OTMA	2
42	66	Message received from OTMA	2
43	67	Message sent to SCI	2
44	68	Message received from SCI	2
45	69	OTMA Timeout	1
46	70	Deallocate Request	3
47	71	Session Error. This event is called when an unrecoverable error has been encountered and the session is being aborted	1

Table 33. Workload-related event records (continued)

Code (Hex)	Code (Dec)	Event description	Collection level
48	72	Trigger event. This is the end-of-frame event recorded by IMS Connect when a multi-event process has completed	2
49	73	Read socket	3
4A	74	Write socket	3
4B	75	Local Client Connect	3
4C	76	Local Message Send	3
4D	77	Local Message Receive	3
4E	78	Local Message Send-then-Receive	3
4F	79	Local Disconnect	3
50	80	Begin Create Context	4
51	81	End Create Context	3
52	82	Begin RRS Prepare	4
53	83	End RRS Prepare	3
54	84	Begin RRS Commit/Abort	4
55	85	End RRS Commit/Abort	3
56	86	Begin Secure Environment Select	3
57	87	End Secure Environment Select	3
58	88	Hold compensation queue	1
59	89	Port Edit Exit Called	2
5A	90	Port Edit Exit Returned	1
5B	91	DRDA Request	2
5C	92	DRDA Reply	2
5D	93	An Allocate PSB Command is Received	2
5E	94	An Allocate PSB Command is Sent	2
5F	95	A Deallocate PSB Command is Received	2
60	96	A Deallocate PSB Command is Sent	2
61	97	ODBM Routing Exit Entered	3
62	98	ODBM Routing Exit Returned	3
63	99	ODBM Security Exit Entered	3
64	100	ODBM Security Exit Returned	3
65	101	RRS Parent UR Token Creation Begins	3
66	102	RRS Parent UR Token Creation Ends	3
69	105	Message is Sent to ODBM	3
6A	106	Message is Received from ODBM	3

Table 33. Workload-related event records (continued)

Code (Hex)	Code (Dec)	Event description	Collection level
6B	107	RRS Delegate Commit Agent UR Begins	3
6C	108	RRS Delegate Commit Agent UR Ends	3
6D	109	XML Adapter CALL Begin	1
6E	110	XML Adapter CALL End	1
6F	111	XML Converter CALL Begin	1
70	112	XML Converter CALL End	1
71	113	Connected to Remote IMS Connect	3
72	114	Disconnected from Remote IMS Connect	3
73	115	Start Remote Thread for Partner ICON	3
74	116	Message Received for Remote ALTPCB	3
75	117	ALTPCB Message Sent to Remote Partner	3
76	118	ALTPCB Message Received from Remote Partner	3
77	119	Message Sent to OTMA for ALTPCB	3
78	120	MSC Message Received from MSC	3
79	121	MSC Message Sent to Partner IMS Connect	3
7A	122	MSC Message Received from Partner IMS Connect	3
7B	123	MSC Message Sent to MSC	3
7C	124	Connection to Partner IMS Connect Time-out	3
7D	125	Start of a session	3
7E	126	Trigger end of a session	3
80	128	IMS Connect Extensions Automatic Trigger	1
81	129	IMS Connect Extensions Exception Event	1
82	130	Event Collection Status	1
AD	173	IMS Connect Extensions ACEE Cache Delete Ageing Cycle Event	1
AE	174	Pre-Routing Exit Audit Event	1

Table 34. Extended event records for event number 255

Code (Hex)	Code (Dec)	Extended event number and event description	Collection level
FF	255	256 Socket connected on RMTICICS 257 Socket disconnected from RMTICICS 258 IMS Connect refreshed a cached RACF user ID after receiving a type 71 Event Notification Facility (ENF) notification 259 IMS Connect sent a health status report to Work Load Manager (WLM) 2050 Communication thread started for a RMTICICS connection 2051 ISC message received from IMS 2052 ISC message sent to IMS 2053 ISC message received on RMTICICS socket connection 2054 ISC message sent on RMTICICS socket connection 2055 ISC message received on CICSPOINT socket connection 2056 ISC message sent on CICSPOINT socket connection	1

IMS Connect Extensions trace records

IMS Connect Extensions trace records include IRM, CSM, RSM, OTMA, XML, and DRDA structures. Trace records can optionally include application data. Which records are written can be made conditional on their matching specified criteria.

IMS Connect Extensions trace event records are produced when tracing has been activated.

Table 35. IMS Connect trace event records

Code (Hex)	Code (Dec)	Event description	Tracing level
A3	163	Event Collection OTMA Trace	1
A4	164	Event Collection IRM Trace	1
A5	165	Event Recording RSM Message Trace	1
A6	166	Event Recording EXIT Output Message Trace	1
A9	169	RXML Trace for XML Adapter	1
AA	170	ODBM trace record	1
AC	172	IMS Connect Extensions Command and Response 1	1

1

Event record 172 (X'AC') is a special type of event record that is used to represent a set of events resulting from IMS Connect Extensions command being issued. A record is produced for each significant action that is initiated by this command or is issued by another process in response to or on behalf of this command.

For example, this event record is recorded when the **ROUTE** command is issued to suspend and resume processing for an IMS data store. It includes the **ROUTE** command as well as details of actions taken on behalf of the **ROUTE** command such as autoresume processing. If the **ROUTE** command targets a routing list, one "request" record and one "response" record is created for the routing list, as well as one "both" record for each IMS data store in the routing list. The response record for the routing list will contain the highest return code and reason code for all of the data store records.

IMS Connect Recorder Trace facility records

Trace data produced by IMS Connect Recorder Trace facility is converted to event record format by the IMS Connect Extensions Recorder Trace utilities.

Table 36. Recorder trace event records produced by IMS Connect

Code (Hex)	Code (Dec)	Event description	Collection level
A0	160	HWS Recorder Base Section Trace	Not applicable
A1	161	HWS Recorder IPB Section Trace	Not applicable
A2	162	HWS Recorder OPB Section Trace	Not applicable

User data logging record

The Event Recording User Data Logging record is produced when user data is submitted to the journal for logging. User data event records contain data submitted by clients for logging to the journal. User data can be segmented over multiple 1024-byte records. The client must have a valid user ID and password to use this service.

Table 37. User data logging event record

Code (Hex)	Code (Dec)	Event description	Collection level
AB	171	Event Recording User Data Logging	1

Event types

There are two types of event records processed by IMS Performance Analyzer, Connect Status Events and Message Related Events.

Connect Status Event

A Connect Status Event identifies a change in the status of your IMS Connect environment. For example, a resource (Datastore, TMEMBER) becoming available or unavailable, or a Socket becoming accepted for input by a Port task. Connect Status events are typically not related to the processing of input messages, but can affect their processing. Connect Status Event records are identified by a constant Event Key, **EVNT**.

Message Related Event

A Message Related Event identifies an event in the processing of an input message (transaction). Message Related Event records have a STCK token Event Key. Each incoming message is assigned a unique Event Key and every event associated with the processing of the message has the same Event Key. In this way, all events involved in the processing of an input message can be "connected" to obtain a complete picture of the life cycle of the message.

Collection levels

The number and type of event records collected by IMS Connect Extensions varies depending on the Collection level specified for the IMS Connect system.

0

Minimum level. Collects start up and shut down events along with some error events. This is the default.

1

Accounting level. Collects Return from Exit events, OTMA timeout and session error events. This level provides accounting information in terms of the number of messages by Transaction, User Exit, and so on.

2

Transit time reporting. Collects the minimum number of records to run simple transit time reports.

3

Comprehensive performance analysis. Collects all TCP/IP read and write events which provides for analysis of TCP/IP activity.

4

Maximum level. Collects all event records.

Required event records for IMS PA reports

For IMS Connect Extensions to collect IMS Connect event data for reporting, you need to ensure that IMS Connect Extensions Event Collection is active and that you specify a Collection Level that is appropriate to the type of reports that you want to produce.

The following figure summarizes how the IMS Connect Extensions Collection Level affects the IMS PA reports.

Connect Report	Collection Level				
	0	1	2	3	4
=====	=====	=====	=====	=====	=====
Transaction Transit Reports					
Analysis	no	no	yes *a	yes	yes
Log	no	no	yes *a	yes	yes
Extract	no	no	yes *b	yes	yes
Resource Usage Reports					
Port Usage	no	no	yes *c	yes	yes
Resume Tpipe	no	no	yes	yes	yes
ACK/NAK	no	no	yes	yes	yes
Exception Events	yes *d	yes *d	yes *d	yes *d	yes *d
Gap Analysis	yes *d	yes *d	yes *d	yes *d	yes *d
Trace Reports					
Transit Event Trace	no	no	yes *d	yes *d	yes
-----	-----	-----	-----	-----	-----

Note:

"no" indicates that the report is not produced when run against data collected at this level; message "No observations in report period" is printed

"yes" indicates that the report is produced when run against data collected at this level, however:

*a Input READ Socket (record 49) and SAF fields (records 3F, 40) are 0

*b Input READ Socket (49), SAF (3F, 40) and Acknowledgement (49, 4A) fields are 0

*c WRITE (4A) Count and Length fields are zero, and
READ Count and Length fields contain only Prepare READ Socket (3C) since READ Socket (49) is 0

*d Only the event records that are collected at that level are listed in the report

Figure 269. IMS Connect reports: IMS Connect Extensions Collection Level cross-reference

OTMA NAK sense codes

This list describes the sense codes that accompany OTMA negative acknowledgment (NAK) messages in type 42 records.

```
01 OTMA sign-on not established
02 Client cannot send/receive messages
03 State-data or XCF length error
04 Bad correlator
05 Multi-segment message duplicated
06 Bad XCF return code
07 Maximum (255) clients reached
08 Client-bid security request failed
09 Invalid OTMA command
0A OTMA data message not allowed
0B Invalid message type
0C Unknown response type
0D Nonexistent Tpipe for continuation
0E Unable to create Tpipe
0F Tpipe is stopped
10 No State data
11 Commit message was not to terminate
12 Prefix (4KB) too large
13 Hash table size not set
14 Second client-bid sent, first still active
15 Hash table storage allocation failed
16 Client not active
17 Invalid SYNC level
18 Invalid Tpipe name
19 Invalid Client name
1A Message cancelled due to IMS error
1B IMS is shut down
1C Invalid Commit Mode
1D User data too long (1K)
1E Server user data too long (256)
1F Sequence number mis-match
20 No Application data
21 No Chain flag
22 Tpipe not found
23 Sequence number invalid
24 Previous conversation still in progress
25 RESYNC Protocol violation
26 RESYNC Dequeue failed
27 RESYNC RSN reset failed
28 Resume tpipe request rejected
29 Total number of tpipes exceeded MAXTP limit
2A Delivery of OTMA message to remote IMS system failed
2B Late or invalid ACK/NAK sent to OTMA
2C Invalid Commit Mode
2D SYNC/Commit levels incompatible
2E SYNC level/Context ID incompatible
2F Unable to express context interest
30 Number of input messages waiting to be processed exceeds maximum number allowed
31 OTMA cannot accept new transactions or commands due to a /STOP TMEMBER command
33 Security violation while processing a resume tpipe request
34 Input transaction expired and therefore cancelled
35 Response message invalid, or failed to process synchronous callout request
36 Invalid message length as sum of parts is greater than XCF message length
37 Client's MULTIRTP value differs from that of super member group of tmember
```

Figure 270. OTMA NAK sense codes

For more information, refer to the section "OTMA Sense Codes for NAK Messages" in the *IMS Open Transaction Manager Access Guide and Reference*.

Typical event flow with Sync Level NONE

The typical event flow of an incoming transaction with Sync Level NONE is shown in the following example.

3C Prepare Read Socket	<== Incoming message from client
49 Read Socket	
3D Message Exit called for READ	
3E Message Exit return for READ	
41 Message sent to OTMA	<== Sent to OTMA for processing
42 Message received from OTMA	
3D Message Exit called for XMIT	
3E Message Exit return for XMIT	
4A Write Socket	<== Response sent back to client
0C Begin Close Socket	<== Non-persistent Socket is closed
0D End Close Socket	
48 Trigger event CLOS	<== Connect has finished processing message

Figure 271. IMS Connect event records: typical event flow with Sync Level NONE

Typical event flow with Sync Level CONFIRM

The typical event flow of an incoming transaction with Sync Level CONFIRM is shown in the following example.

3C Prepare Read Socket	<== Incoming message from client
49 Read Socket	
3D Message Exit called for READ	
3E Message Exit return for READ	
41 Message sent to OTMA	<== Sent to OTMA for processing
42 Message received from OTMA	
3D Message Exit called for XMIT	
3E Message Exit return for XMIT	
4A Write Socket	<== Response sent back to client
49 Read Socket	<== ACK received from Client
3D Message Exit called for READ	
3E Message Exit return for READ	
41 Message sent to OTMA	<== ACK sent to OTMA
42 Message received from OTMA	
46 De-allocate Session	
3D Message Exit called for XMIT	
3E Message Exit return for XMIT	
4A Write Socket	<== Response sent back to client
0C Begin Close Socket	<== Non-persistent Socket is closed
0D End Close Socket	
48 Trigger event CLOS	<== Connect has finished processing message

Figure 272. IMS Connect event records: typical event flow with Sync Level CONFIRM

Chapter 41. OMEGAMON ATF records

IMS Performance Analyzer uses 1-byte hexadecimal codes to identify the IBM OMEGAMON for IMS on z/OS Application Trace Facility (ATF) records that it processes.

Table 38. OMEGAMON ATF records processed by IMS PA

Record code (hex)	Description
01	DLI
03	Fast Path
04	Summary completion
05	DLI IOPCB detail
06	Full Function
82	Db2
87	Generic External Subsystem
88	IBM MQ
F1	Transaction end

Chapter 42. Glossary of Report Form field names

This glossary lists all the fields available to IMS Performance Analyzer form-based list and summary reports.

Report form fields can be used in the following ways:

Report Forms

Use the IMS Performance Analyzer ISPF dialog to construct a Report Form containing fields from the list below. The dialog can be used to generate batch report commands. For more information, see the IMS Performance Analyzer *User's Guide*.

Batch

You can also specify these fields with the following batch report commands using the **FIELDS** operand as follows:

```
IMSPALOG LIST(...,FIELDS(field1,...))
IMSPACEX LIST(...,FIELDS(field1,...))
IMSPALOG SUMMARY(...,FIELDS(field1,...))
IMSPACEX SUMMARY(...,FIELDS(field1,...))
```

Note: The fields below are also the default Db2 column name used when exporting a Form-based extract to Db2. The default Db2 table name is the Report Form name. For more information, see the IMS Performance Analyzer *User's Guide*.

The fields are listed alphabetically ignoring embedded spaces (in column headings). Other details provided for each field are:

- A description of the field.
- The source of the reporting field: IMS, IMS Connect, or both.
- The column heading that is displayed in reports and extracts.
- Where applicable, the corresponding global field used when browsing IMS logs and IMS Connect Extensions journals in IMS Problem Investigator.

Note: Form-fields that result in a hyphen (-) being displayed in the corresponding report column indicate that the required information is not available in the input logs. This is normal behavior that can occur, for example, if the log records required to determine the value are not present.

A

ABEND Code

See [COMPCODE](#)

ABENDCNT

For Form-based summary reporting only, the number of abending transactions that were accumulated in the key range. See also [TRANCNT](#).

Source: IMS

Column heading: Abend Count

ACKREAD

Acknowledgment read socket time. The total elapsed time for all read Socket Events issued after the response from OTMA has been sent to the client. This is the time taken to read the acknowledgment from the client.

Source: IMS Connect

Column heading: ReadSock Ack Time

ALIAS

Original ODBM alias name. For Open Database workloads in IMS Connect, this is the name of the ODBM alias specified in the DRDA request. *See also* [OUTALIAS](#).

Source: IMS Connect

Column heading: Alias Name

APPC

APPC indicator. Indicates whether the transaction originated from APPC. Reported values are:

APPC

Implicit APPC using the IMS message queue

CPIC

Explicit CPI-CI APPC using program schedule and APPC verbs

blank

Transaction is not APPC

Source: IMS

Column heading: APPC

Applict n Grp Name

See [APPLNAME](#)

APPLNAME

Application grouping name provided by the Transaction Substitution exit.

Source: IMS

Column heading: Applict n Grp Name

ApplResp Time(R0)

See [R0TIME](#)

ASIO Waits

See [FPASIOWT](#)

ASYNCRd-Ahead

See [FPASIORA](#)

B**BALG Q Count**

See [FPBALGCT](#)

BMPCHKID

The BMP user checkpoint id.

Column heading: BMP Chkpt ID

BMPCHKPT

The number of checkpoints issued by the BMP, or the unit of work.

See also [BMPSYNCP](#)

Column heading: BMP Chkpt Ct

BMPSYNCP

The number of syncpoints issued by the BMP, or the unit of work.

See also [BMPCHKPT](#)

Column heading: BMP Sync Cnt

C

CEXcm Level

See [COMPLVLC](#)

CEXHICOD

IMS Connect log code associated with the highest reported return code (RC). No value is reported if the return code is zero (0). See also [CEXHIRC](#) and [CEXHIRSN](#).

Source: IMS Connect

Column heading: High Code

CEXHIRC

Highest return code (RC) found in the IMS Connect transaction. See also [CEXHICOD](#) and [CEXHIRSN](#).

Source: IMS Connect

Column heading: CEX High RC

CEXHIRSN

Reason code associated with the highest reported return code (RC) found in the IMS Connect transaction. No value is reported if the return code is zero (0). See also [CEXHICOD](#) and [CEXHIRSN](#).

Source: IMS Connect

Column heading: CEX High RSN

CEXTYPE

IMS Connect transaction type.

OTMA

Open Transaction Manager Access (OTMA) transaction

ODBM

Open Database transaction

blank

Unknown transaction type

Source: IMS Connect

Column heading: Tran Type

CI Lock WAITS

See [FPCILWT](#)

CICSAPPL

CICS generic APPLID.

For CICS-DBCTL only, the generic APPLID of the CICS region that scheduled this thread.

The APPLID is extracted from the first 8 characters of the IMS recovery token.

CICSTASK

CICS task number. For CICS-DBCTL only, the task number of the CICS transaction that scheduled this DBCTL thread.

In CICS Performance Analyzer, the associated CMF field is TRANNUM DFHTASK P031 and is reported using field name TASKNO.

You can use the CICS task number to match transactions in the CICS and IMS reports.

The CICS transaction name and task number are available in the IMS 08 log record. For details, see the IMS-supplied macro SDFS MAC(DFSLOG08).

Source: IMS

Column heading: CICS Task ID

CLASS

Transaction Class. Transaction class as specified in the TRANSACT macro MSGTYPE parameter.

Source: IMS

Column heading: C1s

CLIACK

Client acknowledgment indicator. Indicates how the IMS Connect transaction client acknowledged the transaction results from IMS. Reported values are:

ACK

Client positively acknowledged (ACK)

NAK

Client negatively acknowledged (NAK)

NAKP

Client NAK with Purge if non-deliverable

NAKR

Client NAK with Re-route

blank

Transaction was not Synch Level=CONFIRM

Source: IMS Connect

Column heading: Cli ACK

CLIENTID

IMS Connect Client ID.

Source: IMS Connect

Column heading: Client ID

IMS Problem Investigator global field: ClientID

C1s

See [CLASS](#)

CM0DELAY

OTMA Commit Mode 0 (Commit-Then-Send) client ACK time. For OTMA Commit Mode 0 transactions only, the time it takes the client to acknowledge the response back to IMS. The elapsed time is calculated from when the output message is sent (Comms 31) to when the client acknowledgment is received and dequeued (36). This is a part of transaction processing time and can include the following:

- XCF overhead
- OTMA client (IMS Connect) processing overhead and wait for client acknowledgment

Source: IMS

Column heading: CM0Delay Time

CM1DELAY

OTMA Commit Mode 1 (Send-Then-Commit) delay time. For OTMA Commit Mode 1 transactions only, the delay in processing after the output message has been sent to OTMA. The delay elapsed time is from when the output message is sent (03/31) to when the transaction commences syncpoint processing (5610). This delay is a part of transaction processing time and can include the following:

- XCF overhead
- For Synch Level=CONFIRM only, OTMA client (IMS Connect) processing overhead and wait for client acknowledgment

Source: IMS

Column heading: CM1Delay Time

COMMITMD

IMS Connect Commit mode. Reported values are:

0

Commit mode 0 (Commit-Then-Send)

1

Commit mode 1 (Send-Then-Commit)

blank

Not an IMS Connect transaction

Source: IMS Connect

Column heading: Commit mode

Commit SDEP CIs

See [FPSDEPCI](#)

Commit SDEP Seg

See [FPSDEPSG](#)

COMPCODE

Transaction abend completion code.

Source: IMS

Column heading: ABEND Code

COMPLVL

IMS transaction completion level. IMS Performance Analyzer assigns a completion level to every transaction. IMS Performance Analyzer form-based reporting can specify a minimum completion level allowing you to report only those transactions that have reached this level of completion. The IMS transaction completion levels are:

0

IMS message is a message switch or generated output message, not a transaction. Use Completion level 0 to analyze all message queue activity, not when transaction transit information is required.

1

Transaction input message enqueued onto the IMS message queue. Use Completion level 1 to analyze transaction message queue activity, not when transaction transit information is required.

2

Transaction has started processing in the dependent region but has not completed processing. Only input queue time is available for reporting.

3

Transaction has finished processing in the dependent region but has not sent the output message to the destination LTERM. Input queue and processing times are available for reporting.

4

Transaction has ended but resource utilization statistics (from the type 07 application termination record) are not available, possibly due to WFI processing (schedule not ended). Input queue, processing, output queue and total times are available for reporting.

Note: When processing logs from shared queues subsystems, transactions are possibly assigned completion level 4, even though IMS is writing 56FA transaction-level accounting records. 56FA records result in completion level 6; however, these records can be on the log from an IMS subsystem that was not selected for the report. For transactions to be assigned completion level 6, logs from all IMS subsystems participating in the same shared queues environment must be selected.

For example, suppose a transaction message is received into IMS1, put on the shared queue, read from the shared queue by IMS2, and processed by IMS2. Completion level 4 is assigned because IMS2 might have written the 57FA transaction-level accounting record.

To achieve completion level 6, you can create a Group definition that contains IMS1 and IMS2. Then, run the report for the Group so that IMS PA can merge the logs from both subsystems. For more information refer to the Shared Queue merge processing section in the User's Guide..

5

Transaction has ended and resource utilization statistics (from the type 07 application termination record) are available, and are *approximations* only. Type 07 application termination record statistics are apportioned equally amongst all transactions processed by the program schedule. All application statistics fields are available for reporting.

6

Transaction has ended and accurate resource utilization statistics are available. For Unit-of-Recovery () transactions, resource utilization statistics are derived from the type 56FA transaction-level accounting record. This record provides accurate and reliable information for each Unit-of-Recovery (). Resource statistics for transactions reported over the entire schedule are taken from the type 07 record. This includes DBCTL, ODBM, CPIC, and non-message driven BMP transactions.

All application statistics fields are available for reporting.

Source: IMS

Column heading: Comp Level

COMPLVLC

IMS Connect transaction completion level. IMS Performance Analyzer assigns a completion level to every transaction. IMS Performance Analyzer form-based reporting can specify a minimum completion level allowing you to report only those transactions that have reached this level of completion. The IMS Connect transaction completion levels are:

0

For transactions that specified a transaction socket type, either IMS Connect rejected the transaction request message before calling the user message exit or that exit abended. For other transactions, Resume-Tpipe transaction completed. Use Completion level 0 to analyze all activity.

1

For transactions that specified a transaction socket type, the IMS Connect user message exit rejected the transaction request. Use Completion level 1 to analyze messages rejected by the message exit.

2

IMS Connect Message sent to OTMA for processing.

3

IMS Connect Message received from OTMA. This level may also indicate an OTMA timeout or error.

4

Transaction has completed IMS Connect processing. This level may also indicate an OTMA timeout or error.

Source: IMS Connect

Column heading: CEXcm Level

CONFIRM

Client Confirm time. For Sync Level CONFIRM transactions only, the elapsed time from when OTMA completed processing the input message to when the ACK response from the client is sent back to OTMA.

Source: IMS Connect

Column heading: Confirm Time

CONFOTMA

OTMA ACK processing time. For Sync Level CONFIRM transactions, the time IMS Connect waits for the ACK transaction to be processed by IMS and send the response back.

Source: IMS Connect

Column heading: OTMAconf Time

Conn RTp Time

See [OUTRTCON](#)

Connect Logon Token

See [CONNLTOK](#)

Connect System

See [HWSID](#)

CONNLTOK

IMS Connect Logon token. When used as a key field in IMS Connect summary reports, only persistent socket transactions will be reported.

Source: IMS and IMS Connect

Column heading: Connect Logon Token

IMS Problem Investigator global field: LogToken

CONNOTOK

IMS Connect Resume-Tpipe Orig Message logon token. IMS Connect logon token of the originating input message taken from the first IMS Connect event 58 (IMS Hold Queue Compensation) record encountered in the IMS Connect transaction.

Source: IMS Connect

Column heading: Resume Tpipe Orig Msg Token

CON Resp Time

See [RESPCON](#)

CON Tran Start

See [STARTCON](#)

Conv

See [CONVERS](#)

CONVERS

Conversational transaction indicator. Indicates whether a transaction is conversational as defined in the TRANSACT macro SPA parameter. Reported values are:

C

Conversational

N

Non-conversational

blank

Not a message queue transaction

Source: IMS

Column heading: Conv

CPUSU

Program execution CPU time reported in service units. The service unit normalizes the reporting of CPU time to allow for performance comparisons between, for example, an older processor and a newer processor in terms of CPU effort. CPU service unit reporting is only available in Form-based transit reports.

The CPUSU is calculated as `CPUTIME * conversion factor`. When IMS Performance Analyzer is running on the same system that generated the IMS log input file, the conversion factor can be calculated at run-time. Otherwise the conversion factor must be supplied to IMS Performance Analyzer in the command input as `IMSPALOG SYSTEM(name,vurm,factor)`.

The conversion factor for each IMS system should be specified in your batch JCL:

1. Use the IPICPUSU REXX EXEC located in the SIPIEXEC library to calculate the conversion factor and generate the batch command:

```

* IBM IMS Performance Analyzer: CPU time to Service Units conversion
*
* SYSID: XYZ1
*
* CPU VV --ID-- Model Speed Specialty
* 0 00 039A37 2818 1.000
* 1 00 039A37 2818 1.000
* 2 00 039A37 2818 1.000 zIIP
*
* Adjustment values: RMCTADJC=718 RMCTCPU=4097
*
* Formula: SUSEC = 1000000 / (RMCTADJC * 256 / RMCTCPU)
* Result : 1 CPU second = 22289.563 Service Units
*
* The following IMSPA batch command will convert CPU time to SUs:
  IMSPALOG SYSTEM(name,Vvrm,22289.563)

```

You can specify a conversion factor of CURRENT to instruct IMS Performance Analyzer to calculate the conversion factor at run time, based on the processor where IMS PA is executing. If you do not specify a conversion factor, IMS Performance Analyzer will use CURRENT.

2. Specify the command generated by step 1 in your batch JCL, for example:

```

//IMSPA JOB (ACCOUNT),'NAME'
//*
//IMSPA EXEC PGM=IPIMAIN,PARM='V152'
//STEPLIB DD DISP=SHR,DSN=IMSPA.V4R5M0.SIPILINK
//SYSPRINT DD SYSOUT=*
//LOLD1001 DD DISP=SHR,DSN=IMS.OLD1.SLDS
//LNEW1001 DD DISP=SHR,DSN=IMS.NEW1.SLDS
//IPIOPTS DD *
* IMS System Definitions
  IMSPALOG SYSTEM(OLD1,V151,14637.212)
  IMSPALOG SYSTEM(NEW1,V152,22289.563)
/*
//IPICMD DD *
  IMSPALOG LIST(SECGROUP,FIELDS(...,CPUSU,...))
  IMSPALOG SUMMARY(SECGROUP,FIELDS(...,CPUSU,...))
  IMSPALOG EXECUTE
/*

```

You must execute this REXX on the same system that created the IMS log file. The command generated by this REXX is then input into the IMS Performance Analyzer batch process.

Note: There is no provision for specialty processors.

Source: IMS

Column heading: CPUSU

CPUTIME

Program execution CPU time, approximation only at completion level 5, accurate at completion level 6.

At completion level 5 resource usage metrics are obtained from the type 07 application termination record and apportioned equally among all transactions that executed under that schedule, regardless of their respective processing times.

At completion level 6, resource usage metrics for Unit-of-Recovery () transactions are obtained from the type 56FA transaction accounting record. Metrics for transactions reported over the entire schedule are obtained from the type 07 record. This includes DBCTL, ODBM and non-message driven BMP transactions (with BMPSYNC(NO)).

For Fast Path transactions, CPU time is available only at completion level 6 from the 56FA record.

See also [DBGETS](#) and [DBUPDATS](#).

Source: IMS.

Column heading: CPU Time

CPUZIIP

zIIP execution time.

Source: IMS

Column heading: zIIP CPU Time

D

DATABASE

The DBD name of the database updated by the transaction.

A transaction can update more than one database. In this case there will be additional report lines for each database used by the transaction.

Note: The IMS log only keeps database update activity records (log codes 50 and 5950). Databases accessed by the transaction for read-only will not be reported.

Source: IMS

Column heading: Database DBD Name

Database DBD Name

See [DATABASE](#)

DB AccM

See [DBACMETH](#)

DB Lock Time

See [LOCKTIME](#)

DB Org Type

See [DBORGTYP](#)

DBACMETH

Database access method. Reported values are:

CHKP

BMP user checkpoint. CHKP is an indicator that the database has been read by the BMP.

DEDB

Fast path data entry database

ESDS

Entry-sequenced data set (VSAM)

KSDS

Key-sequenced data set (VSAM)

OSAM

Overflow sequential access method

A transaction can update more than one database. In this case there will be additional report lines for each database used by the transaction.

Recommendation: When requesting this field, also include the [DATABASE](#) field in the form. This will identify the database to which this field applies.

Source: IMS

Column heading: DB AccM

DBBLKDEL

The number of block deletes for the database.

A transaction can update more than one database. In this case there will be additional report lines for each database used by the transaction.

Recommendation: When requesting this field, also include the [DATABASE](#) field in the form. This will identify the database to which this field applies.

Source: IMS

Column heading: DB Block Deletes

DBBLKINS

The number of block inserts for the database.

A transaction can update more than one database. In this case there will be additional report lines for each database used by the transaction.

Recommendation: When requesting this field, also include the DATABASE field in the form. This will identify the database to which this field applies.

Source: IMS

Column heading: DB Block Inserts

DBBLKREP

The number of block replaces for the database.

A transaction can update more than one database. In this case there will be additional report lines for each database used by the transaction.

Recommendation: When requesting this field, also include the DATABASE field in the form. This will identify the database to which this field applies.

Source: IMS

Column heading: DB Block Replaces

DBBLKUPD

The number of block updates for the database.

A transaction can update more than one database. In this case there will be additional report lines for each database used by the transaction.

Recommendation: When requesting this field, also include the DATABASE field in the form. This will identify the database to which this field applies.

Source: IMS

Column heading: DB Block Updates

DBCALLS

Full function database call count, approximation only at completion level 5, accurate at completion level 6. At completion level 5, resource usage metrics are obtained from the type 07 application termination record and apportioned equally among all transactions that executed under that schedule, regardless of their respective processing times. At completion level 6, resource usage metrics are obtained from the type 56FA transaction accounting record.

Source: IMS

Column heading: DB Call Count

DBCTLPRE

The elapsed time between the start of the CICS transaction and the IMS PSB being scheduled and ready to process DLI calls.

For programs that issue the EXEC DLI SCHEDULE at the start of processing, this measurement can provide an estimate of the time for a DBCTL thread to become available, and for IMS to schedule it.

This time is calculated as 08 suffix STCK - IMS recovery token STCK.

For CICS-DBCTL, the IMS recovery token is generated by CICS, and consists of two parts:

1. CICS APPLID
2. Unique recovery UOW identifier (STCK value recorded in CMF field RMUOWID DFHTASK T132)

DBDEQ

The number of DL/I DB DEQ calls.

Source: IMS

Column heading: DB DEQ Count

DBDLET

Database DLET call count. At completion level 5, resource usage metrics are obtained from the type 07 application termination record and apportioned equally among all transactions that executed under that schedule, regardless of their respective processing times. At completion level 6, resource usage metrics are obtained from the type 56FA transaction accounting record.

Source: IMS

Column heading: DB DLET Count

DBGETS

Full function database get call count, approximation only at completion level 5, accurate at completion level 6. Get calls are Get Unique (GU), Get Next (GN), Get Next in Parent (GNP), Get Hold Unique (GHU), Get Hold Next (GHN), and Get Hold Next in Parent (GHNP). At completion level 5, resource usage metrics are obtained from the type 07 application termination record and apportioned equally among all transactions that executed under that schedule, regardless of their respective processing times. At completion level 6, resource usage metrics are obtained from the type 56FA transaction accounting record.

Source: IMS

Column heading: DB Get Count

DBGHN

Database Get Hold Next (GHN) call count. At completion level 5, resource usage metrics are obtained from the type 07 application termination record and apportioned equally among all transactions that executed under that schedule, regardless of their respective processing times. At completion level 6, resource usage metrics are obtained from the type 56FA transaction accounting record.

Source: IMS

Column heading: DB GHN Count

DBGHNP

Database Get Hold Next in Parent (GHNP) call count. At completion level 5, resource usage metrics are obtained from the type 07 application termination record and apportioned equally among all transactions that executed under that schedule, regardless of their respective processing times. At completion level 6, resource usage metrics are obtained from the type 56FA transaction accounting record.

Source: IMS

Column heading: DB GHNP Count

DBGHU

Database Get Hold Unique (GHU) call count. At completion level 5, resource usage metrics are obtained from the type 07 application termination record and apportioned equally among all transactions that executed under that schedule, regardless of their respective processing times. At completion level 6, resource usage metrics are obtained from the type 56FA transaction accounting record.

Source: IMS

Column heading: DB GHU Count

DBGN

Database Get Next (GN) call count. At completion level 5, resource usage metrics are obtained from the type 07 application termination record and apportioned equally among all transactions that executed under that schedule, regardless of their respective processing times. At completion level 6, resource usage metrics are obtained from the type 56FA transaction accounting record.

Source: IMS

Column heading: DB GN Count

DBGNP

Database Get Next in Parent (GNP) call count. At completion level 5, resource usage metrics are obtained from the type 07 application termination record and apportioned equally among all transactions that executed under that schedule, regardless of their respective processing times. At completion level 6, resource usage metrics are obtained from the type 56FA transaction accounting record.

Source: IMS

Column heading: DB GNP Count

DBGNS

Total database Get Next (GN), Get Next in Parent (GNP), Get Hold Next (GHN), and Get Hold Next in Parent (GHNP) calls. At completion level 5, resource usage metrics are obtained from the type 07 application termination record and apportioned equally among all transactions that executed under that schedule, regardless of their respective processing times. At completion level 6, resource usage metrics are obtained from the type 56FA transaction accounting record.

Source: IMS

Column heading: DB GNx Count

DBGU

Database Get Unique (GU) call count. At completion level 5, resource usage metrics are obtained from the type 07 application termination record and apportioned equally among all transactions that executed under that schedule, regardless of their respective processing times. At completion level 6, resource usage metrics are obtained from the type 56FA transaction accounting record.

Source: IMS

Column heading: DB GU Count

DBGUR

The number of DL/I GUR calls.

Source: IMS

Column heading: DB GUR Count

DBGUS

Total database Get Unique (GU) and Get Hold Unique (GHU) calls. At completion level 5, resource usage metrics are obtained from the type 07 application termination record and apportioned equally among all transactions that executed under that schedule, regardless of their respective processing times. At completion level 6, resource usage metrics are obtained from the type 56FA transaction accounting record.

Source: IMS

Column heading: DB GUx Count

DBIOCALL

Total OSAM and VSAM database IO count, approximation only at completion level 5, accurate at completion level 6. At completion level 5, resource usage metrics are obtained from the type 07 application termination record and apportioned equally among all transactions that executed under that schedule, regardless of their respective processing times. At completion level 6, resource usage metrics are obtained from the type 56FA transaction accounting record.

Source: IMS

Column heading: Total IO Count

DBIOTIME

Database IO elapsed time, approximation only at completion level 5, accurate at completion level 6. At completion level 5, resource usage metrics are obtained from the type 07 application termination record and apportioned equally among all transactions that executed under that schedule, regardless of their respective processing times. At completion level 6, resource usage metrics are obtained from the type 56FA transaction accounting record.

Source: IMS

Column heading: DB IO Time

DBIR

The number of DL/I IR calls.

Source: IMS

Column heading: DB IR Count

DBISRT

Database ISRT call count. At completion level 5, resource usage metrics are obtained from the type 07 application termination record and apportioned equally among all transactions that executed under that schedule, regardless of their respective processing times. At completion level 6, resource usage metrics are obtained from the type 56FA transaction accounting record.

Source: IMS

Column heading: DB ISRT Count

DBMR

The number of DL/I MR calls.

Source: IMS

Column heading: DB MR Count

DBORGTYPE

Database organization type. Reported values are:

HDAM

Hierarchical Direct Access Method

HIDAM

Hierarchical Indexed Direct Access Method

DEDB

Data Entry Database

INDEX

Primary or secondary index

HISAM

Hierarchical Indexed Sequential Access Method

A transaction can update more than one database. In this case there will be additional report lines for each database used by the transaction.

Recommendation: When requesting this field, also include the DATABASE field in the form. This will identify the database to which this field applies.

Source: IMS

Column heading: DB Org Type

DBREPL

Database REPL call count. At completion level 5, resource usage metrics are obtained from the type 07 application termination record and apportioned equally among all transactions that executed under that schedule, regardless of their respective processing times. At completion level 6, resource usage metrics are obtained from the type 56FA transaction accounting record.

Source: IMS

Column heading: DB REPL Count

DBRLSE

The number of DL/I DB RLSE calls.

Source: IMS

Column heading: DB RLSE Count

DBUPDATS

Full function database update call count, approximation only at completion level 5, accurate at completion level 6. Update calls are ISRT, DLET, REPL. At completion level 5, resource usage metrics are obtained from the type 07 application termination record and apportioned equally among all transactions that executed under that schedule, regardless of their respective processing times. At completion level 6, resource usage metrics are obtained from the type 56FA transaction accounting record.

Source: IMS

Column heading: DB Updat Count

DBUPRATE

The number of database updates per second.

A transaction can update more than one database. In this case there will be additional report lines for each database used by the transaction.

Recommendation: When requesting this field, also include the DATABASE field in the form. This will identify the database to which this field applies.

Source: IMS

Column heading: Updates/Second

DBWAITS

Full function database wait count, approximation only at completion level 5, accurate at completion level 6. Waits can be for Test enqueues, Queue commands, Update and enqueues, and Exclusive enqueues. At completion level 5, resource usage metrics are obtained from the type 07 application termination record and apportioned equally among all transactions that executed under that schedule, regardless of their respective processing times. At completion level 6, resource usage metrics are obtained from the type 56FA transaction accounting record.

Source: IMS

Column heading: DB Wait Count

DCAUTH

The number of DL/I message queue AUTH calls.

Source: IMS

Column heading: DC AUTH Count

DCCALLS

DC message queue call count, approximation only at completion level 5, accurate at completion level 6. DC calls are Get Unique (GU), Get Next (GN), Insert (ISRT), and PURGE. At completion level 5, resource usage metrics are obtained from the type 07 application termination record and apportioned equally among all transactions that executed under that schedule, regardless of their respective processing times. At completion level 6, resource usage metrics are obtained from the type 56FA transaction accounting record.

Source: IMS

Column heading: DC Call Count

DCCHNG

Message queue Change (CHNG) call count. At completion level 5, resource usage metrics are obtained from the type 07 application termination record and apportioned equally among all transactions that executed under that schedule, regardless of their respective processing times. At completion level 6, resource usage metrics are obtained from the type 56FA transaction accounting record.

Source: IMS

Column heading: DC CHNG Count

DCCMD

Message queue Command (CMD) call count. At completion level 5, resource usage metrics are obtained from the type 07 application termination record and apportioned equally among all transactions that executed under that schedule, regardless of their respective processing times. At completion level 6, resource usage metrics are obtained from the type 56FA transaction accounting record.

Source: IMS

Column heading: DC CMD Count

DCGCMC

Message queue Get Command (GCMC) call count. At completion level 5, resource usage metrics are obtained from the type 07 application termination record and apportioned equally among all transactions that executed under that schedule, regardless of their respective processing times. At completion level 6, resource usage metrics are obtained from the type 56FA transaction accounting record.

Source: IMS

Column heading: DC GCMC Count

DCGN

Message queue Get Next (GN) call count. At completion level 5, resource usage metrics are obtained from the type 07 application termination record and apportioned equally among all transactions that executed under that schedule, regardless of their respective processing times. At completion level 6, resource usage metrics are obtained from the type 56FA transaction accounting record.

Source: IMS

Column heading: DC GN Count

DCGU

Message queue Get Unique (GU) call count. At completion level 5, resource usage metrics are obtained from the type 07 application termination record and apportioned equally among all transactions that executed under that schedule, regardless of their respective processing times. At completion level 6, resource usage metrics are obtained from the type 56FA transaction accounting record.

Source: IMS

Column heading: DC GU Count

DCISRT

Message queue Insert (ISRT) call count. At completion level 5, resource usage metrics are obtained from the type 07 application termination record and apportioned equally among all transactions that executed under that schedule, regardless of their respective processing times. At completion level 6, resource usage metrics are obtained from the type 56FA transaction accounting record.

Source: IMS

Column heading: DC ISRT Count

DCPURG

Message queue Purge (PURG) call count. At completion level 5, resource usage metrics are obtained from the type 07 application termination record and apportioned equally among all transactions that executed under that schedule, regardless of their respective processing times. At completion level 6, resource usage metrics are obtained from the type 56FA transaction accounting record.

Source: IMS

Column heading: DC PURG Count

DCSETO

The number of DL/I message queue SETO calls. At completion level 5, resource usage metrics are obtained from the type 07 application termination record and apportioned equally among all transactions that executed under that schedule, regardless of their respective processing times. At

completion level 6, resource usage metrics are obtained from the type 56FA transaction accounting record.

Source: IMS

Column heading: DC SET0 Count

DDNAME

Input log ddname. The name specified in the JCL for the log containing the start record (usually X'01') for this transaction.

Source: IMS

Column heading: IMS log DDname

DEDBAREA

The DEDB area name of the database.

A transaction can update more than one database. In this case there will be additional report lines for each database used by the transaction.

Recommendation: When requesting this field, also include the DATABASE field in the form. This will identify the database to which this field applies.

Source: IMS

Column heading: DEDB Area

DEDB Get Count

See FPDEGET

DEDB Put Count

See FPDEPUT

Dest Tmember

See TMEMBERD

DLAYOTMA

OTMA delay time. The delay attributable to OTMA for an IMS Connect transaction. This elapsed time is a combination of two times:

1. From when IMS Connect sends the transaction message to OTMA, to when the message is enqueued onto the IMS message queue.
2. From when the IMS transaction sends the response back to OTMA, to when IMS Connect receives the response back.

Important: OTMA delay time can only be calculated when IMS Connect Extensions journal and IMS log data is available. This is because both IMS Connect Extensions journal records and IMS log records are required to calculate the elapsed time delay.

Source: IMS Connect and IMS

Column heading: OTMADlay Time

DLICOMTM

The ODBM unit of work (UOW) commit elapsed time.

Source: IMS Connect

Column heading: DLI UOW Commit

DLIDBNM

Database name associated with the ODBM DL/I function call.

Source: IMS Connect

Column heading: DLI DB Name

DLIDISP

ODBM Unit of Work (UOW) disposition.

COMT

Committed

ROLB

Rolled back

blank

Unknown

Source: IMS Connect

Column heading: UOW Disp

DLIFROWS

Count of rows updated for the ODBM DL/I function call.

Source: IMS Connect

Column heading: DLI Rows Updated

DLIFUNC

Type of DL/I function call made by the ODBM transaction.

ISRT

Insert

DLET

Delete

REPL

Replace

GHU

Get Hold Unique

GU

Get Unique

GUR

Get Unique Record

GHN

Get Hold Next

GN

Get Next

GHNP

Get Hold Next Within Parent

GNP

Get Next Within Parent

DELE

Batch Delete

UPDA

Batch Replace

RETR

Batch Retrieve

Source: IMS Connect

Column heading: DLI Func

DLIFUNCT

Count of each type of DL/I function call made by the ODBM transaction.

Source: IMS Connect

Column heading: DLI Func Count

DLIMSGTM

The elapsed time taken by all messages in the DL/I function call for an ODBM transaction.

Source: IMS Connect

Column heading: DLI Msg Time

DLIPCBNM

PCB name associated with the DL/I function call for an ODBM transaction.

Source: IMS Connect

Column heading: DLI PCB Name

DLIUOWSQ

ODBM UOW relative sequence number. UOW sequence number for this DLI call aggregation, a relative count starting at 1. Usually equates to the IMS Recovery Token COMN+1.

Source: IMS Connect

Column heading: UOW Seq#

DSAPSB

The number of DL/I APSB calls.

Source: IMS

Column heading: DS APSB Count

DSCHKP

The number of DL/I CHKP calls.

Source: IMS

Column heading: DS CHKP Count

DSDPSB

The number of DL/I DPSB calls.

Source: IMS

Column heading: DS DPSB Count

DSGMSG

The number of DL/I GMSG calls.

Source: IMS

Column heading: DS GMSG Count

DSICMD

The number of DL/I ICMD calls.

Source: IMS

Column heading: DS ICMD Count

DSINIT

The number of DL/I INIT calls.

Source: IMS

Column heading: DS INIT Count

DSINQY

The number of system service inquiry (INQY) calls. At completion level 5, resource usage metrics are obtained from the type 07 application termination record and apportioned equally among all transactions that executed under that schedule, regardless of their respective processing times. At completion level 6, resource usage metrics are obtained from the type 56FA transaction accounting record.

Source: IMS

Column heading: DS INQY Count

DSLOG

The number of system service log (LOG) calls. At completion level 5, resource usage metrics are obtained from the type 07 application termination record and apportioned equally among all transactions that executed under that schedule, regardless of their respective processing times. At completion level 6, resource usage metrics are obtained from the type 56FA transaction accounting record.

Source: IMS

Column heading: DS LOG Count

DSRCMD

The number of DL/I RCMD calls.

Source: IMS

Column heading: DS RCMD Count

DSROLB

The number of DL/I ROLB calls.

Source: IMS

Column heading: DS ROLB Count

DSROLS

The number of DL/I ROLS calls.

Source: IMS

Column heading: DS ROLS Count

DSSETS

The number of DL/I SETS calls.

Source: IMS

Column heading: DS SETS Count

DSSETU

The number of DL/I SETU calls.

Source: IMS

Column heading: DS SETU Count

DSXRST

The number of DL/I XRST calls.

Source: IMS

Column heading: DS XRST Count

E

ESAFCALL

Total ESAF call count, approximation only at completion level 5, accurate at completion level 6. At completion level 5, resource usage metrics are obtained from the type 07 application termination record and apportioned equally among all transactions that executed under that schedule, regardless of their respective processing times. At completion level 6, resource usage metrics are obtained from the type 56FA transaction accounting record.

Source: IMS

Column heading: ESAFcall Count

ESAFCCON

The time of day when the external subsystem completed Commit Continue processing during the transaction syncpoint.

A transaction can use more than one external subsystem (for example, Db2 and the IBM MQ adapter). In this case there will be additional report lines for each subsystem used by the transaction.

Recommendation: When requesting this field, also include the ESAFNAME field in the form. This will identify the subsystem to which this field applies.

Source: IMS

Column heading: ESAF CC End

ESAFCOMT

The elapsed time it took for the external subsystem to complete Commit processing during the transaction syncpoint.

A transaction can use more than one external subsystem (for example, Db2 and the IBM MQ adapter). In this case there will be additional report lines for each subsystem used by the transaction.

Recommendation: When requesting this field, also include the ESAFNAME field in the form. This will identify the subsystem to which this field applies.

Source: IMS

Column heading: ESAF SP Time

ESAFNAME

The name of the external subsystem used by the transaction.

A transaction can use more than one external subsystem (for example, Db2 and the IBM MQ adapter). In this case there will be additional report lines for each subsystem used by the transaction.

Source: IMS

Column heading: ESAF Name

ESAFPRE

ESAF Commit Prepare start time. The time of day when the external subsystem started Commit Prepare processing during the transaction syncpoint.

A transaction can use more than one external subsystem (for example, Db2 and the IBM MQ adapter). In this case there will be additional report lines for each subsystem used by the transaction.

Recommendation: When requesting this field, also include the ESAFNAME field in the form. This will identify the subsystem to which this field applies.

Source: IMS

Column heading: ESAF CP Start

EXCLDEQ

The number of DL/I exclusive dequeue calls.

Source: IMS

Column heading: Exc1 Dequeues

EXCLENQ

The number of DL/I exclusive enqueue calls.

Source: IMS

Column heading: Exc1 Enqueues

EXCLWAIT

The number of DL/I waits on DL/I exclusive enqueue calls.

Source: IMS

Column heading: Waits on Excl Enq

EXITNAME

The user message exit name for an IMS Connect transaction. This exit name is extracted from the first "message exit returned from READ" event record (log code 3E) for the transaction.

Source: IMS Connect

Column heading: Connect Exit

EXPRESS

Indicates the type of Express program. Reported values are:

MSG

EXPRESS=YES message.

PGM

EXPRESS program switch transaction.

blank

Not an EXPRESS Message/Program.

-

Unknown

F

FAILED

Transaction failure indicator. The reason for an IMS or IMS Connect transaction failure. Reported values are:

blank

Transaction did not fail.

ABEND

Transaction abend (abnormal end of task).

CANCEL

Transaction cancelled.

REJECT

Transaction rejected.

SESSION

Connect transaction failed due to a session error.

SF=?

Fast Path Syncpoint Failure, code = ?

Source: IMS, and Connect

Column heading: Failure Reason

Failure Reason

See [FAILED](#)

FFCHGN

The number of full function Lock Change requests.

Source: IMS

Column heading: FFChange count

FFDB50

The number of associated full-function database update (type 50) log records.

Source: IMS

Column heading: FF DBUpd count

FFLOCK

The number of full function Lock requests.

Source: IMS

Column heading: FF Lock count

FFUNLK

The number of full function Unlock requests.

Source: IMS

Column heading: FFUnlock count

FLD Call Count

See [FPFLD](#)

FP SyncP Count

See [FPSYNCCCT](#)

FPASIORA

Fast Path ASYNC Read-aheads. The number of UOW asynchronous read-aheads by HSSP or the High Speed DEDB Direct Reorganization utility in a transaction (one unit of work).

Source: IMS

Column heading: ASYNC Rd-Ahead

FPASIOWT

Fast Path Waits for ASIO. The number of UOW asynchronous read-aheads to complete by HSSP or the High Speed DEDB Direct Reorganization utility in a transaction (one unit of work). This number should be either zero or one.

Source: IMS

Column heading: ASIO Waits

FPBALGCT

Fast Path BALG Queue Count at Syncpoint. The number of transactions in the balancing group (BALG) queue when this transaction entered sync point processing.

Source: IMS

Column heading: BALG Q Count

FPBFOTHR

Fast Path Buffers sent to OTHREAD. The number of Fast Path buffers sent to OTHREAD.

Source: IMS

Column heading: OTHREAD Buffers

FPBFSTL

Fast Path Buffer steals per Tran. The number of times buffer stealing is invoked by this transaction.

Source: IMS

Column heading: FPBuffer Steals

FPBFWT

Fast Path Waits for Buffer. The number of times the transaction waited for a buffer to become available.

Source: IMS

Column heading: FPBuffer Waits

FPBUFFER Steals

See [FPBFSTL](#)

FPCALLS

Fast Path database call count. FP DB calls are Get Unique (GU), Get Next (GN), Get Next in Parent (GNP), Get Hold Unique (GHU), Get Hold Next (GHN), Get Hold Next in Parent (GHNP), Insert (ISRT), Delete (DLET), Replace (REPL), Field (FLD), and Position (POS). Fast Path resource usage statistics are accurate, not approximations. Fast Path writes a 5937 syncpoint record for every Message Processing Program (MPP) transaction that uses a Fast Path database.

Source: IMS

Column heading: FP Call Count

FPCHGN

The number of Fast Path Lock Change requests.

Source: IMS

Column heading: FPChange count

FPCILWT

Fast Path CI Lock IWAITs.

Source: IMS

Column heading: CI Lock WAITS

FPCOMB

Fast Path count of combinations logged.

Source: IMS

Column heading: FP COMB Count

FPDB5950

The number of associated Fast Path database update (type 5950) log records.

Source: IMS

Column heading: FP DBUpd count

FPDDEPU

The number of Direct Dependent Segment updates for the Fast Path database.

A transaction can update more than one database. In this case there will be additional report lines for each database used by the transaction.

Recommendation: When requesting this field, also include the DATABASE field in the form. This will identify the database to which this field applies.

Source: IMS

Column heading: DDEP Updates

FPDECL

Fast Path DEDB call count. DL/I calls to DEDB databases.

Source: IMS

Column heading: DEDB Calls

FPDEGET

Fast Path DEDB Get count.

Source: IMS

Column heading: DEDB Get Count

FPDEPUT

Fast Path DEDB Put count.

Source: IMS

Column heading: DEDB Put Count

FPDEQ

Fast Path DEDB Dequeue (DEQ) count.

Source: IMS

Column heading: FP DEQ Count

FPDLET

Fast Path database Delete (DLET) call count.

Source: IMS

Column heading: FP DLET Count

FPFLD

Fast Path Field (FLD) call count.

Source: IMS

Column heading: FLD Call Count

FPGETS

Fast Path database get call count. Fast Path DB get calls are Get Unique (GU), Get Next (GN), Get Next in Parent (GNP), Get Hold Unique (GHU), Get Hold Next (GHN), Get Hold Next in Parent (GHNP). Fast Path resource usage statistics are accurate, not approximations. Fast Path writes a 5937 syncpoint record for every MPP transaction that uses a Fast Path database.

Source: IMS

Column heading: FP Get Count

FPGHN

Fast Path database Get Hold Next (GHN) call count.

Source: IMS

Column heading: FP GHN Count

FPGHNP

Fast Path database Get Hold Next in Parent (GHNP) call count.

Source: IMS

Column heading: FP GHNP Count

FPGHU

Fast Path database Get Hold Unique (GHU) call count.

Source: IMS

Column heading: FP GHU Count

FPGN

Fast Path database Get Next (GN) call count.

Source: IMS

Column heading: FP GN Count

FPGNP

Fast Path database Get Next within Parent (GNP) call count.

Source: IMS

Column heading: FP GNP Count

FPGNS

Sum of Fast Path database Get Next (GN), Get Next in Parent (GNP), Get Hold Next (GHN) and Get Hold Next in Parent (GHNP) calls.

Source: IMS

Column heading: FP GNx Count

FPGU

Fast Path database Get Unique (GU) call count.

Source: IMS

Column heading: FP GU Count

FPGUS

Sum of Fast Path database Get Unique (GU) and Get Hold Unique (GHU) calls.

Source: IMS

Column heading: FP GUx Count

FPISRT

Fast path database Insert (ISRT) call count.

Source: IMS

Column heading: FP ISRT Count

FPLGCI

Fast path count of whole control intervals (CIs) logged.

Source: IMS

Column heading: FP CI Count

FPLOCK

Number of Fast Path Lock requests.

Source: IMS

Column heading: FP Lock count

FPMSCl

Fast Path MSDB call count. DL/I calls to MSDB databases.

Source: IMS

Column heading: MSDB Calls

FPNBFS

The Fast Path normal buffer allocation (NBA) value specified in the region startup procedure.

Source: IMS

Column heading: NBA Buffers

FPNBFU

Number of Fast Path normal buffer allocation (NBA) buffers used.

Source: IMS

Column heading: NBA Used

FPNRDBFU

Fast Path main storage database (MSDB) and sequential dependent segment (SDEP) buffers used.

Source: IMS

Column heading: SDEP Buf Used

FPOBFS

The Fast Path overflow buffer allocation (OBA) value specified in the region startup procedure.

Source: IMS

Column heading: OBA Buffers

FPOBFU

Number of Fast Path overflow buffer allocation (OBA) buffers used.

Source: IMS

Column heading: OBA Used

FPOTELAP

For transactions that update Fast Path DEDBs, the time taken to complete output thread (OThread) processing. OThread is an asynchronous process that performs the updates to the Fast Path databases. Depending on delays, OThread can complete before or after the end of transaction processing, but always independently. It is calculated as 5612 suffix STCK - TPCPCLCK.

Source: IMS

Column heading: Othread Time

FPPBFU

The number of private buffers used by High-Speed Sequential Processing (HSSP) or the High Speed DEDB Direct Reorganization utility in a transaction (one unit of work).

Source: IMS

Column heading: PVT Buff Used

FPPBFWT

The number of waits for private buffers by High-Speed Sequential Processing (HSSP) or the High Speed DEDB Direct Reorganization utility in a transaction (one unit of work).

Source: IMS

Column heading: PVT Buff Waits

FPPH1PH2

Sum of Fast Path Syncpoint Phase 1 and Phase 2 time.

Source: IMS

Column heading: PH1+PH2 FP Time

FPPOS

Fast Path Position (POS) call count.

Source: IMS

Column heading: POS Call Count

FPPRCTYP

Fast Path Process type from the 5937/38 log record. Reported values are:

HSSP

High-Speed Sequential Processing (HSSP)

Non-HSSP

Non-HSSP

Data-Cap

Data Capture Log written

Abort

APPL Abort (Sent DFS2766I)

Java

JAVA Application

Source: IMS

Column heading: Process Type

FPREPL

Fast Path database Replace (REPL) call count.

Source: IMS

Column heading: FP REPL Count

FPRLSE

Fast Path Release Locks (RLSE) call count.

Source: IMS

Column heading: FP RLSE Count

FPRTCODE

Fast Path Routing Code.

Source: IMS

Column heading: Routing Code

FPSDEPCI

Commit sequential dependent segment (SDEP) control interval (CI) number used.

Source: IMS

Column heading: Commit SDEP CIs

FPSDEPI

The number of sequential dependent segment (SDEP) inserts for the Fast Path database.

A transaction can update more than one database. In this case there will be additional report lines for each database used by the transaction.

Recommendation: When requesting this field, also include the DATABASE field in the form. This will identify the database to which this field applies.

Source: IMS

Column heading: SDEP Inserts

FPSDEPSG

Commit sequential dependent segment (SDEP) segments used.

Source: IMS

Column heading: Commit SDEP Seg

FPSEMHQI

Fast Path shared expedited message handler (EMH) queue input time. Shared EMHQ input time is the elapsed time a transaction input message spends on the shared EMH queue.

Source: IMS

Column heading: SEMHQ Input

FPSEMHQO

Shared expedited message handler (EMH) queue output time is the elapsed time a transaction output message spends on the shared EMH queue.

Source: IMS

Column heading: SEMHQ Output

FPSYNCCT

The number of Fast Path synchronization points for a transaction. This value is a count of the following IMS log records for a transaction:

- X'5937' Fast Path synchronization point operation completed
- X'5938' Fast Path synchronization point operation was unsuccessful

Source: IMS

Column heading: FP SyncP Count

FPTOTIME

Fast Path Terminal Output time. Terminal output time is the elapsed time that the Fast Path transaction output message took to be sent to the terminal.

Source: IMS

Column heading: OutTermQ Time

FPUNLK

The number of Fast Path Unlock requests.

Source: IMS

Column heading: FPUUnlock count

FPUOWLWT

Fast Path UOW Lock IWAITs.

Source: IMS

Column heading: UOW Lock WAITS

FPUPDATS

Fast Path database update call count. Fast Path database update calls are Insert (ISRT), Delete (DLET), and Replace (REPL). Fast Path resource usage statistics are accurate, not approximations. Fast Path writes a 5937 syncpoint record for every MPP transaction that uses a Fast Path database.

Source: IMS

Column heading: FP Updat Count

FPVSORFD

Virtual Storage Option (VSO) reads from daspace. The number of control interval (CI) read requests satisfied from a daspace or coupling facility structure.

Source: IMS

Column heading: VSO Read Dataspace

FPVSREAD

Virtual Storage Option (VSO) reads from DASD. The number of control intervals (CIs) read from DASD into a daspace or coupling facility structure.

Source: IMS

Column heading: VSO Read DASD

FPVSWRIT

Virtual Storage Option (VSO) writes to DASD. The number of control intervals (CIs) with updates to a daspace or coupling facility structure. This number represents the number of CIs that would have been sent to the output thread (OThread) if the areas were non-VSO.

Source: IMS

Column heading: VSOWrite DASD

FPWAITS

Fast Path database wait count. Fast Path database waits include waits for data entry database (DEDB) buffers, control interval (CI) locks, and unit of work (UOW) locks. Fast Path resource usage statistics are accurate, not approximations. FP cuts a 5937 syncpoint record for every MPP transaction that uses a Fast Path database.

Source: IMS

Column heading: FP Wait Count

FPWTNOC

Fast Path IRLM internal suspend count, or suspends not related to lock requests.

Source: IMS

Column heading: FP IRLM Susp Cnt

H

HWSID

IMS Connect system name.

Source: IMS Connect

Column heading: Connect System

I

ICALCNT

Sync Callout Message count. The number of IMS calls (DL/I ICAL calls) made by this transaction. This number is taken from either the application terminate accounting (log code 07) record or the transaction-level statistics (log code 56FA) record.

Source: IMS

Column heading: ICAL Count

IMSACK

IMS acknowledgment indicator. Indicates how the IMS Connect transaction was acknowledged by IMS. Reported values are:

ACK

IMS positively acknowledged (ACK)

NAK

IMS negatively acknowledged (NAK)

blank

Transaction was not acknowledged by IMS

Source: IMS Connect

Column heading: IMS ACK

IMSID

Processing IMS ID. IMS subsystem ID where the transaction was processed.

Source: IMS

Tip: To control the source of the IMS Processing ID, see *Log Global Options* in the IMS Performance Analyzer *User's Guide*.

Column heading: Proc IMS ID

IMS Problem Investigator global field: IMSID

IMS log DD name

See [DDNAME](#)

IMSRel

See [IMSVER](#)

IMS Resp Time

See [RESPIMS](#)

IMS RTp Time

See [OUTRTIMS](#)

IMS RTp Tot Time

See [TOTRTIMS](#)

IMS Tran Start

See [STARTIMS](#)

IMSVER

Processing IMS Version. IMS Version of the system where the IMS transaction was processed.

Source: IMS

Column heading: Proc Vers

IMS Problem Investigator global field: IMSRe1

Input Msg Len

See [MSGLIN](#)

INPUTQ

Input queue time. The elapsed time from when the input message is enqueued onto the message queue (01/35) to when the program starts processing the transaction (31 DLI).

Source: IMS

Column heading: InputQ Time

INREAD

Input read Socket time. The elapsed time taken for IMS Connect to read the incoming message from when the transaction input message enters IMS Connect (Read Prepare) to when IMS Connect has completed reading the message (final Read Socket).

Source: IMS Connect

Column heading: ReadSock In Time

IPADDR

Client IP address, either IPv4 dot-decimal notation or IPv6 format.

Source: IMS Connect

Column heading: IP Address

J**JOBNAME**

Job name of the dependent region that processed the transaction.

Source: IMS, ATF

Column heading: Jobname

L**LOCKMAX**

The high water lock count for the Unit of Recovery. This shows the maximum number of locks held at any one time by a transaction, and can provide an insight as to whether database contention could be the cause of transaction delays. For a Fast Path transaction, the lock count is obtained from the x'5937' SYNCLKS field, otherwise the count is obtained from the x'3730' XFERLHLD field. In the case of an abended transaction the lock count is obtained from either the x'3801' QLRILHLD field or the x'5938' SYNCLKS field, depending on the transaction type.

Source: IMS

Column heading: High Lock Cnt

LOCKTIME

Database Locking elapsed time, approximation only at completion level 5, accurate at completion level 6. At completion level 5, resource usage metrics are obtained from the type 07 application termination record and apportioned equally among all transactions that executed under that schedule, regardless of their respective processing times. At completion level 6, resource usage metrics are obtained from the type 56FA transaction accounting record.

Source: IMS

Column heading: DB Lock Time

LogToken

See [CONNLTOK](#)

LTERM

Input LTERM. The logical terminal (LTERM) from where the incoming transaction was initiated. For a generated message, the LTERM is unavailable and the Userid is reported.

Source: IMS, ATF

Column heading: Input LTERM

IMS Problem Investigator global field: LTerm

LTERMOUT

Output LTERM. The logical terminal (LTERM) to where the output message from the transaction is sent.

Source: IMS

Column heading: Output LTERM

LTERMOVR

Override LTERM. Override logical terminal (LTERM) to where the output message from the transaction is sent.

Source: IMS and IMS Connect

Column heading: Override LTERM

M

MODE

Description: Transaction Mode indicator

Transaction Mode indicator. Specifies when database updates and non-express output messages are committed.

Reported values are:

M

MODE=MULT transaction

S

MODE=SNGL transaction

blank

Not a message queue transaction

Note: The MODE keyword of the TRANSACT macro is equivalent to CMTMODE for the CREATE|UPDATE TRAN|TRANDESC dynamic definition commands.

Source: IMS

MSC

Indicates whether the transaction involved Multiple Systems Coupling (MSC). Reported values are:

FE

Front-end MSC transaction, where the transaction originated.

BE

Back-end MSC transaction, where the transaction was processed.

blank

Not an MSC transaction.

Source: IMS

Column heading: MSC

MSDB Calls

See [FPMSCS](#)

MSGLIN

Input message length, including the message prefix. All type 01 records for the transaction input messages are accumulated to obtain the total input message length.

Source: IMS, ATF

Column heading: Input Msg Len

MSGLOUT

Output message length, including the message prefix. All type 03 records for output messages issued by the transaction are accumulated to obtain the total output message length.

Source: IMS, ATF

Column heading: Output Msg Len

N

NBA Buffers

See [FPNBFS](#)

NBA Used

See [FPNBFU](#)

O

OBA Buffers

See [FPOBFS](#)

OBA Used

See [FPOBFU](#)

ODBALPSB

ODBM allocate PSB elapsed time.

Source: IMS Connect

Column heading: Allocate PSB Time

ODBCORTK

ODBM correlation token.

Source: IMS Connect

Column heading: ODBM Correlation Token

ODBDEPSB

ODBM deallocate PSB elapsed time.

Source: IMS Connect

Column heading: Dealloc PSB Time

ODBMNAME

ODBM name.

Source: IMS Connect

Column heading: ODBM Name

ODBMSGTM

The elapsed time taken by all messages in the ODBM transaction.

Source: IMS Connect

Column heading: ODBM Msg Time

OLR

Indicates that a batch message processing (BMP) region is scheduled for Online Reorganization. Reported values are:

Y

BMP is scheduled for Online Reorg

N

Not an Online Reorganization (OLR) BMP

-

Unknown

Source: IMS

Column heading: OLR

ORGIMS

IMS subsystem ID where the IMS transaction originated.

Note: For shared queue transactions, the transaction was processed by the IMS subsystem in field [IMSID](#).

Source: IMS and IMS Connect

Column heading: Org IMS ID

ORGLTERM

Originating LTERM. Input logical terminal (LTERM) of the originating transaction in the program switch sequence. For the first transaction in a program switch sequence, ORGLTERM is the input LTERM. For subsequent transactions in the program switch sequence, ORGLTERM will be blank for List reports, and the originating LTerm for Summary reports.

Use ORGLTERM for Transit List-style reporting where you want to see the start of a program switch sequence, followed by the program switches in sequence.

ORGLTERM has special values for non-message driven transactions:

CICS-DBCTL

CICS APPLID (taken from the IMS recovery token)

BMP

Job name

Source: IMS

Column heading: Org LTERM

ORRGTY

Region type of the originating transaction in the program switch sequence. Reported values are:

AER

IMS Application Execution Region (AER)

BAT

Batch Application

BMP

Batch message processing (BMP) region

DBC

IMS DBCTL region

IFP

IMS Fast Path Message-Driven region

JBP

Java batch processing (JBP) region

JMP

Java message processing (JMP) region

MPP

Message processing program (MPP) region

MSC

Multiple Systems Coupling (MSC) transaction sent to a remote IMS system for processing

ODB

Open Database (ODBM/ODBA)

SWI

Message switch or generated output message, not a transaction

TRK

Tracking thread

UTI

Utility

Source: IMS

Column heading: Org Reg

ORGTRAN

Transaction Code of the originating transaction in the program switch sequence.

Tip: Use ORGTRAN, PARTRAN, TRANCODE and PGMSWIT (hidden) as keys for Form-based summary reporting when transit analysis is required. IMS Performance Analyzer will summarize transaction transit activity by grouping all transactions involved in program switching, in the sequence that they are processed. For an example of this kind of report, see [SWITSUMM : Program Switch Summary summary report](#).

Source: IMS and IMS Connect

Column heading: Org Trancode

ORGUOWID

Originating tracking unit of work (UOW) ID. Only the tracking token is reported, as this uniquely identifies a transaction in a sysplex.

Tip: Field [ORGIMS](#) contains the UOW originating IMS subsystem ID.

Source: IMS

Column heading: Originating UOW ID

IMS Problem Investigator global field: OrgUOWID

ORGVER

Version of the IMS where the transaction originated.

Source: IMS

Column heading: Org Vers

ORIGDS

Original IMS data store ID. For Open Transaction Manager Access (OTMA) workloads in IMS Connect, this is the name of the IMS data store specified in the IMS destination ID field (IRM_IMSDESTID) of the IMS request message (IRM). *See also* [TARGDS](#).

Source: IMS Connect

Column heading: Original Datastor

Orig Tmember

See [TMEMBERO](#)

OSAMREAD

Overflow sequential access method (OSAM) data set read IO count, approximation only at completion level 5, accurate at completion level 6. At completion level 5, resource usage metrics are obtained from the type 07 application termination record and apportioned equally among all transactions that

executed under that schedule, regardless of their respective processing times. At completion level 6, resource usage metrics are obtained from the type 56FA transaction accounting record.

Source: IMS

Column heading: OSAMRead Count

OSAMWRIT

Overflow sequential access method (OSAM) data set write IO count, approximation only at completion level 5, accurate at completion level 6. At completion level 5, resource usage metrics are obtained from the type 07 application termination record and apportioned equally among all transactions that executed under that schedule, regardless of their respective processing times. At completion level 6, resource usage metrics are obtained from the type 56FA transaction accounting record.

Source: IMS

Column heading: OSAMWrit Count

OTHREAD Buffers

See [FPBFOTHR](#)

OTMA

Indicates whether the transaction originated from Open Transaction Manager Access (OTMA). Reported values are:

CONNECT

Transaction originated from OTMA via IMS Connect.

MQ

Transaction originated from OTMA via IBM MQ.

OTMA

Transaction originated from OTMA via an unknown client.

blank

Transaction did not originate from OTMA.

Source: IMS

Column heading: OTMA

OTMAconf Time

See [CONFOTMA](#)

OTMADlay Time

See [DLAYOTMA](#)

OTMAproc Time

See [PROCOTMA](#)

OUTALIAS

Target ODBM alias name. For Open Database workloads in IMS Connect, this is the name of the ODBM alias that processed the request. See also [ALIAS](#)

Source: IMS Connect

Column heading: Out Alias

OUTDEQ

The number of output messages sent (dequeued) by the transaction.

Tip: Outstanding output messages can fill up the message queue, causing IMS to fail. Use OUTDEQ with [OUTENQ](#) to ensure that output messages issued by transactions are being sent to the destination LTERM (dequeued).

Source: IMS

Column heading: Out DEQ Count

OUTENQ

The number of output messages issued (enqueued) by the transaction.

Tip: Outstanding output messages can fill up the message queue, causing IMS to fail. Use OUTENQ with [OUTDEQ](#) to ensure that output messages issued by transactions are being sent to the destination LTERM (dequeued).

Source: IMS

Column heading: Out ENQ Count

OUTODBNM

ODBM name.

Source: IMS Connect

Column heading: Output ODBMName

OUTPUTG

SMQ global output queue time. The elapsed time from when the output message is put onto the shared message queue (SMQ) by the back-end system to when it is read off the queue by the front-end system.

Source: IMS

Column heading: SMQ Glob OutQTime

OUTPUTL

SMQ local output queue time. The elapsed time from when the output message is read from the shared message queue (SMQ) to when it is sent to the output logical terminal (LTERM).

Source: IMS

Column heading: SMQ Loc1 OutQTime

Output LTERM

[See LTERMOUT](#)

Output Msg Len

[See MSGLOUT](#)

OUTPUTQ

Output queue time. The elapsed time from when the transaction ends to when the output message is sent back to the logical terminal (LTERM).

Source: IMS

Column heading: OutputQ Time

OUTRTCON

IMS Connect Resume-Tpipe time. Calculated as the elapsed time between the IMS Connect 48 Trigger Event that terminates the Send-Only Connect transaction and the subsequent IMS Connect 42 OTMA Message Received Event after the Resume-Tpipe transaction has commenced.

Source: IMS Connect

Column heading: Conn RTp Time

OUTRTIMS

IMS Resume Tpipe output time. The elapsed time from when the transaction output message is queued and eligible to be sent (transaction 35 COMMS when QLNQCTMP=0, otherwise 3730) to when the output message is sent to its final destination (transaction 31 COMMS).

Source: IMS

Column heading: IMS RTp Time

OutTermQ Time

[See FPTOTIME](#)

P

P2P

Program-switch indicator. Indicates whether the transaction is a program switch. The reported values are:

Y

Program switch transaction.

N

Not a program switch transaction, but may be the originating transaction in a program switch sequence.

-

Unknown. Typically a SL=2 transaction started with a type 31 (DLI GU) record.

Source: IMS

Column heading: P2P

PARRGTYP

Region type of the parent transaction in a program switch sequence. Reported values are:

AER

IMS Application Execution Region (AER)

BAT

Batch Application

BMP

Batch message processing (BMP) region

DBC

IMS DBCTL region

IFP

IMS Fast Path Message-Driven region

JBP

Java batch processing (JBP) region

JMP

Java message processing (JMP) region

MPP

Message processing program (MPP) region

MSC

Multiple Systems Coupling (MSC) transaction sent to a remote IMS system for processing

ODB

Open Database (ODBM/ODBA)

SWI

Message switch or generated output message, not a transaction

TRK

Tracking thread

UTI

Utility

Source: IMS

Column heading: Par Reg

PARTOKEN

The last 8 hexadecimal bytes (unique part) of the IMS unit of recovery token of the parent transaction in the program switch sequence, identifying the system where the parent transaction is processed. For CICS-DBCTL only, the recovery token ends in the 8-byte RMUOWID (a STCK value).

Tip: To report the full recovery token, use PARTOKEN with [PARTOKID](#).

Source: IMS

Column heading: Parent Rectoken

PARTOKID

The first 8 characters of the IMS unit of recovery token of the parent transaction in the program switch sequence, identifying the system where the parent transaction is processed. For CICS-DBCTL only, the first 8 characters of the recovery token is the CICS generic APPLID.

Tip: To report the full recovery token, use PARTOKID with [PARTOKEN](#).

Source: IMS

Column heading: Parent RecTokID

PARTRAN

The transaction code of the parent transaction in the program switch sequence.

Source: IMS

Column heading: Parent Trancode

PGMSWIT

Transaction number in program switch sequence. The sequence number of the transaction in the program switch sequence. The originating transaction starts the sequence at position 0.

Tip: Use [ORGTRAN](#), PGMSWIT (hidden) and [TRANCODE](#) as keys for form-based summary reporting when transit analysis is required. IMS Performance Analyzer will summarize transaction transit activity by grouping all transactions involved in program switching, in the sequence that they are processed.

Source: IMS

Column heading: Prog Swit#

PgmSwit Time

See [SWITTIME](#)

PH1+PH2 Time

See [FPPH1PH2](#)

PORT

IMS Connect TCP/IP port number.

Source: IMS Connect

Column heading: Port

IMS Problem Investigator global field: Port

PORTDEP

Port depth. The number of concurrently open sockets on the port from which the transaction was received. This field can be used to monitor the socket usage at the time the individual transactions were received by IMS Connect.

Source: IMS Connect

Column heading: Port Depth

PORTTYPE

Port type. Indicates whether a transaction is using a TCP/IP or local port connection. Reported values are:

T

TCP/IP

L

Local

blank

Not an IMS Connect transaction

Source: IMS Connect

Column heading: Port Type

POS Call Count

See [FPPOS](#)

POSTOTMA

Total post-OTMA output time. For Sync Level NONE transactions, the elapsed time from when OTMA completed processing the input message to when the transaction terminates (trigger event). For Sync Level CONFIRM transactions, the elapsed time from when OTMA completed processing the ACK response to when the transaction terminates (trigger event).

Source: IMS Connect

Column heading: PostOTMA Time

PREOTMA

Total pre-OTMA input time. The elapsed time from when the transaction input message enters IMS Connect (Read Prepare) to when the transaction is sent to IMS (OTMA) for processing.

Source: IMS Connect

Column heading: PreOTMA Time

PRIORITY

Transaction priority as specified in the TRANSACT macro PRTY parameter.

Source: IMS

Column heading: Pr

PROCESS

Processing time. The elapsed time the transaction spends processing in the dependent region.

Source: IMS

Column heading: Process Time

Processing UOW ID

See [PROUOWID](#)

Process Start

See [STARTDEP](#)

Process Type

See [FPPRCTYP](#)

Proc IMS ID

See [IMSID](#)

PROCOTMA

OTMA processing time. The elapsed time OTMA spent processing the transaction, from when the message is sent to IMS (OTMA) to when the response is received back from OTMA. Transaction messages are sent to OTMA for processing. For Sync Level CONFIRM transactions, the ACK response from the client is also sent to OTMA for processing, but this elapsed time is not included in OTMA procession time.

Source: IMS Connect

Column heading: OTMAproc Time

PROGRAM

Program or PSB name.

Source: IMS, ATF

Column heading: Program

IMS Problem Investigator global field: Program

Program exec time

See [PROCESS](#)

Prog Swit#

See [PGMSWIT](#)

PROUOWID

Processing tracking unit of work (UOW) ID.

Source: IMS

Column heading: Processing UOW ID

PSBNAME

PSB name.

Source: IMS Connect

Column heading: PSB Name

PSTID

The PST ID of the dependent region that processed the transaction.

Source: IMS

Column heading: PST

IMS Problem Investigator global field: Region

PVT Buff Used

See [FPPBFU](#)

PVT Buff Waits

See [FPPBFWT](#)

Q

QCMDDEQ

The number of DL/I queue command dequeues.

Source: IMS

Column heading: Q Cmd Dequeues

QCMDENQ

The number of DL/I queue command enqueues.

Source: IMS

Column heading: Queue Type

QCMDWAIT

The number of DL/I waits on queue command enqueues.

Source: IMS

Column heading: Queue Type

QTYPE

Message queue type. Indicates the type of message queue from where the transaction was taken to be processed. Reported values are:

MSGQ

IMS message queue

LOCALF

Local-first (always processed by the same system where the message was queued)

LOCAL

IMS shared message queue (SMQ) processed locally by the front-end IMS system

GLOBAL

IMS shared message queue (SMQ) processed globally by another back-end IMS system

NONMSG

Non-message driven BMP

CPI-CI

CPI-CI APPC transaction scheduled in message region

Tip: Use QTYPE with TRANCODE as keys for form-based summary reporting when transit analysis of input queue time is required. For shared message queues, you will be able to compare input queue times for globally and locally processed transactions.

Source: IMS

Column heading: Queue Type

R**R0TIME**

Internal application response time. The sum of the input queue time and processing time.

Source: IMS

Column heading: ApplResp Time(R0)

R1TIME

Total response time. The sum of the input queue time, processing time, and output queue time.

Source: IMS

Column heading: Tot Resp Time(R1)

RATEMIN

Transaction rate / Minute. For form-based summary reporting only, the transaction rate per minute.

Source: IMS and IMS Connect

Column heading: Rate/Min

RATESEC

Transaction rate / Second. For Form-based summary reporting only, the transaction rate per second.

Source: IMS and IMS Connect

Column heading: Rate/Sec

READEXIT

Read message Exit time. The elapsed time the input message spent being processed by the READ Message Exit. For Sync Level NONE transactions, the READ Message Exit is called once for the input message. For Sync Level CONFIRM transactions, the READ Message Exit is called twice, initially for the input message and a second time for the ACK response from the client.

Source: IMS Connect

Column heading: ReadExit Time

ReadSock Ack Time

See ACKREAD

ReadSock In Time

See INREAD

RECOVER

Recoverable transaction indicator. Indicates whether a transaction is recoverable or non-recoverable as defined in the TRANSACT macro INQUIRY parameter. Reported values are:

R

Recoverable

N

Non-recoverable

blank

Not a message queue transaction

Source: IMS

Column heading: Rec

RECTOKEN

The last 8 hexadecimal bytes (unique part) of the 16-byte IMS unit of recovery token that uniquely identifies a unit of work. The reported value consists of the following fields:

OASN

4-byte origin application sequence number assigned at schedule time. OASN is unique and reset back to zero at cold start.

COMN

4-byte commit number initialized to zeros and incremented each time the application goes through commit processing.

For CICS-DBCTL only, the last 8 bytes of the CICS-generated recovery token contains the RMUOWID (a STCK value).

Tip: To report the full recovery token, use RECTOKEN with [RECTOKID](#).

Source: IMS, ATF

Column heading: Recovery Token

IMS Problem Investigator global field: RecToken

RECTOKID

The first 8 characters of the IMS unit of recovery token containing the ID of the IMS subsystem where the transaction is processed. For CICS-DBCTL only, CICS generic APPLID is reported from first 8 bytes of the CICS-generated recovery token.

Tip: To report the full recovery token, use RECTOKID with [RECTOKEN](#).

Source: IMS, ATF

Column heading: Recovery Token ID

Region

See [PSTID](#)

REGOCCUP

Region occupancy time. The elapsed time that an MPP transaction spends in the dependent region, from when it is scheduled, or starts processing, to when the next transaction is eligible for processing.

Source: IMS

Column heading: Region Occ Time

REGTYPE

Region type.

The type of region that processed the transaction. Reported values are:

AER

IMS Application Execution Region (AER)

BAT

Batch Application

BMP

Batch message processing (BMP) region

DBC

IMS DBCTL region

IFP

IMS Fast Path Message-Driven region

JBP

Java batch processing (JBP) region

JMP

Java message processing (JMP) region

MPP

Message processing program (MPP) region

MSC

Multiple Systems Coupling (MSC) transaction sent to a remote IMS system for processing

ODB

Open Database (ODBM/ODBA)

SWI

Message switch or generated output message, not a transaction

TRK

Tracking thread

UTI

Utility

Note: To report on CPI, see [APPC](#).

Source: IMS

Column heading: Reg Typ

REJECT

Transaction rejected indicator. Indicates whether an IMS Connect transaction has been rejected. Reported values are:

R

Transaction rejected

blank

Transaction not rejected

Source: IMS Connect

Column heading: Rej

REROUTNM

IMS Connect Reroute name. The name used on a NAK Reroute request to specify the new destination for the message that is to be negatively acknowledged.

Source: IMS Connect

Column heading: Reroute Name

RESPCON

Connect response time. The elapsed time from when the transaction input message enters IMS Connect (Read Prepare) to when the transaction terminates (trigger event).

Source: IMS Connect

Column heading: CON Resp Time

RESPIMS

IMS response time. IMS transaction end-user response time. The elapsed time from when the input transaction is enqueued by IMS (01/35) to when the response is sent back to the originating LTERM (31 Communications). Only transactions that respond back to their originating LTERM incur a response time. Responses may occur prior to the completion of program execution time resulting in a response time less than the total transaction time.

Tip: To analyze all transactions from end-to-end, regardless of their response destination, use field TOTALTM.

Source: IMS

Column heading: IMS Resp Time

RESPMODE

Response mode indicator. Indicates whether a transaction is response mode or not. Reported values are:

R

Response mode

N

Not response mode

blank

Not a message queue transaction

Source: IMS

Column heading: Resp Mode

Resp time

See RESPIMS

RESUMETP

Resume Tpipe indicator. Indicates whether IMS Connect uses a resume Tpipe to request asynchronous output data from IMS during a transaction. Reported values are:

R

Resume Tpipe is used

N

Resume Tpipe is not used

blank

Not an IMS Connect transaction

Source: IMS Connect

Column heading: Resum Tpipe

IMS Problem Investigator global field: ResumeTP

Resume Tpipe Orig Msg Token

See CONNOTOK

Routing Code

See FPRTCODE

RXMLEXIT

XML Adapter message Exit time. The elapsed time the input message from the XML Adapter spent being processed by the READ Message Exit.

Source: IMS Connect

Column heading: RXMLExit Time

ROTIME

Internal Application Response time. The sum of the input queue time and processing time.

Source: IMS

Column heading: ApplResp Time (R0)

R1TIME

Total Response time. The sum of the input queue time, processing time, and output queue time.

Source: IMS

Column heading: Tot Resp Time(R1)

S

SAF Call Time

See [SAFTIME](#)

SAFTIME

SAF security call time. The accumulated elapsed time spent in all SAF calls for the message.

Source: IMS Connect

Column heading: SAF Call Time

SCHEDTM

Schedule time. Schedule time is taken from the LINTMSCH field of the IMS Application Start (08) record. If the (08) does not contain a valid LINTMSCH value then, for a Message Region, it is the elapsed time from when the application program starts (08) to when the input message processing starts (31 DLI).

Source: IMS, ATF

Column heading: Schedule Time

SCHEDTYP

Description: Schedule type.

Reported values are:

REAL

Real schedule - first transaction only is counted.

QUICK

Quick re-schedule - first transaction only is counted.

FALSE

False schedule

Blank

Unknown, or not the first transaction in schedule.

Note: For FALSE schedules to be reported, Form-based Transit option 'False schedules' must be set to 2 (YES).

Source: IMS

SCHEDWIC

Wait time for Intent Conflict, taken from the LINTMINT field of the IMS Application Start (08) record.

Source: IMS

Column heading: Schedule WIC Time

SCHEDWPS

Wait time for Pool Space, taken from the LINTMPOL field of the IMS Application Start (08) record.

Source: IMS

Column heading: Schedule WPS Time

SCOACKCT

Sync Callout ACK count. The number of Sync callout ACK events attributed to the transaction. *See also* [SCOACKTM](#).

Source: IMS

Column heading: SyncCout ACK Cnt

SCOACKTM

Sync Callout ACK time. The elapsed time from when the Sync Callout message is sent to when the ACK is received (YOUT-YACK). If the transaction issued more than one ICAL call, then this field contains the sum of all ACK times. The count of ACK times is available in [SCOACKCT](#).

Source: IMS

Column heading: SyncCout ACK Time

SCOCALCT

Sync Callout Response count. The number of ICAL calls issued by the transaction that recorded a response time. *See also* [SCOCALTM](#).

Source: IMS

Column heading: SyncCout Resp Cnt

SCOCALTM

Sync Callout Total time. The elapsed time from when the Sync Callout message is sent to when the Response (YOUT-YRSP) or a NAK (YOUT-YNAK) is received back. If the transaction issued more than one ICAL call, then this field contains the sum of all elapsed times. The count of Total Response times is available in [SCOCALCT](#).

Source: IMS

Column heading: SyncCout RespTime

SCOEXTCT

Sync Callout External Response count. The total number of Sync Callout external acknowledgments or responses processed by the transaction. *See also* [SCOEXTTM](#).

Source: IMS

Column heading: SyncCout XRsp Cnt

SCOEXTTM

Sync Callout External Response time. The elapsed time from when the Sync Callout ACK is received to when either the Response (YOUT-YRSP) or a NAK (YOUT-YNAK) is received. If the transaction issued more than one ICAL call, then this field contains the sum of all elapsed times. The count of External Response times is available in [SCOEXTCT](#).

Source: IMS

Column heading: SyncCout XRspTime

SCONAKCT

Sync Callout NAK count. The number of Sync callout ACK events attributed to the transaction. *See also* [SCONAKTM](#).

Source: IMS

Column heading: SyncCout NAK Cnt

SCONAKTM

Sync Callout NAK time. The elapsed time from when the Sync Callout message is sent to when the NAK is received (YOUT-YNAK). If the transaction issued more than one ICAL call, then this field contains the sum of all NAK times. The count of NAK times is available in [SCONAKCT](#).

Source: IMS

Column heading: SyncCout NAK Time

SCOTPIPE

Sync Callout TPIPE name. TPIPE name derived from the IMS x'6701' YOUT Sync Callout record.

Source: IMS

Column heading: Callout TPIPE

SDEP Buf Used

See [FPNRDBFU](#)

SECCHK

Highest security check code returned from an ODBM command.

Source: IMS Connect

Column heading: Sec Code

SEMHQ Input

See [FPSEMHQI](#)

SEMHQ Output

See [FPSEMHQO](#)

SMQ Glob OutQTime

See [OUTPUTG](#)

SMQ Locl OutQTime

See [OUTPUTL](#)

SOCKET

Socket number.

Source: IMS Connect

Column heading: Sock Num

SOCKTYPE

Socket type.

N

Non-persistent socket

P

Persistent socket

T

Transaction socket

blank

Unknown

Source: IMS Connect

Column heading: Sock Type

STARTCON

Connect transaction start time. The time of day when the transaction input message enters IMS Connect (Read Prepare).

Source: IMS Connect

Column heading: CON Tran Start

STARTDEP

IMS transaction processing start. The time of day when the IMS Full Function transaction starts (31) or the time of day when the Fast Path transaction starts (5901+InputQ).

Source: IMS

Column heading: Process Start

STARTIMS

IMS transaction arrival time. The time of day when the transaction input message is enqueued onto the IMS message queue with a type 01 (INPUT MSG) or type 35 (MSG ENQ) record.

Source: IMS

Column heading: IMS Tran Start

STARTLVL

IMS transaction start level. Start level is an attribute that IMS Performance Analyzer assigns to every transaction reported in the IMS log. It is an indicator of how far the transaction lifecycle has already progressed at the start of the IMS log. Together with Completion level (**COMPLVL**), Start level is an indicator of the completeness of information collected about the reported transaction. The reported values are:

1

Transaction started with a type 01 (INPUT MSG) or type 35 (MSG ENQ) record generated when the transaction was added to the IMS Message Queue.

2

Transaction started with a type 31 (DLI GU) record generated when the transaction was retrieved from the IMS Message Queue for processing.

3

Transaction generated for a Non-message driven BMP or Thread process where the type 08 Application Start record is not available but dependent region processing has commenced.

Source: IMS

Column heading: Start Level

STEPNAME

Region Stepname. The stepname of the dependent region that processed the transaction.

Source: IMS, ATF

Column heading: Stepname

SVRCOD

Highest severity code returned from an ODBM command.

Source: IMS Connect

Column heading: Svr Code

SWITTIME

Program switch time.

A program switch occurs when one transaction calls another by inserting a message (destination is an IMS scheduler message block (SMB)) onto the message queue. Program switch time is the elapsed time from when the program switch message is eligible for processing to when it actually starts processing in a dependent message processing region. This time is attributed to the program switch transaction, not the originating transaction, and is analogous to input queue time for transactions coming into IMS from VTAM or OTMA.

Program-to-program (P2P) transactions are discrete transactions with their own units of recovery. Their processing eligibility depends on the type of IO PCB used to insert the message:

- For EXPRESS=YES alternate IO PCB, the P2P transaction is immediately eligible for processing (asynchronously). SWITTIME is from the enqueue of the input message (35) to the start of processing (31 DLI).
- Otherwise for IO PCB, the P2P transaction cannot start until the parent completes syncpoint phase 1 processing. SWITTIME is from syncpoint phase 2 when the message is transferred from the temporary hold queue to its permanent destination (37) to the start of processing (31 DLI).

Source: IMS

Column heading: PgmSwTch Time

SYNCELAP

Syncpoint total elapsed time (phases 1 and 2). The time reported depends on the following:

- For all Fast Path transactions this is X'5936'.FLDQPRTS if available, otherwise X'5937'.SYNCPRTM.
- For all other transactions this is X'5610' to X'5612', except when X'5937'.SYNCOTHR > 0 then it is X'5610' to X'5937'.

Note: The required log records are not always available in the log. In this case, the time reported may be the value reported for Phase 1 or Phase 2 only.

Source: IMS

Column heading: Syncpt Time

SYNCFAIL

Fast Path Syncpoint Failure code from the 5938 log record.

Source: IMS

Column heading: Sync Fail

SYNCLEV

OTMA synchronization level. Reported values are:

NONE

Synch Level=NONE. No acknowledgment is required from the client.

CONFIRM

Synch Level=CONFIRM. The client is required to acknowledge.

SYNCH

Sync Level=SYNCH. Two-phase commit processing is required.

blank

Not an OTMA transaction.

Source: IMS and IMS Connect

Column heading: Synch Level

SYNCPH1E

Syncpoint phase 1 elapsed time, measured as the time between the X'5610' and X'3730' log records.

Note: The required log records are not always available in which case the time will be reported as not available.

Source: IMS

Column heading: Sync PH1 Time

SYNCPH2E

Syncpoint phase 2 elapsed time.

- For all Fast Path transactions this is the value reported in log record field X'5936'.FLDQPRTS (if available), otherwise the value in X'5937'.SYNCPRTM is reported.
- For all other transactions this is the time between the X'3730' and X'5612' log records, except when the value in log record X'5937'.SYNCOTHR is greater than 0 in which case the time between log records X'3730' and X'5937' is used.

Note: The required log records are not always available in which case the time will be reported as not available.

Source: IMS

Column heading: Sync PH2 Time

SYNCPH2F

Syncpoint phase 2 elapsed time for Fast Path only. For all non-IFP transactions that use Fast Path this is the time between log records X'3730' and X'5937/38'. For all Fast Path transactions this is the time reported in log record field X'5936'.FLDQPRTS' (if available), otherwise the value in log record field X'5937'.SYNCPRTM' is used.

Note: The required log records are not always available in which case the time will be reported as not available.

Source: IMS

Column heading: Sync PH2 FP Time

SYNCTIME

The time of day when the IMS Full Function transaction or Fast Path transaction ends (5612).

Source: IMS

Column heading: Syncpoint Time

T

TARGDS

Target IMS data store. For OTMA workloads from IMS Connect, this is the name of the IMS data store that processed the request. *See also* [ORIGDS](#).

Source: IMS Connect

Column heading: Target datastor

TERMINAL

VTAM Node name or BTAM Line/PTERM number. When neither VTAM or BTAM, TERMINAL may be reported as:

- For implicit APPC transactions, network ID (LUP_NETWORK_ID)
- For OTMA transactions, Tpipe name (TMAMCTNM)
- For MSC transactions, origin LTERM (MSGMSINM)

Source: IMS

Column heading: Terminal

IMS Problem Investigator global field: Terminal

TESTDEQ

The number of DL/I test dequeues.

Source: IMS

Column heading: Test Dequeues

TESTENQ

The number of DL/I test enqueues.

Source: IMS

Column heading: Test Enqueues

TESTWAIT

The number of DL/I waits on test enqueues.

Source: IMS

Column heading: Waits on Test Enq

TIMEOUT

Transaction timeout indicator. Indicates whether an IMS Connect transaction has timed-out. Reported values are:

T

Transaction timed-out

blank

Transaction did not time out

Source: IMS Connect

Column heading: Time Out

TIMERV

Transaction timer value. This value, set by the client in the IMS request message (IRM) header, is the time IMS Connect will wait for a response from OTMA before timing out. The time is reported in microseconds. Use the **SECGROUP** operand to report values in seconds in the range 0 (no wait option) to 4200 (70 mins), or 9999 to wait forever.

Tip: Use the [TIMEOUT](#) field to indicate whether the IMS Connect transaction did time out.

Source: IMS Connect

Column heading: Transact Timer

TMEMBERD

Destination OTMA Tmember name. IMS XCF queue which delivers the message to IMS Connect.

Source: IMS Connect

Column heading: Dest Tmember

TMEMBERO

Originating OTMA Tmember name. IMS Connect XCF queue which will return the message to IMS.

Source: IMS

Column heading: Orig Tmember

Total IMS Time

See [TOTALTM](#)

Total IO Count

See [DBIOCALL](#)

Total time

See [TOTALTM](#)

TOTALTM

Total transaction elapsed time. The total elapsed time that the transaction incurs in message queues and being processed by IMS. For self-contained transactions, or the initial transaction in a program switch sequence, total time consists of input queue, processing and output queue times. For subsequent transactions in a program switch sequence, total time consists of switch time, processing time and output queue time.

Source: IMS

Column heading: Total IMS Time

Tot Resp Time(R1)

See [R1TIME](#)

TOTRTIMS

Resume Tpipe total time. The elapsed time from when the input message arrives (01/35) to when the Resume Tpipe takes the output message and sends it to its final destination (RTPIPE 31 COMMS). This time is useful for transactions that use SENDONLY RESUME-TPIPE protocol – it measures the overall time in IMS that contributes to end-user response time.

Source: IMS

Column heading: IMS RTp Tot Time

TPIPE

IMS Connect Tpipe name derived from IMS Connect Extensions journal 41 record field CERE_41_TPIPE_NAME.

Source: IMS Connect

Column heading: Tpipe

TRANCNT

Transaction count. For Form-based summary reporting only, the number of transactions that were accumulated in this key range.

When TRANCNT is used in combination with fields that report on database activity or external subsystems, additional report lines are produced that provide a count for each database or external subsystem affected by the transaction. If requested, a summary line is also produced that reports on the total number of transactions. As transactions can update more than one database, or more than one external subsystem, the total in the summary line will not necessarily be the sum of counts listed above.

In the following example, the total number of transactions (**A**) does not equal the sum of counts for each database as some transactions have accessed more than one database.

Trancode	Database DBD Name	Tran Count
IVTNO	-	4
IVTNO	IVPDB1	7
IVTNO	IVPDB1I	6
IVTNO		11 A

Fields that report on database activity: [DATABASE](#), [DBACMETH](#), [DBBLKDEL](#), [DBBLKINS](#), [DBBLKREP](#), [DBBLKUPD](#), [DBORGTYP](#), [DBUPRATE](#), [DEDBAREA](#), [FPDDEPU](#), [FPSDEPI](#)

Fields that report on external subsystems: [ESAFNAME](#), [ESAFCALL](#), [ESAFCCON](#), [ESAFCOMT](#), [ESAFPRE](#)

See also [ABENDCNT](#)

Source: IMS and IMS Connect

Column heading: Tran Count

TRANCODE

Transaction code. For CICS-DBCTL only, the CICS transaction code is reported. Otherwise, the IMS transaction code is reported.

Source: IMS and IMS Connect

Column heading: Trancode

IMS Problem Investigator global field: TranCode

Transact Timer

See [TIMERV](#)

U

UORTIME

Unit-of-recovery () time, or in other words, the elapsed time the transaction spends processing in the dependent region. IMS Performance Analyzer calculates the time as the difference between the IMS X'5612' and X'5607' log records.

Note: UOR time is similar to Processing Time, the difference for an MPP transaction is:

- UOR time starts when the IMS unit-of-recovery commences (5607).
- Processing time starts when the MPP transaction gets the input message from the message queue (31 DLI), usually after the commencement of the .

Therefore UOR time is usually longer than Processing time.

Source: IMS

Column heading: Time

UOW Lock WAITS

See [FPUOWLWT](#)

UPDDEQ

The number of DL/I update dequeues.

Source: IMS

Column heading: Update Dequeues

UPDENQ

The number of DL/I update enqueues.

Source: IMS

Column heading: Update Enqueues

UPDWAIT

The number of DL/I waits on update and enqueues.

Source: IMS

Column heading: Waits on Upd Enq

USERID

User ID. RACF user ID, or substitute as used by IMS for security purposes.

Source: IMS, IMS Connect, and ATF

Column heading: Userid

IMS Problem Investigator global field: Userid

V**VSAMREAD**

VSAM read IO count, approximation at completion level 5, accurate at completion level 6. At completion level 5, resource usage metrics are obtained from the type 07 application termination record and apportioned equally among all transactions that executed under that schedule, regardless of their respective processing times. At completion level 6, resource usage metrics are obtained from the type 56FA transaction accounting record.

Source: IMS

Column heading: VSAMRead Count

VSAMWRIT

VSAM write IO count, approximation at completion level 5, accurate at completion level 6. At completion level 5, resource usage metrics are obtained from the type 07 application termination record and apportioned equally among all transactions that executed under that schedule, regardless of their respective processing times. At completion level 6, resource usage metrics are obtained from the type 56FA transaction accounting record.

Source: IMS

Column heading: VSAMWrit Count

VSO Read DASD

See [FPVSREAD](#)

VSO Read Dataspace

See [FPVSORFD](#)

VSO Write DASD

See [FPVSWRIT](#)

W**WFI TIME**

WFI elapsed time. SUBQ6 time where the message region waited before the next WFI transaction starts processing.

Important: IMS only records SUBQ6 time to a precision of 0.1 seconds.

Source: IMS

Column heading: WFI Time

X

XMITEXIT

Transmit message Exit time. The elapsed time output messages (responses) spent being processed by the XMIT Message Exit.

Source: IMS Connect

Column heading: XmitExit Time

XMLADAPT

XML Adapter name. The name of the XML Adapter passed by the SOAP Gateway.

Source: IMS Connect

Column heading: XML Adapter

XQRYCOPY

The number of XQuery COPY calls.

Source: IMS

Column heading: Xquery COPY Cnt

XQRYRSTR

The number of XQuery RSTR calls.

Source: IMS

Column heading: Xquery RSTR Cnt

XQRYSAVE

The number of XQuery SAVE calls.

Source: IMS

Column heading: Xquery SAVE Cnt

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