

z/VM
7.5

Migration Guide



Note:

Before you use this information and the product it supports, read the information in [“Notices” on page 153.](#)

This edition applies to version 7, release 5 of IBM® z/VM® (product number 5741-A09) and to all subsequent releases and modifications until otherwise indicated in new editions.

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About This Document

This document provides a history of significant changes to the z/VM product since z/VM V5.4, as delivered in new product releases and between-release small programming enhancements (SPEs) and New Function APARs.

Intended Audience

This document is intended for personnel who are responsible for planning and completing a system upgrade. This information could also be helpful to programmers who will be migrating applications to the new system.

Where to Find More Information

You can find information about changes between various releases of z/VM in these editions of this book:

- This edition contains information about changes in z/VM releases 7.1 through 7.5.
- The z/VM 7.4 edition of *z/VM: Migration Guide*, GC24-6294-74, contains information about changes in z/VM releases 6.1 through 6.4, in addition to releases 7.1 through 7.4.
- The z/VM 5.4 edition of *z/VM: Migration Guide*, GC24-6201-14, contains information about changes in z/VM 5.4 and earlier releases.

For information about the current z/VM hardware and software requirements, see *z/VM: General Information*. For more information about z/VM functions, see the other books listed in the “Bibliography” on page 157.

Links to Other Documents and Websites

The PDF version of this document contains links to other documents and websites. A link from this document to another document works only when both documents are in the same directory or database, and a link to a website works only if you have access to the Internet. A document link is to a specific edition. If a new edition of a linked document has been published since the publication of this document, the linked document might not be the latest edition.

How to provide feedback to IBM

We welcome any feedback that you have, including comments on the clarity, accuracy, or completeness of the information. See [How to send feedback to IBM](#) for additional information.

Summary of changes for z/VM: Migration Guide

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

GC24-6294-75, z/VM 7.5 (September 2026)

This edition supports the general availability of z/VM 7.5. Note that the publication number suffix (-75) indicates the z/VM release to which this edition applies.

- **Installation, migration, and service**

- “[7.5] Installation changes” on page 20
- “[7.5] z/CMS as the default CMS” on page 21
- “[7.5] System infrastructure virtual switch” on page 21
- “[7.5] Integration of removable media services into the base of z/VM” on page 21

- **Support and exploitation of hardware and architectures, and hypervisor efficiency and scalability**

- “[7.5] HYPERSWAP for guest HyperPAV” on page 56
- “[7.5] Real memory scalability infrastructure” on page 57
- “[7.5] Architecture level set (ALS)” on page 57
- “[7.5] Enable multithreading by default” on page 57

- **Connectivity and networking**

- “[7.5] Removal of support for the LDAP server” on page 64
- “[7.5] Removal of z/VM NFS support” on page 64
- “[7.5 APAR PH71335] z/VM FTP client support for SOCKS5” on page 64

- **System administration, operation, and ease of use**

- “[7.5] Memory overcommitment control” on page 86
- “[7.5] Memory terminology simplification” on page 86
- “[7.5] Default changes” on page 87
- “[7.5] Fence 3380 from VM system use” on page 88
- “[7.5] Semantic versioning support for CP ” on page 89
- “[7.5] XEDIT respects the WIDTH option if it is specified” on page 89

- **Security**

- “[7.5] RACF simplification” on page 95
- “[7.5] Host secure boot” on page 96

- **Application development and deployment**

- “[7.5, 7.4 APARs] Enhanced QDIO support in DirMaint and SMAPI” on page 99

- **System diagnosis**

- “[7.4 VM66877] Soft abend improvements” on page 102
- “[7.5] Allow TRSOURCE to initiate a SNAPDUMP” on page 102

Miscellaneous update

The DMS260T HELPMMSG file, which was deleted in z/VM 6.3, is restored. This is noted in [Table 22](#) on page 146.

GC24-6294-74, z/VM 7.4 (April 2026)

This edition includes updates to support product changes provided or announced after the general availability of z/VM 7.4.

- **Installation, migration, and service**
 - [“\[7.4, 7.3 APARs\] GETSHOPZ support for z/VM installation media” on page 20](#)
- **Support and exploitation of hardware and architectures, and hypervisor efficiency and scalability**
 - [“\[7.4 APAR\] Control-only access for guest crypto domains ” on page 55](#)
 - [“\[7.4 APAR\] Removal of paging pack without an IPL” on page 55](#)
- **System administration, operation, and ease of use**
 - [“\[7.4 APAR\] QUERY DASD and QUERY TAPE enhancements ” on page 94](#)
- **Security**
 - [“\[7.4 APAR\] RACF utility enhancements II ” on page 94](#)
 - [“\[7.4 APAR\] Simplified DirMaint RACF connector ” on page 94](#)
 - [“\[7.4 APAR\] Certificate manager command enhancements” on page 95](#)
- **Application development and deployment**
 - [“\[7.4 APAR\] DirMaint support for control-only access for guest crypto domains ” on page 98](#)
 - [“\[7.4 APAR\] Systems Management support for renaming a userid ” on page 98](#)
 - [“\[7.4 APAR\] CRYPTO APVIRT NONE ” on page 98](#)
- **System diagnosis**
 - [“\[7.4 APAR\] FICON RAS improvements” on page 101](#)

GC24-6294-74, z/VM 7.4 (September 2025)

This edition includes updates to support product changes provided or announced after the general availability of z/VM 7.4.

- **Support and exploitation of hardware and architectures, and hypervisor efficiency and scalability**
 - [“\[7.4, 7.3 APARs\] Enhanced QDIO virtual switch vNIC simulation” on page 54](#)
 - [“\[7.4, 7.3 APARs\] Transactional execution disablement” on page 54](#)
- **System administration, operation, and ease of use**
 - [“\[7.4 APAR\] Unified DIFF and PATCH support for CMS” on page 85](#)
 - [“\[7.4 APAR\] Fast LOGOFF control” on page 85](#)
- **Security**
 - [“\[7.4 APAR\] RACF utility enhancements I” on page 94](#)
- **Application development and deployment**
 - [“\[7.4 APAR\] DirMaint and SMAPI LOADDEV ALTERNATE directory support” on page 98](#)
 - [“\[7.4 APAR\] SMAPI support for querying linear service ” on page 98](#)
- **System diagnosis**
 - [“\[7.4 VM66877\] Soft abend improvements” on page 102](#)

The following topics are also updated:

- [“\[7.4, 7.3 APARs\] Single system image \(SSI\) prerequisite support for future-server compatibility ” on page 49](#)
- [“\[7.4, 7.3 APARs\] z/VM support for the IBM z17 family” on page 50](#)

- [“\[7.4, 7.3 APARs\] z/VM TCP/IP support for enhanced QDIO” on page 63](#)

GC24-6294-74, z/VM 7.4 (July 2025)

This edition includes updates to support product changes provided or announced after the general availability of z/VM 7.3 and 7.4.

The following topics are updated:

- **Support and exploitation of hardware and architectures, and hypervisor efficiency and scalability**
 - [“\[7.4, 7.3 APARs\] z/VM support for the IBM z17 family” on page 50](#)
- **System administration, operation, and ease of use**
 - [“\[7.4, 7.3 APARs\] z/VM Performance Data Pump enhancements” on page 85](#)

GC24-6294-74, z/VM 7.4 (June 2025)

This edition includes updates to support product changes provided or announced after the general availability of z/VM 7.3 and 7.4.

- **Installation, migration, and service**
 - [“\[7.4 APAR\] z/VM linear service environment variables” on page 20](#)
- **Support and exploitation of hardware and architectures, and hypervisor efficiency and scalability**
 - [“\[7.4, 7.3 APARs\] Single system image \(SSI\) prerequisite support for future-server compatibility ” on page 49](#)
 - [“\[7.4, 7.3 APARs\] z/VM support for the IBM z17 family” on page 50](#)
- **Connectivity and networking**
 - [“\[7.4, 7.3 APARs\] z/VM TCP/IP support for enhanced QDIO” on page 63](#)
- **System administration, operation, and ease of use**
 - [“\[7.4, 7.3 APARs\] SMAPI support for enhanced QDIO” on page 84](#)
 - [“\[7.4, 7.3 APARs\] z/VM Performance Data Pump enhancements” on page 85](#)

GC24-6294-74, z/VM 7.4 (March 2025)

This edition includes updates to support product changes provided or announced after the general availability of z/VM 7.4.

- **Installation, migration, and service**
 - [“\[7.4 APAR\] GETSHOPZ ServiceLink support” on page 20](#)
- **Support and exploitation of hardware and architectures, and hypervisor efficiency and scalability**
 - [“\[7.4 APAR\] TRSOURCE support for five-digit real device addresses” on page 49](#)
- **System administration, operation, and ease of use**
 - [“\[7.4 APAR\] Two-speed Monitor sampling” on page 84](#)

GC24-6294-74, z/VM 7.4 (September 2024)

This edition supports the general availability of z/VM 7.4. Note that the publication number suffix (-74) indicates the z/VM release to which this edition applies.

- **Product packaging**
 - [“\[7.4\] Integration of HCD and HCM for z/VM into the CP component base” on page 6](#)
 - [“\[7.4\] Removal of physical DVDs as a product distribution medium” on page 6](#)

- [“\[7.4\] Discontinuance of support for EREP VM 3” on page 6](#)
- **Installation, migration, and service**
 - [“\[7.4\] Installation changes” on page 17](#)
 - [“\[7.4\] Product parameter file names” on page 17](#)
 - [“\[7.4\] Changes to predefined user directory entries” on page 18](#)
 - [“\[7.4\] Linear service” on page 19](#)
 - [“\[7.4\] New format for service level” on page 20](#)
- **Support and exploitation of hardware and architectures, and hypervisor efficiency and scalability**
 - [“\[7.4\] Architecture level set \(ALS\)” on page 48](#)
- **Connectivity and networking**
 - [“\[7.4\] Removal of support for LAN Channel Station \(LCS\) emulation” on page 63](#)
- **System administration, operation, and ease of use**
 - [“\[7.4\] Removal of obsolete crypto support” on page 83](#)
 - [“\[7.4\] Removal of use of DVHWAKE module” on page 84](#)

GC24-6294-73, z/VM 7.3 (July 2024)

This edition includes terminology, maintenance, and editorial changes.

GC24-6294-73, z/VM 7.3 (April 2024)

This edition includes updates to support product changes provided or announced after the general availability of z/VM 7.3.

- **System Administration and Operation**
 - [“\[7.3 APAR\] SCP identification enhancements” on page 83](#)

GC24-6294-73, z/VM 7.3 (March 2024)

This edition includes updates to support product changes provided or announced after the general availability of z/VM 7.3.

- **Security**
 - [“\[7.3 APAR\] Digital Signature Verification of z/VM Service Packages” on page 94](#)

GC24-6294-73, z/VM 7.3 (December 2023)

This edition includes updates to support product changes provided or announced after the general availability of z/VM 7.3.

- **System Administration and Operation**
 - [“\[7.3 APAR\] Package TERSE with z/VM” on page 82](#)
 - [“\[7.3 APAR\] FCP SCSI List-directed IPL alternate paths” on page 82](#)
 - [“\[7.3 APAR\] VM/Pass-Through Facility 370 Accommodation Removal” on page 82](#)
 - [“\[7.3 APAR\] MONWRITE CLOSE enhancements” on page 83](#)
- **Application Development and Deployment**
 - [“\[7.3 APAR\] CMS Tape Block Size Increase” on page 98](#)
- **Additional changes:**

z/VSE has achieved end of life and has been replaced by 21CS VSEⁿ. Support for 21CS VSEⁿ is provided by 21CS, not by IBM. For more information, see [IBM Z-compatible operating systems supported as guests of z/VM in z/VM: General Information](#).

GC24-6294-73, z/VM 7.3 (October 2023)

This edition includes terminology, maintenance, and editorial changes.

GC24-6294-73, z/VM 7.3 (September 2023)

This edition includes updates to support product changes provided or announced after the general availability of z/VM 7.3.

- **Support and Exploitation of Hardware and Architectures**
 - [“\[7.3 APAR\] Warning Track Interruption Facility” on page 48](#)
- **System Administration and Operation**
 - [“\[7.3 APAR\] z/VM Performance Data Pump” on page 81](#)
- **Security**
 - [“\[7.3 APAR\] System SSL z/OS 2.5 Equivalence” on page 94](#)

GC24-6294-73, z/VM 7.3 (May 2023)

This edition includes updates to support product changes provided or announced after the general availability of z/VM 7.3.

- **Support and Exploitation of Hardware and Architectures**
 - [“\[7.3 APAR\] Thin Stack Adapter Interrupt Support” on page 47](#)
 - [“\[7.3 APAR\] Crypto Stateless-Command Filtering” on page 47](#)
 - [“\[7.3 APAR\] Remove obsolete IOCP parameters DYN and NODYN” on page 47](#)
 - [“\[7.3 APAR\] Enable larger \(>64GB\) NVMe paging allocation extents” on page 47](#)
- **System Administration and Operation**
 - [“\[7.3 APAR\] QUERY MONITOR SAMPLE enhancements” on page 80](#)
 - [“\[7.3 APAR\] *VMEVENT Enhancements” on page 80](#)
 - [“\[7.3 APAR\] Large Guest Reset Time Mitigation” on page 81](#)
 - [“\[7.3 APAR\] Increase crashkernel area size” on page 81](#)
- **Security**
 - [“\[7.3 APAR\] CMS Password/Key Management Utility - Keyvault” on page 92](#)
 - [“\[7.3 APAR\] Security Settings and Compliance Interfaces” on page 92](#)
 - [“\[7.3 APAR\] Guest Secure IPL” on page 92](#)

GC24-6294-73, z/VM 7.3 (September 2022)

This edition supports the general availability of z/VM 7.3. Note that the publication number suffix (-73) indicates the z/VM release to which this edition applies.

- **Product Packaging**
 - [“\[7.3\] Removal of the CMSDESK function, external GUI functions, and the GUICSLIB DCSS” on page 6](#)
- **Installation, Migration, and Service**
 - [“\[7.3\] z/VM Centralized Service Management enhancements” on page 13](#)

- [“\[7.3\] Change in location and size of the MONDCSS and PERFOUT saved segments” on page 14](#)
- **Support and Exploitation of Hardware and Architectures**
 - [“\[7.3\] Architecture Level Set \(ALS\)” on page 44](#)
 - [“\[7.3\] Eight-member SSI support” on page 45](#)
 - [“\[7.3\] NVMe emulated device \(EDEVICE\) support” on page 46](#)
 - [“\[7.3\] Display Mnemonics for Instructions that are Not Supported by CP Trace” on page 47](#)
- **Connectivity and Networking**
 - [“\[7.3\] TLS 1.1 Disabled by Default” on page 62](#)
 - [“\[7.3\] TCP/IP Changes” on page 63](#)
- **System Administration and Operation**
 - [“\[7.3\] Updates to QUERY LOADDEV and QUERY DUMPDEV commands” on page 79](#)
- **Security**
 - [“\[7.3\] RACF support for z/VM 7.3” on page 91](#)
 - [“\[7.3\] RACF database sharing no longer permitted with z/OS” on page 91](#)
 - [“\[7.3\] ESM control of DEFINE MDISK” on page 92](#)
- **Application Development and Deployment**
 - [“\[7.3\] Language Environment upgrade” on page 97](#)
 - [“\[7.3\] User Directory TODENABLE” on page 97](#)
 - [“\[7.3 APAR\] SMAPI FCP EQID API” on page 97](#)

Chapter 1. Introduction

Changes to the z/VM product include the addition of new functions, enhancements to existing functions, additional support, and removal of functions or support. The following topics explain how z/VM changes are delivered and how information about the changes is presented in this document.

z/VM Continuous Delivery Model

With z/VM 7.5, IBM continues to deliver product enhancements to its z/VM advanced virtualization technology on IBM Z® and LinuxONE servers using the z/VM Continuous Delivery model. This model for new functions offers clients timely support for new technology throughout the life of a z/VM release using a delivery mechanism that is familiar to clients and time tested. Because the z/VM Continuous Delivery model is not centered around a release date, it allows schedule flexibility as IBM partners with the z/VM community in the design, development, and delivery of new functions.

With this model, IBM helps clients to benefit faster from new functions and capabilities with the z/VM product. This is how z/VM functions and service are delivered:

- IBM will deliver most new z/VM 7.5 functions as feature packs in the service stream. Following general availability of z/VM 7.5, z/VM 7.4 will, with a few exceptions, receive only corrective service. Similarly, when a new release is introduced after z/VM 7.5, feature packs will be delivered on that release going forward, and z/VM 7.5 will receive mostly corrective service only. The most notable exceptions from the corrective-service-only policy for z/VM 7.4 will be features required for hardware toleration and security compliance.
- Virtualization technology on IBM Z and LinuxONE servers using the z/VM Continuous Delivery model. This model for new functions offers clients timely support for new technology throughout the life of a z/VM release using a delivery mechanism that is familiar to clients and time tested. Because the z/VM Continuous Delivery model is not centered around a release date, it allows schedule flexibility as IBM partners with the z/VM community in the design, development, and delivery of new functions. z/VM Version 7 releases will include:
 - Previously-released feature packs
 - New function that is too disruptive or pervasive to ship in the z/VM service stream
 - Fixes that were shipped in the service stream of the earlier release
- IBM services each z/VM release until six months after the N+2 release is generally available.
- A z/VM release remains orderable for 18 months after the general availability of its follow-on release. This allows clients who are running older levels of z/VM the option of:
 - Moving to the most current release, to receive feature packs
 - Moving to the service-only release, to receive corrective service only

For example, on the general availability date of z/VM 7.4, z/VM 7.3 became a service-only release and received corrective service until six months after the general availability date of z/VM 7.5. Similarly, on the general availability date of z/VM 7.5, z/VM 7.4 also became a service-only release and would receive corrective service until six months after the general availability date of the *next* follow-on release. If a service-only z/VM 7.3 client wanted to upgrade but wanted to avoid receiving new function in the service stream, they could move to service-only z/VM 7.4, which would be orderable up to 18 months after z/VM 7.5 became generally available.

To learn about ordering options, contact your local IBM representative.

To learn about the z/VM sponsor user program, see [IBM z/VM Sponsor User information \(https://www.ibm.com/support/pages/zvm/sponsor_user/\)](https://www.ibm.com/support/pages/zvm/sponsor_user/).

To learn about z/VM continuous delivery and the proposed schedules, see [IBM: z/VM Continuous Delivery News \(https://www.ibm.com/support/pages/zvm/newfunction/\)](https://www.ibm.com/support/pages/zvm/newfunction/).

To be notified when new functions become available, see [New Function APARs for the z/VM Platform](https://www.ibm.com/support/pages/zvm/service/vmnfapar.html) (<https://www.ibm.com/support/pages/zvm/service/vmnfapar.html>).

New Function Variables

Note about environment function variables: Starting with z/VM 7.5, IBM intends to no longer create new environment function variables for new functionality introduced in releases of z/VM. Existing environment function variables will be preserved for at least one future release. Functionality provided by the Semantic Versioning support is the recommended way to discover available features in a running system in the future.

To get the most up-to-date list of (and more information about) CP new function variables that define new z/VM functions, go to:

IBM: z/VM New Function Variable List (<https://www.ibm.com/support/pages/zvm/newfunction/varlist.html>)

Table 1 on page 2 includes a list of variables that define new function APARs available with z/VM 7.4, 7.3, and 7.2.

Table 1. New Function Variables

Variable	Version/release, APAR number
CP.ESM.CONTROL.DEFINE.MDISK	7.3
CP.FUNCTION.COPYSERVICES.FC_PRESERVE_MIRROR	7.2 [VM66433]
CP.FUNCTION.CRYPTO.HW_CCA_FILTERING	7.3 [VM66423]
CP.FUNCTION.CRYPTO.INTERRUPTIONS	7.2 [VM66534]
CP.FUNCTION.CRYPTO.MANAGEMENT	7.4 [VM66891]
CP.FUNCTION.CRYPTO.MIXED_APVIRT_LGR	7.2 [VM66496]
CP.FUNCTION.DASD.HYPERPAV_1_END	7.2 [VM66421]
CP.FUNCTION.DASD.MINIDISK.HPF.PHASE	7.2 [VM66450]
CP.FUNCTION.DASD.MP_VARY_ON	7.2 [VM66449]
CP.FUNCTION.DUMP.PRESERVE_PARTIAL	7.2 [VM66560]
CP.FUNCTION.DUMP.SPEEDUP	7.2 [VM66431]
CP.FUNCTION.EDEVICE.DEFINITION	7.2 [VM66420]
CP.FUNCTION.EDEVICE.NVME	7.3 7.3 [VM66675]
CP.FUNCTION.EDEVICE.PATH_MANAGEMENT	7.2 [VM66507]
CP.FUNCTION.EQDIO	7.4 [VM66824] 7.3 [VM66823]
CP.FUNCTION.FACILITIES	7.3 [VM66850], 7.4 [VM66844]
CP.FUNCTION.FAST_GUEST_LOGOFF	7.3 [VM66673]
CP.FUNCTION.PAGING.REMOVE_PACK_WITHOUT_IPL	7.4 [VM66891]
CP.FUNCTION.QUERY.DEVICES	7.2 [VM66469]
CP.FUNCTION.RECORDING.DEFAULTS	7.4
CP.FUNCTION.SCSI.IPL.ALTERNATE_PATH	7.3 [VM66727]

Table 1. New Function Variables (continued)

Variable	Version/release, APAR number
CP.FUNCTION.SECURITY.IPL	7.3 [VM66434]
CP.FUNCTION.SOFTABEND	7.4 [VM66877]
CP.FUNCTION.SPOOL.EXTENSIONS	7.2 [VM66479]
CP.FUNCTION.SRM.WARNINGTRACK	7.3 [VM66678]
CP.FUNCTION.THINSTACK	7.3 [VM66654]
CP.FUNCTION.VMEVENT	7.3 [VM66679]
CP.FUNCTION.VSWITCH.IPV6QUERY	7.2 [VM66485]
CP.FUNCTION.VSWITCH.NICDISTRIBUTION	7.2 [VM66557]
CP.FUNCTION.VSWITCH.VNIC.EQDIO	7.4 [VM66877], 7.3 [VM66878]
CP.FUNCTION.ZXC	7.2 [VM66201]
CP.LIMIT.MEMORY.REAL_TOTAL	7.2 [VM66173]
CP.LIMIT.MEMORY.RECLAIM	7.2 [VM66173]
CP.LIMIT.MEMORY.RECONFIG	7.2 [VM66271]
CP.FUNCTION.TRSOURCE.MSS CP.LIMIT.MONITOR.SUBINTERVAL	7.4 [VM66829]
CP.LIMIT.SSI.MEMBERS	7.3

z/VM linear service environment variables

To get the most up-to-date list of (and more information about) z/VM linear service environment variables, go to:

z/VM Service Environment Variable List (<https://www.ibm.com/support/pages/zvm/service/zvmsrvev.html>)

How Information about z/VM Changes Is Presented in This Document

Information about z/VM changes is presented two ways in this document:

- The topics in [Chapter 2, “System changes,”](#) on [page 5](#) describe significant changes to z/VM system functions. The information is organized according to the general functional areas where the changes have occurred, such as product packaging, installation and service, hardware and architecture support, connectivity and networking, and so on.
- The topics in [Chapter 3, “Changes to external interfaces,”](#) on [page 105](#) identify changes to specific external interfaces in the z/VM components. External interfaces are commands, routines, macros, DIAGNOSE codes, directory control statements, and so on. Each change is identified as either **upwardly compatible** or **incompatible**. (For definitions of these terms, see “Compatibility Terms” on [page 4](#).) The information is organized by component, and within each component by interface type.

For each change, the release in which it occurred is indicated in brackets, like this: **[7.5]**. Within a section, changes are listed from oldest to newest.

Notes:

1. The indicated release is either:

- The first release that included the change in the base product
 - The last release for which the change was available as a New Function APAR
2. A change provided as a New Function APAR is indicated like this:
 - In Chapter 2, the term **APAR** is included with the release in brackets. The APAR number is identified in the description.
 - In Chapter 3, the APAR number is included with the release in brackets.
 3. A change might be superseded by another change, or support might be withdrawn, in a later release.
 4. In Chapter 3, for types of changes that occur every release, such as responses from commands that query the level of the system, only the latest release is indicated.
 5. Many descriptions of system changes include cross-references to other documents for more information about those functions. Over the course of product releases, the titles of some VM documents might have changed. In most cases, the cross-reference points to the *current* title of the appropriate document.

Compatibility Terms

In Chapter 3, “Changes to external interfaces,” on page 105, the following terms are used to convey the degree of compatibility for each change:

Upwardly compatible

The syntax, function, or response of the external interface has been changed, but not significantly. Invocations and applications using the external interface on the new system in the same manner as on the current system should continue to execute unchanged.

Note: New function, if not exploited, is also upwardly compatible.

Incompatible

The syntax, function, or response of the external interface has been changed significantly. Some invocations and applications using the external interface on the new system in the same manner as on the current system might execute differently, incorrectly, or not at all.

Note: Depending on how you use the interface, a change identified as incompatible might be upwardly compatible for you.

Chapter 2. System changes

These topics describe new functions, enhancements, and support that have been added to z/VM. Some topics identify functions and support that have been removed. For information about changes to specific external interfaces, see [Chapter 3, “Changes to external interfaces,” on page 105](#).

The system changes are described in the following major topics:

- [“Product packaging” on page 5](#)
- [“Installation, migration, and service” on page 6](#)
- [“Support and exploitation of hardware and architectures, and hypervisor efficiency and scalability” on page 27](#)
- [“Connectivity and networking” on page 58](#)
- [“System administration, operation, and ease of use” on page 65](#)
- [“Application development and deployment” on page 96](#)
- [“System diagnosis” on page 99](#)
- [“Product documentation” on page 103](#)

Product packaging

These topics describe changes in what facilities are provided in the z/VM base product or offered as optional features, and how z/VM is distributed.

[7.1] Integration of z/VM SSI for Continuous Operation

z/VM single system image (SSI) is included in the base of z/VM 7.1 at no additional cost. Previously, it was a priced feature of z/VM V6, and is withdrawn. Integrating and making SSI available at no charge is intended to help more clients reduce or shorten planned outages of their Linux® workloads as they adopt the z/VM Continuous Delivery model for their z/VM systems. SSI includes live guest relocation and single system maintenance to give clients a mechanism to host Linux virtual server images without suffering interruptions as they apply updates to their z/VM systems.

Note: If you are upgrading or migrating your z/VM system to 7.1, SSI remains enabled within the system configuration for compatibility reasons. IBM recommends leaving the SSI state as enabled to allow moving back to the old z/VM level for any reason and to allow 7.1 to coexist in an SSI cluster with older z/VM levels.

For information about setting up SSI clusters, see [z/VM: CP Planning and Administration](#).

[7.1] OSA/SF Not Shipped with z/VM

The Open Systems Adapter / Support Facility (OSA/SF) is no longer shipped with z/VM. To customize the modes of operation of OSA features, use OSA/SF on the Hardware Management Console (HMC). For more information, see [Open Systems Adapter/Support Facility on the Hardware Management Console \(https://www.ibm.com/docs/en/SSLTBW_2.3.0/pdf/SC14-7580-02.pdf\)](https://www.ibm.com/docs/en/SSLTBW_2.3.0/pdf/SC14-7580-02.pdf).

[7.1] z/VM Messages and Help Files for Kanji Have Been Discontinued

z/VM no longer provides messages and help files translated into Japanese (KANJI). Mixed-case American English (AMENG) and uppercase American English (UCENG) are the only languages included in z/VM 7.1. Clients can still install other languages on their z/VM 7.1 system. With the general availability of z/VM 7.1, any new or updated messages delivered with z/VM 6.4 service will no longer be translated into Japanese Kanji.

[7.2] Removal of KANJI language files

All of the KANJI language file infrastructure has been removed from the base z/VM components.

[7.3] Removal of the CMSDESK function, external GUI functions, and the GUICSLIB DCSS

The CMSDESK function, external GUI functions, and the GUICSLIB DCSS have been removed. The CMS CMSDESK command, the CMS SET WORKSTATION command, and the CMS QUERY WORKSTATION command are no longer valid commands. References to CMS GUI have been removed from the publications.

[7.4] Integration of HCD and HCM for z/VM into the CP component base

The functional executables of the Hardware Configuration Definition and Hardware Configuration Manager for z/VM (HCD and HCM for z/VM) are shipped as part of the CP component of z/VM 7.4. Service support is provided with the CP component of z/VM.

[7.4] Removal of physical DVDs as a product distribution medium

DVD-R is no longer a supported system image distribution medium. The replacement for installing from a physical DVD on an HMC is to use a USB flash drive. An electronic image in ISO format will be provided. Customers can copy the contents of the electronic image to a USB flash drive by following instructions provided with their order. Only USB flash drives supported by the HMC can be used.

This satisfies the Statement of Direction from the z/VM 7.3 product announcement.

For complete installation instructions, see the [z/VM: Installation Guide](#).

[7.4] Discontinuance of support for EREP VM 3

In response to Withdrawal Announcement AD24-0128 indicating that EREP VM 3 will be withdrawn from service effective 28 February 2025, EREP product support for record retrieval and reporting has been removed from z/VM 7.4. In addition, EREP packaging infrastructure has been removed from z/VM 7.4.

This satisfies the z/VM statement of direction announced March 26, 2024.

The following functions have been updated:

- System configuration statements:
 - SYSTEM_USERIDS
- CP commands:
 - RECORDING
 - QUERY RECORDING
- CP utility no longer supported and therefore removed:
 - CPEREPXA

The following CP new function variable definition is new:

- CP.FUNCTION.RECORDING.DEFAULTS

Installation, migration, and service

These topics describe changes to the z/VM installation, migration, and service processes, procedures, and tools.

For more information about installation changes, see [z/VM: Installation Guide](#). For more information about service changes, see [z/VM: Service Guide](#).

[7.1] Installation and Migration Changes

Installation and migration changes for z/VM 7.1 include the following:

- The upgrade installation process allows you to upgrade from z/VM 6.4 to z/VM 7.1.

Upgrading to z/VM 7.1 from z/VM 6.2 or z/VM 6.3 is not supported.

- Installation of z/VM on 3390 Model 3 DASDs is no longer supported.

Storage devices supported for installation include:

- 3390 volumes with a minimum size of 10016 cylinders.
- SCSI volumes with a minimum size of 6 GB.

- Kanji (KANJI) is no longer supported as a system default language.

Mixed-case American English (AMENG) and uppercase English (UCENG) are supported as system default languages.

Instead of translated Kanji files, the repositories and help files for KANJI are shipped containing uppercase English files.

- OSA/SF is no longer shipped with z/VM.
- For non-SSI traditional installations, ownership information is no longer written on the M01S01 and M01P01 volumes.

For more information, see [z/VM: Installation Guide](#).

[7.1] User Directory Modifications

In response to modern threat models and password policies in a modern enterprise, and in accordance with guidelines offered by IBM for decades, the default user directory provided by IBM has been modified to transition IBM-provided virtual machines to have a password of either AUTOONLY or LBYONLY:

AUTOONLY

The virtual machine can only be autologged and run disconnected. It cannot be logged on by a user at a terminal.

LBYONLY

The virtual machine can be logged on only by a logon-by user listed on a LOGONBY statement in the directory entry for that virtual machine. The logon-by user issues the LOGON BY command with the logon-by user's own ID and password.

Additionally, a default logon-by virtual machine (IBMVM1) is provided to represent a person for logging on to these system user IDs. IBM recommends that this virtual machine's name and password be changed, and associated LOGONBY statements in the user directory be adjusted accordingly to match local security policy.

This change is pertinent only to a fresh installation of z/VM 7.1. If any previous automation is transferred to a fresh z/VM 7.1 system, be advised that LOGON requirements may have changed.

The following user IDs have a password of AUTOONLY.

DATAMOVE	DATAMOV2	DATAMOV3	DATAMOV4	DIRMAINT
DIRMSAT	DIRMSAT2	DIRMSAT3	DIRMSAT4	DTCSMAPI
GCS	LOHCOST	PERSMAPI	SSLDCSSM	VSMEVSRV
VSMGUARD	VSMREQIN	VSMREQIU	VSMREQI6	VSMWORK1
VSMWORK2	VSMWORK3			

The following user IDs have a password of LBYONLY.

CSMSERVE	SSL00001	SSL00002	SSL00003	SSL00004
----------	----------	----------	----------	----------

SSL00005	SYSMON	ZHPM	AUDITOR	AUTOLOG2
AVSVM	BLDCMS	BLDNUC	BLDRACF	BLDSEG
CMSBATCH	DISKACNT	DTCVSW1	DTCVSW2	DTCVSW3
DTCVSW4	EREP	FTPSEVE	GSKADMIN	LDAPSRV
LGLOPR	MAINT	MONWRITE	MROUTE	OPERATNS
OPERSYMP	PERFSVM	PORTMAP	REXECD	RSCS
RSCSAUTH	RSCSDNS	RXAGENT1	SMTP	SNMPD
SNMPQE	SNMPSUBA	SYSADMIN	TCPIP	TCPMAINT
TSAFVM	UFTD	VMNFS	VMRMADMN	VMRMSVM
VMSEVP	VMSEVR	VMSEVS	VMSEVU	VMUTIL
XCHANGE				

The following user IDs have a password of NOLOG (a user cannot log on).

ADM	BIN	DAEMON	DEFAULT	NOBODY
PMAINT	ROOT	SYSMAINT	SYS	7VMTCP10
SYSDUMP1	6VMLEN20			

The following user IDs have a default password when the system is installed, which should be changed in accordance with local security policy.

AUTOLOG1	CBDIODSP	CSMWORK	IBMUSER	IBMVM1
MAINTCSM	MAINT710	MIGMAINT	OPERATOR	OP1
RACFSMF	RACFVM	RACMAINT	5684042J	7VMDIR10
7VMHCD10	7VMPTK10	7VMRAC10	7VMRSC10	

For more information, see the default system information topic in [*z/VM: Installation Guide*](#).

[7.1] Changes to Predefined User Directory Entries

Deleted User IDs

- CMS1 (USER)
- IMAP (IDENTITY)
- IMAPAUTH (IDENTITY)
- OPNCLOUD (IDENTITY)
- OSADMIN1 (IDENTITY)
- OSADMIN2 (IDENTITY)
- OSADMIN3 (IDENTITY)
- OSAMAIN (IDENTITY)
- OSASF (IDENTITY)
- ZVMLXTS (IDENTITY)
- ZVMMAPLX (IDENTITY)
- 4OSASF40 (USER)

Added User IDs

CSMSERVE (IDENTITY)

Infrastructure for a future deliverable

CSMWORK (USER)

Infrastructure for a future deliverable

IBMVM1 (USER)

See “[7.1] User Directory Modifications” on page 7.

MAINTCSM (USER)

Infrastructure for a future deliverable

ZHPM (IDENTITY)

Infrastructure for a future deliverable

Replaced (Renamed) User IDs

- 6VMDIR40 changed to 7VMDIR10.
- 6VMHCD40 changed to 7VMHCD10.
- 6VMPTK40 changed to 7VMPTK10.
- 6VMRAC40 changed to 7VMRAC10.
- 6VMRSC40 changed to 7VMRSC10.
- 6VMTCP40 changed to 7VMTCP10.
- MAINT640 changed to MAINT710.

Changed User Specifications

Note: Links to renamed user IDs have been updated to specify the new names.

- CBDIODSP
 - MDISK 400 increased to 720 cylinders.
- GSKADMIN
 - IDENTITY entry:
 - Added CRYPTO APVIRT.
- LDAPSRV
 - IDENTITY entry:
 - Added CRYPTO APVIRT.
- MAINT710
 - Added 5BC minidisk.
- MONWRITE
 - IDENTITY entry:
 - Storage changed to 32M 64M.
- TCPSSLU
 - PROFILE entry:
 - Added CRYPTO APVIRT.
- 5684042J
 - MDISK 2D2 increased to 60 cylinders.
- 7VMDIR10
 - MDISK 2B1 increased to 15 cylinders.

- MDISK 2B2 increased to 20 cylinders.

[7.1] VMSES/E MIGRATE Command Support Withdrawn

The VMSES/E MIGRATE command and related commands, first supplied with z/VM V5.2, are no longer provided or supported in z/VM 7.1. The upgrade installation process that was introduced with z/VM 6.3 can be used to upgrade supported z/VM levels to z/VM 7.1. The migration of customized data for components, features, or products from z/VM levels prior to those supported by the upgrade installation process for z/VM 7.1 now must be performed using locally developed procedures.

The following VMSES/E commands are no longer supported:

- MIGCLEAN
- MIGLINK
- MIGRATE
- MIGSETUP

The following VMSES/E system software inventory file is no longer supported:

- *prodid* MIGDvrm (the migration disk tables)

Various CP, TCP/IP, and VMSES/E messages are updated or deleted.

For more information, see:

- [z/VM: VMSES/E Introduction and Reference](#)
- [z/VM: Installation Guide](#)
- [z/VM: Other Components Messages and Codes](#)
- [z/VM: CP Messages and Codes](#)
- [z/VM: TCP/IP Messages and Codes](#)

[7.1 APAR] Query RSCS Service Level

With the PTF for APAR VM66174, RSCS provides a SERVICE operand on the QUERY SYSTEM command to get information about the service level of each module in the running RSCS system. This eliminates ambiguity on whether service was applied.

[7.2] Installation changes

Installation changes for z/VM 7.2 include the following:

- The upgrade installation process allows you to:
 - Upgrade from z/VM 6.4 or 7.1 to z/VM 7.2.
 - Reuse the work system that was created while upgrading the first member of a multi-member SSI cluster to upgrade subsequent members.
- The packaging for installing z/VM from DVD is changed.

There is now a two-disc product package.

- The package for 3390 consists of the following:

DISC 1

z/VM Product Package for installation on 3390

DISC 2

z/VM Product Package for installation on 3390

- The package for SCSI consists of the following:

DISC 1

z/VM Product Package for installation on SCSI

DISC 2

z/VM Product Package for installation on SCSI

The z/VM installation RSU is included on Disc 2 of each package.

For more information, see [z/VM: Installation Guide](#).

[7.2] Update to SERVICE EXEC to report installed APARs and PTFs

The STATUS operand of the VMSES/E SERVICE EXEC has been enhanced to allow reporting of all of the APARs and PTFs installed for z/VM products and components that are included in your VM System Software Inventory table (VM SYSSUF). For more information, see the [SERVICE EXEC](#) in the [z/VM: VMSES/E Introduction and Reference](#).

[7.2] z/VM Centralized Service Management for non-SSI environments

z/VM Centralized Service Management provides support to deploy service to multiple systems, regardless of geographic location, from a centralized primary location that manages distinct levels of service for a select group of traditional z/VM systems. One system is designated as a principal system and uses the z/VM Shared File System (SFS) to manage service levels for a set of defined managed systems regardless of their geographic location. The principal system builds service levels using the new service management command, SERVMGR, and existing VMSES/E SERVICE commands. This centralized service process keeps track of available service levels and manages the files needed to supply a customer-defined service level to a managed system.



Attention: Before you initialize z/VM Centralized Service Management, the PTF for APAR VM66428 *must* be:

1. Installed on the principal system and all remote systems in your z/VM Centralized Service Management environment
2. Applied to any customer-defined z/VM Centralized Service Management service level that is based on the BASE z/VM Centralized Service Management service level (the service level that incorporates the initial z/VM 720 RSU).

See the [z/VM: Service Guide](#) for more information.

[7.2] Product parameter file names

Table 2 on page 11 lists the base \$PPF file for each z/VM component, facility, and optional feature and indicates whether the file name has changed for z/VM 7.2.

Table 2. Base \$PPF file names

Component, facility, or feature	File ID	Changed?
AVS	7VMAVS20 \$PPF	Yes
CMS	7VMCMS20 \$PPF	Yes
CP	7VMCPR20 \$PPF	Yes
DirMaint	7VMDIR20 \$PPF	Yes
Dump Viewing Facility	7VMDVF20 \$PPF	Yes
GCS	7VMGCS20 \$PPF	Yes
HCD/HCM	7VMHCD20 \$PPF	Yes
Language Environment®	6VMLEN20 \$PPF	No
Performance Toolkit	7VMPTK20 \$PPF	Yes
RACF®	7VMRAC20 \$PPF	Yes
REXX	7VMREX20 \$PPF	Yes

Table 2. Base \$PPF file names (continued)

Component, facility, or feature	File ID	Changed?
RSCS	7VMRSC20 \$PPF	Yes
TCP/IP	7VMTCP20 \$PPF	Yes
TSAF	7VMTSA20 \$PPF	Yes
VMSES/E	7VMSES20 \$PPF	Yes

[7.2] Changes to predefined user directory entries

Replaced (renamed) user IDs

- MAINT710 changed to MAINT720
- 7VMDIR10 changed to 7VMDIR20
- 7VMHCD10 changed to 7VMHCD20
- 7VMPTK10 changed to 7VMPTK20
- 7VMRAC10 changed to 7VMRAC20
- 7VMRSC10 changed to 7VMRSC20
- 7VMTCP10 changed to 7VMTCP20

Added user IDs

None.

Deleted user IDs

None.

Changed User Specifications

- Added minidisks:
 - MAINT720 222
 - MAINTCSM 1190
 - MAINTCSM 1890
 - MAINTCSM 1590
- Added links:
 - USER BLDNUC:

```
LINK MAINT 193 193 RR
LINK MAINTCSM 1190 1190 RR
LINK MAINTCSM 1890 1890 RR
LINK MAINTCSM 1590 1590 RR
```

- Changed link mode:
 - USER BLDNUC:

Changed link mode from MW to MR:

```
LINK MAINT 490 190 MR
LINK MAINT 890 990 MR
```
 - USER BLDRACF:

Changed link mode from MW to MR:

```
LINK RACMAINT 490 490 MR
```

- Disk size changes:
 - CBDIODSP 400: Changed from 720 to 940 cylinders.
 - GSKADMIN 191: Changed from 2 to 4 cylinders.
 - MAINT720 191: Changed from 175 to 200 cylinders.
 - MAINT720 5BC: Changed from 2200 to 3000 cylinders.
 - MAINT720 5E5: Changed from 18 to 40 cylinders.
 - MAINT720 5E6: Changed from 9 to 20 cylinders.
 - MAINT720 5B2: Changed from 75 to 125 cylinders.
 - MAINT720 5D2: Changed from 30 to 50 cylinders.
 - 7VMHCD20 2B2: Changed from 200 to 300 cylinders.
 - 7VMHCD20 300: Changed from 360 to 470 cylinders.
- Removed the 401 (KANJI):
 - IDENTITY MAINT: Deleted the 401 minidisk.
 - Global: Deleted all links to the MAINT 401.
- Discontinuance of support for separately ordered EREP:
 - USER MAINT720: Does not ship a 201 minidisk.
 - IDENTITY MAINT: Deleted links to the 201.
 - IDENTITY EREP:

Changed from this:

```
LINK MAINT 201 201 RR
```

to this:

```
LINK MAINT 193 201 RR
```

[7.3] Installation changes

Installation changes for z/VM 7.3 include the following:

- New with product installation, z/VM 7.3 provides the ability to select a default password when installing or upgrading a z/VM system.
- The user directory shipped by IBM includes an ACCOUNT IBM statement for all guest definitions. For an upgrade-in-place installation, new guest definitions that are added to the current user directory include an ACCOUNT IBM statement, but existing guest definitions will remain unchanged.
- The upgrade installation process allows you to upgrade from z/VM 7.1 or 7.2 to z/VM 7.3.
- The GUICSLIB shared segment has been removed in z/VM 7.3.

For more information, see the [z/VM: Installation Guide](#).

[7.3] z/VM Centralized Service Management enhancements

z/VM Centralized Service Management (z/VM CSM) includes the following usability enhancements:

- QUERY processing for service levels now allows queries that are specific to individual components in a service level.
- Wildcard support is added to the SERVMGR SRVLVL QUERY command.
- The ability to query z/VM CSM managed systems for current PUT2PROD status is added.
- Additional details are provided when querying local modifications.

The following VMSES/E commands have been updated (in [z/VM: VMSES/E Introduction and Reference](#)):

- [SERVMGR SRVLVL](#)
- [SERVMGR SYSTEM](#)

For additional related z/VM 7.3 documentation updates, see:

- [z/VM: Service Guide](#)
- [z/VM: Other Components Messages and Codes](#)

[7.3] Product parameter file names

Table 3 on page 14 lists the base \$PPF file for each z/VM component, facility, and optional feature and indicates whether the file name has changed for z/VM 7.3.

Table 3. Base \$PPF file names

Component, facility, or feature	File ID	Changed?
AVS	7VMAVS30 \$PPF	Yes
CMS	7VMCMS30 \$PPF	Yes
CP	7VMCPR30 \$PPF	Yes
DirMaint	7VMDIR30 \$PPF	Yes
Dump Viewing Facility	7VMDVF30 \$PPF	Yes
GCS	7VMGCS30 \$PPF	Yes
HCD/HCM	7VMHCD30 \$PPF	Yes
Language Environment	7VMLEN30 \$PPF	Yes
Performance Toolkit	7VMPTK30 \$PPF	Yes
RACF	7VMRAC30 \$PPF	Yes
REXX	7VMREX30 \$PPF	Yes
RSCS	7VMRSC30 \$PPF	Yes
TCP/IP	7VMTCP30 \$PPF	Yes
TSAF	7VMTSA30 \$PPF	Yes
VMSES/E	7VMSES30 \$PPF	Yes

[7.3] Change in location and size of the MONDCSS and PERFOUT saved segments

The default CP MONITOR MONDCSS saved segment starting virtual address has been changed to 1 GB and the size has been increased to 96 MB. The IBM Performance Toolkit PERFOUT saved segment starting virtual address has been changed to 1120 MB, immediately following the new MONDCSS. The reasons for these changes include:

- Moving the segment starting locations addresses a problem with the Linux kdump configuration, which failed in a virtual machine with 1 GB of virtual memory that had attached one or both current versions of these segments.
- Increasing the size of the MONDCSS segment accommodates the increased volume of CP Monitor data produced and provides room for its future growth.

These changes will not affect existing versions of these segments; they must be re-created for the new defaults to take effect.

[7.3] Changes to predefined user directory entries

Replaced (renamed) user IDs

- MAINT720 changed to MAINT730
- 7VMDIR20 changed to 7VMDIR30
- 7VMHCD20 changed to 7VMHCD30
- 7VMPTK20 changed to 7VMPTK30
- 7VMRAC20 changed to 7VMRAC30
- 7VMRSC20 changed to 7VMRSC30
- 7VMTCP20 changed to 7VMTCP30
- 6VMLEN20 changed to 7VMLEN30

Added user IDs

- PROFILE IBMSFS

Deleted user IDs

None.

Changed User Specifications

- Added minidisks:
 - MAINT 19B
- Link statements changed on new release userIDs:
 - USER 7VMRSC30 changed LINK MAINT 51D 51D MR to LINK MAINT730 51D 51D MR
 - USER 7VMRSC30 changed LINK MAINT 5E5 5E5 MR to LINK MAINT730 5E5 5E5 MR
 - USER 7VMTCP30 changed LINK MAINT 51D 51D MR to LINK MAINT730 51D 51D MR
 - USER 7VMTCP30 changed LINK MAINT 5E5 5E5 MR to LINK MAINT730 5E5 5E5 MR
 - USER 7VMRAC30 changed LINK MAINT 51D 51D MR to LINK MAINT730 51D 51D MR
 - USER 7VMRAC30 changed LINK MAINT 5E5 5E5 MR to LINK MAINT730 5E5 5E5 MR
 - USER 7VMPTK30 changed LINK MAINT 51D 51D MR to LINK MAINT730 51D 51D MR
 - USER 7VMPTK30 changed LINK MAINT 5E5 5E5 MR to LINK MAINT730 5E5 5E5 MR
 - USER 7VMHCD30 changed LINK MAINT 51D 51D MR to LINK MAINT730 51D 51D MR
 - USER 7VMHCD30 changed LINK MAINT 5E5 5E5 MR to LINK MAINT730 5E5 5E5 MR
 - USER MAINT730 added LINK MAINT 19B 19B RR
 - USER 7VMLEN30 added LINK MAINT 19B 19B RR
- Link statements deleted:
 - VSMGUARD deleted LINK PMAINT CF0 CF0 MD
 - VSMGUARD deleted LINK PMAINT 551 551 RR
 - VSMGUARD deleted LINK TCPMAINT 591 591 RR
- Link statements added:
 - TCPSSLU added LINK MAINT 0990 0990 RR
 - MIGMAINT added LINK MAINT 193 193 RR
 - LDAPSRV added LINK MAINT 990 990 RR
 - MPROUTE added LINK MAINT 990 990 RR

- GSKADMIN added LINK MAINT 990 990 RR
- RACFSMF added LINK RACFVM 191 001 RRD
- PERFSVM added LINK MAINT 990 990 RR
- CBDIODSP added LINK MAINT 0990 0990 RR
- PERSMAPI added LINK MAINT 990 990 RR
- MAINTCSM added LINK MAINT 990 990 RR
- Changed link mode:
 - RACFSMF changed LINK RACFVM 301 301 MR link mode from MR to MRD
 - RACFSMF changed LINK RACFVM 302 302 MR link mode from MR to MRD
 - RACMAINT changed LINK RACFVM 200 200 MR link mode from MR to MW
 - RACMAINT changed LINK RACFVM 300 300 MR link mode from MR to MW
- IPL statements changed:
 - PROFILE TCPCMSU changed IPL CMS to IPL 190
 - PROFILE TCPSSLU changed IPL CMS PARM FILEPOOL VMSYS to IPL 990 PARM FILEPOOL VMSYS
 - IDENTITY CBDIODSP changed IPL CMS to IPL ZCMS
 - IDENTITY MPROUTE changed IPL ZCMS to IPL 990
 - USER MAINTCSM changed IPL 190 PARM AUTOOCR to IPL 990 PARM AUTOOCR
 - IDENTITY LDAPSRV added IPL 990
 - IDENTITY GSKADMIN added IPL ZCMS
- Privilege classes changed:
 - IDENTITY RACMAINT changed priv classes from ABCDEGH to ABCG
 - IDENTITY RACFVM changed priv classes from ABCDEGH to ABCG
- Virtual storage value changed:
 - IDENTITY MIGMAINT changed v stor from 256M 1000M to 2G 2G
 - USER MAINT730 changed vstor from 256M 1000M to 2G 2G
- Option statement changed:
 - IDENTITY VSMGUARD deleted OPTION LNKS LNKE
- Disk sizes changed:
 - DIRMAINT 155 changed from 12 to 20 cylinders
 - DIRMSAT 155 changed from 9 to 20 cylinders
 - DATAMOVE 155 changed from 9 to 20 cylinders
- MDISK statement modes changed:
 - RACFVM 200 MDISK mode changed from MW to MWV
 - RACFVM 300 MDISK mode changed from MW to MWV
- MDISK statement password changes
 - MAINT 990: Changed read password from READ to ALL
 - MAINT730 890: Changed read password from READ to ALL
- MACH statements changed:
 - PROFILE TCPSSLU changed MACH XA to MACH Z
 - USER MAINTCSM changed MACH ESA to MACH XC
 - IDENTITY LDAPSRV added MACH Z
 - IDENTITY GSKADMIN added MACH Z

- INCLUDE profile changed:
 - IDENTITY VMSERV changed INCLUDE IBMDFLT to INCLUDE IBMSFS
IDENTITY VMSERV deleted CONSOLE 009 3215 T MAINT (it is in IBMSFS)
 - IDENTITY VMSERVS changed INCLUDE IBMDFLT to INCLUDE IBMSFS
IDENTITY VMSERVS deleted CONSOLE 009 3215 T MAINT (it is in IBMSFS)
 - IDENTITY VMSERVU changed INCLUDE IBMDFLT to INCLUDE IBMSFS
IDENTITY VMSERVU deleted CONSOLE 009 3215 T MAINT (it is in IBMSFS)
 - USER VMSERVP changed INCLUDE IBMDFLT to INCLUDE IBMSFS
USER VMSERVP deleted CONSOLE 009 3215 T MAINT (it is in IBMSFS)
- PASSWORD field changed:
 - IDENTITY RACFSMF changed pw from WD5JU8QP to LBYONLY
IDENTITY RACFSMF added LOGONBY IBMVM1
 - IDENTITY RACMAINT changed pw from WD5JU8QP to LBYONLY
IDENTITY RACMAINT added LOGONBY IBMVM1
- All users now have the ACCOUNT statement:
 - ACCOUNT IBM

[7.4] Installation changes

Installation changes for z/VM 7.4 include the following:

- The upgrade installation process allows you to upgrade from z/VM 7.2 or 7.3 to z/VM 7.4.
- z/VM 7.4 includes a sample EXEC — IMAGHASH — on the installation media. You can use this EXEC to generate SHA256 hash values for a set of image files and compare those hash values with reference values that are included in supplied installation DVDHASH files.
- z/VM 7.4 requires that customers supply a default user directory password when a z/VM system is installed or upgraded. Reliance on or use of an IBM-supplied default user ID password is no longer possible.
- The option to install z/VM 7.4 from a Hardware Management Console CD / DVD-ROM (HMC DVD) drive has been removed.
- Starting with z/VM 7.4, Preventive Service Planning (PSP) buckets will no longer be created for product releases.
- The TCP/IP user directory entry has been updated to IPL 990 (ZCMS).
- Installation support is added for the performance DATAPUMP user ID.
- A hash value has been added to the DVDIMAGE file for each file on each DVD/ZIP.
- The installation password for DIRMAINT has been updated from AUTOONLY to LOGONBY.
- The RLDSAVE option is no longer specified in the 7VMCPR40 PPF file for the build of the CPLOAD module.

For more information, see the [z/VM: Installation Guide](#).

[7.4] Product parameter file names

Table 4 on page 18 lists the base \$PPF file for each z/VM component, facility, and optional feature and indicates whether the file name has changed for z/VM 7.4.

Table 4. Base \$PPF file names

Component, facility, or feature	File ID	Changed?
AVS	7VMAVS40 \$PPF	Yes
CMS	7VMCMS40 \$PPF	Yes
CP	7VMCPR40 \$PPF	Yes
DirMaint	7VMDIR40 \$PPF	Yes
Dump Viewing Facility	7VMDVF40 \$PPF	Yes
GCS	7VMGCS40 \$PPF	Yes
Language Environment	7VMLEN40 \$PPF	No
Performance Toolkit	7VMPTK40 \$PPF	Yes
RACF	7VMRAC40 \$PPF	Yes
REXX	7VMREX40 \$PPF	Yes
RSCS	7VMRSC40 \$PPF	Yes
TCP/IP	7VMTCP40 \$PPF	Yes
TSAF	7VMTSA40 \$PPF	Yes
VMSES/E	7VMSES40 \$PPF	Yes

[7.4] Changes to predefined user directory entries

Replaced (renamed) user IDs:

- MAINT730 changed to MAINT740
- 7VMDIR30 changed to 7VMDIR40
- 7VMPTK30 changed to 7VMPTK40
- 7VMRAC30 changed to 7VMRAC40
- 7VMRSC30 changed to 7VMRSC40
- 7VMTCP30 changed to 7VMTCP40

Added user IDs:

- IDENTITY DATAPUMP
- IDENTITY LWMBOSS
- IDENTITY LMWWORK
- USER KEYSTORE

For detailed information about these added identity and user entries, consult the CP directory supplied with z/VM 7.4.

Deleted user IDs:

- IDENTITY EREP
- USER 7VMHCD30

Changed user specifications:

- Added minidisks:

- KEYSTORE 191 (10 cylinders, 14400 blocks)
- LWMBOSS 191 (10 cylinders, 14400 blocks)
- LMMWORK 191 (10 cylinders, 14400 blocks)
- MAINT740 200 (added by USER MAINT740 to replace 7VMHCD30 300 minidisk)
- Deleted minidisks:
 - 7VMHCD30 191
 - 7VMHCD30 2A2
 - 7VMHCD30 2A6
 - 7VMHCD30 2B2
 - 7VMHCD30 2C2
 - 7VMHCD30 2D2
 - 7VMHCD30 29D
 - 7VMHCD30 300 (replaced by MAINT740 200 minidisk)
- Disk size changes:
 - MAINT740 194 — from 400 to 650 cylinders (from 576000 to 936000 blocks)
 - MAINT740 2D2 — from 400 to 900 cylinders (from 576000 to 1296000 blocks)
 - MAINT740 5C4 — from 5 to 25 cylinders (from 7200 to 36000 blocks)
- Other changes:
 - IDENTITY PERSMAPI:

Virtual storage changed from 128M 512M to 512M 3G
 - IDENTITY TCPIP:

Added statements:

```
MACH Z
IPL 990
```
 - PROFILE TCPCMSU:

Added statement: LINK MAINT 0990 0990 RR
 - SUBCONFIG MAINT:

Added statement: LINK MAINT740 319 319 RR
 - SUBCONFIG MIGMAINT:

Added statement: LINK MAINT 5E6 5E6 RR
 - USER DIRMAINT:

Added: LOGONBY IBMVM1
Changed: AUTOONLY to LBYONLY

[7.4] Linear service

z/VM 7.4 introduces linear service to the product for components at the 740 function level. Corrective service updates — in the form of fix packs, hot fixes, and hardware support — and new functions in feature packs are released in service stream PTFs. The latest PTF identifies the requisites of all fixes and features for a component up to that point. For more information about linear service, including schedules and the types of APARs, see:

Introducing z/VM Linear Service (<https://www.ibm.com/support/pages/zvm/service/linear.html>)

This satisfies the z/VM Statements of Direction included in the IBM z16® A02 and AGZ announcement and the IBM LinuxONE LA2 and AGL announcement dated April 4, 2023.

[7.4] New format for service level

The product service level, as reported by z/VM components with a query service command, uses new format *ffxx*:

- *ff* indicates the latest feature pack number.
- *xx* indicates the fix pack number for the latest feature pack.

[7.4 APAR] GETSHOPZ ServiceLink support

With the PTF for APAR VM66834, z/VM 7.4 provides GETSHOPZ support for direct-to-host transfer of service packages from IBM ServiceLink. Clients currently use the GETSHOPZ utility to securely transfer z/VM service packages directly from Shopz. This support provides the same ability for ServiceLink orders.

The following CMS utility is updated:

- [GETSHOPZ EXEC](#)

For more information, see the [z/VM: Service Guide](#).

[7.4 APAR] z/VM linear service environment variables

With the PTF for APAR VM66840, environment variables are established to provide the ability to easily determine the latest service that is installed on a z/VM 7.4 system. z/VM linear service environment variables allow administrators or automation to view the linear service level from CP, CMS, or a Linux guest.

The following VMSES/E command is updated:

- [SERVICE EXEC](#)

For more information, see:

- [z/VM linear service environment variables in the z/VM: Service Guide](#)
- [z/VM: VMSES/E Introduction and Reference](#)
- [z/VM: Other Components Messages and Codes](#)

[7.4, 7.3 APARs] GETSHOPZ support for z/VM installation media

With the PTFs for APARs VM66893 (7.4) and VM66900 (7.3), GETSHOPZ can transfer and decompress ZIP files that contain z/VM installation media. Installation media is ordered through Shopz, allowing clients using GETSHOPZ to use direct-to-host transfer similarly to how they would for service packages. Clients also have the option to use workstation upload and extract. This support simplifies the client workflow to prepare a CMS minidisk with installation media and removes a number of manual steps from the installation process.

The following CMS utility is updated:

- [GETSHOPZ EXEC](#)

For more information, see:

- [z/VM: Service Guide](#)

[7.5] Installation changes

Installation changes for z/VM 7.5 include the following:

- The upgrade installation process allows you to upgrade from z/VM 7.3 or 7.4 to z/VM 7.5.
- You can no longer perform second-level and upgrade installations from a physical DVD, a USB flash drive, or an FTP server directory. Starting with z/VM 7.5, you must perform second-level and upgrade installations from a CMS-formatted VM minidisk.

First-level installations of z/VM from an IBM Z Hardware Management Console (HMC) will continue to support FTP, File Transfer Protocol Secure (FTPS), and Secure File Transfer Protocol (SFTP) from an FTP server.

This satisfies a previous Statement of Direction.

For more information, see:

- [z/VM: Installation Guide](#)

[7.5] Change of access to restricted source and program listings

z/VM 7.5 no longer provides restricted source upon request or access to program listings with View Program Listings (VPL).

[7.5] z/CMS as the default CMS

z/CMS has become the default when an IPL of CMS is requested by a user or automatically from a directory entry. z/CMS is IPLed by issuing IPL CMS or IPL ZCMS.

Users who need ESA/390 CMS must explicitly issue IPL CMS390. While CMS itself is unchanged functionally, packaging, installation behaviors, and defaults now assume a 64-bit execution environment.

The following commands are new:

- QUERY FSTHIGH
- SET FSTHIGH

The following CMS commands are updated:

- SAMPNSS
- VMFLOAD

The following CMS macro is updated:

- DEFNUC

This satisfies the Statement of Direction from the z/VM 7.4 product announcement.

For more information, see:

- [z/VM: CMS Commands and Utilities Reference](#)
- [z/VM: CMS Planning and Administration](#)

[7.5] System infrastructure virtual switch

A new system infrastructure virtual switch is set up during a traditional installation and then configured later when IPWIZARD is run after the installation. During an upgrade installation, the system infrastructure virtual switch is defined, but is not connected to an uplink port, allowing customers to configure the virtual switch manually in the system configuration file when they are ready to exploit it.

For more information, see:

- [z/VM: Installation Guide](#)

[7.5] Integration of removable media services into the base of z/VM

The DFSMS/VM removable media services (RMS) and fast copy functions are included with the base of z/VM 7.5. The remaining DFSMS/VM minidisk and shared file system (SFS) space management functions, and RMS tape mount services for remote hosts, are not included or supported on z/VM 7.5.

The following commands have been removed:

- DFSMS ACTIVATE
- DFSMS ALTER

- DFSMS CHECK
- DFSMS CONVERT
- DFSMS DELETE
- DFSMS DISCARD
- DFSMS MANAGE
- DFSMS MIGRATE
- DFSMS MOVE
- DFSMS RECALL
- DFSMS REPORT
- DFSMS STOP

The following DFSMS configuration statements are no longer supported and should be removed from the DGTVCNTL DATA file located in VMSYS:DFSMS.CONTROL if DFSMS/VM has previously been installed:

- ACTIVE_CONFIG_FILE_ID
- DFSMS_ACCOUNTING
- DFSMS_LOG_TO_CONSOLE
- DFSMS_LOG_TO_FILE
- DFSMS_MASTER_VM
- DFSMS_OWNER_VM
- DFSMS_SERVER_VM
- DIRECTORY_INTERFACE
- DIRECTORY_TIMEOUT
- DIRECTORY_VM
- DIRECTORY_VOLSER_RESET
- FULLY_QUALIFIED_LUNAME
- MIGRATION_LEVEL_1
- MIGRATION_LEVEL_2
- MINIDISK_IPLTEXT_LIMIT
- MINIDISK_LINK_MODE_LIMIT
- MINIDISK_MISMATCH_LIMIT
- MINIDISK_RESERVED_LIMIT
- MINIDISK_SERVER_VM
- STORGRP_HIGH_THRESHOLD
- STORGRP_LOW_THRESHOLD
- RM_FOREIGN_SERVER_VM

The IGD* messages have been removed.

With z/VM 7.5, support for DFSMS space management within shared file system (SFS) file pools has been removed. As a result, SFS MIGRATE and RECALL functions are no longer supported. This change includes the removal of support for the DFSMS startup parameter within the file pool server's DMSPARMS file, which was previously used to enable migrate and recall processing. Before upgrading to z/VM 7.5, customers currently using DFSMS SFS space management **must issue** DFSMS RECALL to recall migrated SFS files. Before issuing the DFSMS RECALL command, customers should make sure there is enough space available to the file pool to accommodate the recalled files in their uncompressed state. The command DFSMS REPORT can be used to list migrated SFS files.

Note: Products or solutions that rely on SFS-based DFSMS MIGRATE and RECALL functionality will no longer operate when running on z/VM 7.5.

Changes to product documentation

- Information that is applicable to removable media services in the z/VM 7.5 base is included in a new publication: [z/VM: Removable Media Services](#).
- The DFSMS COPY command can be found in [z/VM: CMS Commands and Utilities Reference](#).
- The RMS DGT* and FSM* messages can be found in [z/VM: CMS and REXX/VM Messages and Codes](#).
- The following publications have been removed from the z/VM 7.5 product documentation library:
 - [z/VM: DFSMS/VM Customization](#)
 - [z/VM: DFSMS/VM Diagnosis Guide](#)
 - [z/VM: DFSMS/VM Messages and Codes](#)
 - [z/VM: DFSMS/VM Planning Guide](#)
 - [z/VM: DFSMS/VM Removable Media Services](#)
 - [z/VM: DFSMS/VM Storage Administration](#)

This satisfies a previous Statement of Direction.

[7.5] Changes to predefined user directory entries

Replaced (renamed) user IDs:

- MAINT740 changed to MAINT750
- 7VMDIR40 changed to 7VMDIR50
- 7VMPTK40 changed to 7VMPTK50
- 7VMRAC40 changed to 7VMRAC50
- 7VMRSC40 changed to 7VMRSC50
- 7VMTCP40 changed to 7VMTCP50

Deleted user IDs:

- IDENTITY LWMBOSS
- IDENTITY LMMWORK
- IDENTITY VMNFS
- IDENTITY LDAPSRV

Added user IDs:

- USER DFSMS LBYONLY 64M 64M EG
- IDENTITY VGLIBSRV LBYONLY 64M 64M BG
- IDENTITY VGINVHLP LBYONLY 64M 64M BG
- IDENTITY RMSMASTR LBYONLY 64M 64M BG

For detailed information about these added identity and user entries, consult the CP directory supplied with z/VM 7.5.

Changed user specifications:

- Deleted minidisks:

- MAINT 990
- MAINT750 890
- LWMBOSS 191
- LWMWORK 191
- VMNFS 191
- LDAPSRV 191
- Added minidisks:
 - MAINT750 134 (fullpack overlay for new 750RL4)
 - DFSMS 1B5 1 x
 - VGLIBSRV 191 5 x
 - VGINVHLP 191 5 x
 - RMSMASTR 191 5 x
 - MAINT 390 60 x
 - MAINT750 391 60 x
- Disk size changes:
 - VMSEVP 302 from 15 to 30 cyl (21600 to 43200 blocks)
 - VMSEVP 301 from 60 to 120 cyl (86400 to 172800 blocks)
 - VMSEVP 303 from 15 to 30 cyl (21600 to 43200 blocks)
 - VMSEVP 304 from 160 to 320 cyl (230400 to 460800 blocks)
 - VMSEVP 305 from 500 to 1200 cyl (1728000 to 3600000 blocks)
 - VMSEVP 306 from 500 to 1200 cyl (1728000 to 3600000 blocks)
 - VMSEVP 307 from 500 to 1200 cyl (1728000 to 3600000 blocks)
 - VMSEVP 308 from 500 to 1200 cyl (1728000 to 3600000 blocks)
 - VMSEVP 309 from 500 to 1200 cyl (1728000 to 3600000 blocks)
 - VMSEVP 310 from 500 to 1200 cyl (1728000 to 3600000 blocks)
 - VMSEVP 311 from 500 to 1200 cyl (1728000 to 3600000 blocks)
 - MAINT750 2D2 from 900 to 10000 cyl (1296000 to 11712000 blocks)
 - MAINT750 3D2 from 500 to 6000 cyl (0720000 to 8640000 blocks)
 - MAINT750 500 from 1200 to 3000 cyl (1728000 to 4320000 blocks)
 - MAINT750 5D2 from 50 to 100 cyl (72000 to 144000 blocks)
 - MAINT750 6D2 from 9 to 18 cyl (12960 to 25920 blocks)
 - MAINT750 7D2 from 9 to 18 cyl (12960 to 25920 blocks)
 - 7VMRSC50 2D2 from 25 to 50 cyl (36000 to 72000 blocks)
 - 7VMTCP50 2D2 from 500 to 3000 cyl (720000 to 4320000 blocks)
 - 7VMDIR50 2D2 from 50 to 100 cyl (72000 to 144000 blocks)
 - 7VMRAC50 2D2 from 70 to 140 cyl (100800 to 201600 blocks)
 - 7VMPTK50 2D2 from 50 to 100 cyl (72000 to 144000 blocks)
- Links:
 - MAINT:

Added statements:

```
LINK MAINT 190 990 RR
LINK MAINT750 391 391 RR
```

Deleted statements:

```
LINK MAINT750 890 890 RR
```

– BLDCMS:

Added statement:

```
LINK MAINT 390 390 RR
```

– BLDNUC

Added statement:

```
LINK MAINT 391 390 MR
```

Deleted statement:

```
LINK MAINT 890 990 MR
```

– MAINT750:

Added statements:

```
LINK MAINT      390 390 MR
LINK DFSMS      185 973 MR
LINK VGLIBSRV   191 974 MR
LINK VGINVHLP   191 975 MR
LINK RMSMASTR   191 976 MR
```

Deleted statements:

```
LINK LWMBOSS    191 970 MR
LINK LMWWORK    191 971 MR
LINK LDAPSRV    191 87F MR
LINK VMNFS      191 882 MR
```

– 7VMTCP50:

Deleted statements:

```
LINK VMNFS 191 27C MR
LINK LDAPSRV 191 283 MR
```

– VGLIBSRV:

Added statement:

```
LINK VGINVHLP 191 292 RR
```

– VGINVHLP

Added statement:

```
LINK VGLIBSRV 191 292 RR
```

• Virtual storage definitions:

Increased virtual storage definition to 64M 64M:

- IDENTITY AUDITOR 64M 64M
- IDENTITY AUTOLOG1 64M 64M
- IDENTITY AUTOLOG2 64M 64M
- IDENTITY AVSVM 64M 64M
- USER BLDRACF 64M 64M
- IDENTITY CMSBATCH 64M 64M
- IDENTITY CSMSEVER 64M 64M

- IDENTITY DISKACNT 64M 64M
- IDENTITY FTPSERVE 64M 64M
- IDENTITY GCS 64M 64M
- IDENTITY LGLOPR 64M 64M
- IDENTITY MONWRITE 64M 64M
- IDENTITY OPERATOR 64M 64M
- IDENTITY OPERSYMP 64M 64M
- IDENTITY OP1 64M 64M
- IDENTITY PORTMAP 64M 64M
- IDENTITY RACFVM 64M 64M
- IDENTITY RACMAINT 64M 64M
- IDENTITY REXECD 64M 64M
- IDENTITY RSCS 64M 64M
- IDENTITY RSCSAUTH 64M 64M
- IDENTITY RSCSDNS 64M 64M
- IDENTITY RXAGENT1 64M 64M
- IDENTITY SMTP 64M 64M
- IDENTITY SNMPD 64M 64M
- IDENTITY SNMPQE 64M 64M
- IDENTITY SNMPSUBA 64M 64M
- IDENTITY SSLDCSSM 64M 64M
- USER SYSADMIN 64M 64M
- IDENTITY SYSDUMP1 64M 64M
- USER SYSMaint 64M 64M
- IDENTITY SYSMON 64M 64M
- IDENTITY TCPMAINT 64M 64M
- IDENTITY TSAFVM 64M 64M
- IDENTITY VMRMADMN 64M 64M
- IDENTITY VMSERV 64M 64M
- IDENTITY VMSERVU 64M 64M
- IDENTITY VMUTIL 64M 64M
- IDENTITY XCHANGE 64M 64M
- USER 5684042J 64M 64M
- USER 7VMDIR50 64M 64M
- USER 7VMLEN30 64M 64M
- USER 7VMPTK50 64M 64M
- USER 7VMRAC50 64M 64M
- USER 7VMRSC50 64M 64M

Increased minimum virtual storage definition to 64M:

- USER DATAMOVE 64M 128M
- USER DATAMOV2 64M 128M
- USER DATAMOV3 64M 128M
- USER DATAMOV4 64M 128M

- USER DTCSMAPI 64M 128M

Increased virtual storage definition:

- IDENTITY MIGMAINT 2G 2G to 4G 4G
- IDENTITY DTCSMAPI 64M 128M to 128M 256M
- IDENTITY MAINTCSM 256M 1000M to 2G 2G

- Other:

- IDENTITY TCPIP all subconfigurations

Added:

- * NICDEF 750 TYPE EQDIO LAN SYSTEM IBMVSW1

- IDENTITY TSAFVM

Changed:

IPL CMS PARM AUTOOCR to IPL CMS390 PARM AUTOOCR

Support and exploitation of hardware and architectures, and hypervisor efficiency and scalability

These topics describe z/VM support for, or exploitation of, new or enhanced hardware devices, facilities, and architectures.

Notes:

1. Some hardware z/VM support or exploitation might depend on hardware level or availability. See the sections on server support and device support in *z/VM: General Information*. For detailed information on hardware capabilities and requirements, refer to the appropriate hardware announcements and other hardware documentation.
2. This section also describes the z/VM simulation or emulation of certain hardware architectures and facilities. Other simulations and emulations might be described under [“Connectivity and networking” on page 58](#).

[7.1] Architecture Level Set

z/VM 7.1 requires a new architecture level set (ALS) and supports only IBM zEnterprise EC12 (zEC12) and IBM zEnterprise BC12 (zBC12) and later servers. See the appropriate Preventive Service Planning (PSP) bucket for the minimum microcode level (MCL) and any required updates. See the server support information in *z/VM: General Information*.

Specific server facilities might also be required. See *IBM: z/VM 7.1 Architecture Level Set* (<https://www.ibm.com/support/pages/zvm/zvm710/architecture>).

[7.1] Foundational Support for Dynamic Memory Downgrade

Foundational support is provided for a future z/VM deliverable to increase flexibility in managing z/VM configurations by enabling real storage to be removed from a z/VM LPAR without requiring an outage. This support will complement existing functionality to add real storage to an active z/VM system.

The following CP command has been updated:

- SET STORAGE includes the new PERMANENT operand.

For more information, see:

- [z/VM: CP Commands and Utilities Reference](#)
- [z/VM: CP Messages and Codes](#)

[7.1] Foundational Support for More Than 64 Logical Processors

Foundational support is provided for a future z/VM deliverable that will increase the number of supported logical processors beyond the current limit of 64. This will allow clients to run a z/VM LPAR with more than 64 cores in an SMT1 environment or more than 32 cores in an SMT2 environment to accommodate workload growth demands.

Support for dedicating processors to guests is disabled.

The following CP commands are updated:

- DEFINE CPU
- INDICATE LOAD
- INDICATE USER
- QUERY PROCESSORS
- QUERY SHARE
- QUERY SRM
- QUERY SXSPAGES
- QUERY VIRTUAL CPUS
- SET SHARE
- SET SRM
- SET TRACEFRAMES
- VARY CORE
- VARY PROCESSOR
- VMRELOCATE

The following CP commands are deleted:

- DEDICATE
- UNDEDICATE

The following CP utility is updated:

- TRACERED

The following statement is updated:

- CPU directory statement

The following CP functions are updated:

- DIAGNOSE code X'70' - Time-of-Day Clock Accounting Interface
- DIAGNOSE code X'2FC' - Obtain Certain Guest Performance Data
- Store Hypervisor Information (STHYI) instruction

Various messages are updated or deleted. Various abends are deleted.

The following CP monitor records are updated:

- Domain 0 Record 10 - MRSYTSCG - Scheduler Activity (global)
- Domain 0 Record 23 - MRSYTLCK - Formal Spin Lock Data (global)
- Domain 1 Record 5 - MRMTRPRP - Processor Configuration (per processor)
- Domain 5 Record 3 - MRPRCPRP - Processor Data (per processor)
- Domain 5 Record 15 - MRPRCDSV - Dispatch Vector Assignments (Event)
- Domain 5 Record 16 - MRPRCPUP - Park/Unpark Decision (Event)
- Domain 5 Record 17 - MRPRCRCD - Real CPU Data (per CPU) (Sample)
- Domain 5 Record 18 - MRPRCDHF - Dispatch Vector High Frequency Data (Sample)

The following SMAPI routines are updated:

- Image_CPU_Define_DM
- Image_CPU_Query_DM
- Image_Definition_Create_DM
- Image_Definition_Query_DM
- Image_Definition_Update_DM

The following DirMaint command is updated:

- SETCPU

For more information, see:

- [*z/VM: CP Commands and Utilities Reference*](#)
- [*z/VM: CP Messages and Codes*](#)
- [*z/VM: CP Planning and Administration*](#)
- [*z/VM: CP Programming Services*](#)
- [*z/VM: Directory Maintenance Facility Commands Reference*](#)

[7.1 APAR] Support for the IBM Adapter for NVMe

With the PTF for APAR VM66180, z/VM 7.1 provides dynamic I/O and guest enablement support for the IBM Adapter for NVMe on the Emperor II and Rockhopper II servers with driver D36. This feature supports the NVMe (non-volatile memory express) communications protocol by allowing a client-procured SSD (solid-state drive) storage device to be directly connected to the I/O subsystem through an IBM PCIe adapter.

- Dynamic I/O

The ability to dynamically define the NVMe PCIe adapter type.

- Guest Exploitation

The ability of guest exploitation of NVMe PCI functions by allowing CP to identify these functions and allowing them to be brought online and attached to guests.

The ability to query and track NVMe PCI functions via the QUERY PCIF command, QUERY VIRTUAL PCIF command, and monitor data by updating these areas to recognize this new function type that are associated with them.

The following CP command has been updated:

- DEFINE PCIFUNCTION

The responses for the following CP commands have been updated:

- QUERY PCIFUNCTION
- QUERY VIRTUAL PCIFUNCTION

The following CP monitor records have been updated:

- Domain 1 Record 27 - MRMTRPCI - PCI function Configuration Data
- Domain 6 Record 42 - MRIODPAD - PCI function added to the system
- Domain 6 Record 45 - MRIODPON - Real PCI function varied on

For more information, see:

- [*z/VM: CP Commands and Utilities Reference*](#)
- [*z/VM: Performance*](#)

[7.1 APAR] Extended Address Volume (EAV) Paging Space Support

With the available PTF for APARs VM66263 and VM66297, z/VM supports paging space that is located anywhere on Extended Address Volumes, allowing clients to define sufficient paging capacity for z/VM partitions with large memory sizes while reducing the burden of managing a larger number of smaller paging devices. As systems continue to grow, the need for paging space has increased. This z/VM support allows allocation and use of paging space on ECKD devices above cylinder 65520 up to the 1TB (1,182,006 cylinder) limit.

The following CP commands and utilities have been updated (see [Table 8 on page 111](#) and [Table 9 on page 135](#)):

- ATTACH
- CPFMTXA

The description of the following SMAPI API has been updated:

- System_Page_Utilization_Query

The following CP monitor records have been updated:

- Domain 0 Record 6 - MRSYTASG - Auxiliary Storage (Global)
- Domain 1 Record 8 - MRMTRPAG - Paging Configuration Data
- Domain 3 Record 4 - MRSTOASP - Auxiliary Storage Management (per Exposure)
- Domain 3 Record 7 - MRSTOATC - Page/Spool Area of a CP Volume

The PTF for APAR VM66297 provides SMAPI help file updates.

For more information, see:

- [z/VM: CP Commands and Utilities Reference](#)
- [z/VM: CP Planning and Administration](#)
- [z/VM: Systems Management Application Programming](#)
- [z/VM: CP Messages and Codes](#)
- [z/VM: Performance](#)

[7.1 APAR] Performance Toolkit Support for EAV Paging Space

With the PTF for APAR VM66293, Performance Toolkit for z/VM displays data for paging space on CP-owned extended address volumes (EAVs).

No screen layout changes have been introduced with the support for EAV paging.

[7.1 APAR] Support for 80 Logical Processors

With the available PTF for APARs VM66265 and VM66296, z/VM supports 80 logical processors on IBM z14[®] and IBM z15[®], relieving the previous limitation of 64 logical processors per LPAR. This will allow clients to run more workload on z/VM by increasing the number of supported logical processors, which is especially important when multithreading is enabled. From a client's perspective, this will allow defining more logical processors for running workload on each LPAR, possibly requiring fewer LPARs to support the same workload.

This support increases the limit to 40 cores when simultaneous multithreading (SMT) support is enabled, or to 80 cores when SMT is disabled.

The following CP commands have been updated:

- QUERY PROCESSORS
- SET SRM
- VARY CORE
- VARY PROCESSOR

The following CP utility has been updated:

- TRACERED

The following CP configuration statement has been updated:

- MULTITHREADING

The following CP trace codes have been added: 3616, 3617, and 3651.

The following CP trace codes have been removed: 3614, 3615, and 3650.

The PTF for APAR VM66296 provides StandAlone Dump support.

For more information, see:

- [z/VM: CP Commands and Utilities Reference](#)
- [z/VM: CP Planning and Administration](#)
- [z/VM: CP Messages and Codes](#)
- [z/VM: Diagnosis Guide](#)

[7.1 APAR] Performance Toolkit Support for 80 Logical Processors

With the PTF for APAR VM66292, Performance Toolkit for z/VM can report on up to 80 logical processors. Customers can monitor LPARs with up to 80 logical processors defined. Performance data screens display all logical processor IDs and core IDs in hexadecimal format rather than the previous decimal format.

The following performance data screens, their descriptions, or both, are updated:

- FCX100, CPU Load and Transactions Screen - CPU
- FCX126, LPAR Load Screen - LPAR
- FCX144, Processor Log Screen - PROCLOG
- FCX174, User Transaction Details Screen - UTRANDET
- FCX180, System Configuration Screen - SYSCONF
- FCX232, I/O Processor Log Screen - IOPROCLG
- FCX239, Processor Summary Log Screen - PROCSUM
- FCX287, System Topology Machine Organization Screen - TOPOLOG
- FCX298, Logical Core Organization Log Screen - PUORGLOG
- FCX299, Processor Unit (Core and Threads) Configuration Log Screen - PUCFGLOG
- FCX300, Dispatch Vector Configuration Change Log Screen - DSVCLG
- FCX301, Dispatch Vector Activity Screen - DSVBKACT
- FCX303, DSVBK Steals per Processor Log Screen - DSVSLOG
- FCX304, Processor Log Screen - PRCLOG

For more information, see:

- [z/VM: Performance Toolkit Reference](#)

[7.1 APAR] Removal of 1000-Member Limit for a Single Resource Pool

With the PTF for APAR VM65786, the previous limit of 1000 members in a single resource pool has been removed.

[7.1 APAR] IBM z15 (z15) and LinuxONE III Server Compatibility

With the PTFs for APAR VM66248, VM66321, and VM66325, z/VM's IBM z15™ (z15) and LinuxONE III Server Compatibility support allows guests of z/VM to use these facilities:

- Miscellaneous-Instruction-Extensions Facility 3

- Vector Enhancements Facility 2
- Vector Packed Decimal Enhancement Facility
- Synchronous execution support for on-chip data compression, deflate-conversion
- Message-Security-Assist Extension 9
- Crypto Express7S adapter shared and dedicated guest support

The PTF for APAR VM66206 provides infrastructure support in z/VM 6.4 and 7.1 for the z15 server, and z/VM Dynamic Crypto support, which must be installed on all the members of an SSI cluster before any member will be running on the z15 server.

In addition, the PTF for APAR VM65976 provides infrastructure support for ESA/390-compatibility mode within z/VM 6.4, and must be installed on all members of an SSI cluster before any z/VM 6.4 member of the cluster is run on an IBM z15 or LinuxONE III server.

With the available PTF for APAR PI99085, the z/VM 6.4 and 7.1 TCP/IP stack and NETSTAT OSAINFO command have been updated to provide support for:

- OSA-Express7s GbE
- OSA-Express7S 10GbE
- OSA-Express7S 25GbE
- OSA-Express7s 1000BASE-T

The following CP commands have been updated (see [Table 8 on page 111](#)):

- QUERY CRYPTO command
- QUERY VIRTUAL CRYPTO command
- SET SVC76 command

The following system configuration statement has been updated:

- [CRYPTO APVIRTUAL Statement](#)

The following directory statement has been updated:

- [CRYPTO Directory Statement](#)

The following CP monitor records have been updated:

- D1R4 MRMTRSYS: Added field MTRSYS_MAXPU.
- D1R15 MRMTRUSR: Added CPNC and CPVC.
- D4R2 MRUSELOF: Added new simulation counts.
- D4R3 MRUSEACT: Added new simulation counts.
- D4R9 MRUSEATE: Added CPNC and CPVC.
- D5R20 MRPRCMFM: Updated CSVN value.

In addition, support is added for installation of z/VM 6.4 and 7.1 using a USB flash drive.

[7.1 APAR] Dynamic Crypto

With the PTF for APAR VM66266, z/VM's Crypto support will enable dynamic changes to the cryptographic (crypto) environment on a z/VM system.

The Dynamic Crypto support allows the addition or removal of Crypto Express adapters, as well as maintenance and repair of these adapters, to be less disruptive to the system and virtual machine's running on the system. It will also allow the flexibility to change crypto resources between dedicated and shared use.

The following new commands are provided as an interface to make these changes without requiring an IPL of z/VM or an IPL of the virtual machine.

- [DEFINE CRYPTO](#)

- [DETACH CRYPTO](#)
- [VARY CRYPTO](#)

The following CP commands have been updated.

- [ATTACH](#)
- [QUERY CRYPTO](#)
- [QUERY VIRTUAL CRYPTO](#)

The following CP trace codes have been added:

- 3800
- 3801
- 3802

For more information, see:

- [z/VM: CP Commands and Utilities Reference](#)
- [z/VM: CP Messages and Codes](#)

Improved information about defining crypto resources to z/VM guests

A new chapter has been added to [z/VM: CP Planning and Administration](#) to provide improved information about how to define crypto resources to z/VM guests. See [Crypto Planning and Management](#) for more information.

[7.1 APAR] System Recovery Boost

With the PTF for VM66283, the System Recovery Boost feature on the z15 Models T01 and T02 server allows z/VM to boost general-purpose processors running as subcapacity to full capacity for up to 60 minutes during z/VM system initialization and workload bring-up; and up to 30 minutes during workload quiesce and system shutdown, and during system abend processing.

z/VM support primarily benefits the 21CS VSEⁿ and z/TPF guest environments.

The FEATURES system configuration file statement has been updated.



Warning: When enabling or disabling System Recovery Boost in the z/VM SYSTEM CONFIG file, it is recommended to add a separate FEATURES statement on a new line rather than include RECOVERY_BOOST on an existing FEATURES line. This will avoid issues with existing FEATURES statements when IPLing CPLOAD MODULES that do not include System Recovery Boost support.

The following CP messages are new: HCP65221 and HCP6523E.

The following CP monitor record has been updated: Domain 0 Record 16 - MRSYTCUP - CPU Utilization in a Logical Partition

For more information, see:

- [z/VM: CP Planning and Administration](#)
- [z/VM: CP Messages and Codes](#)
- [z/VM: Performance](#)

[7.1 APAR] z15 I/O Processor Compatibility

With the PTF for APAR VM66242, z/VM provides support for IBM Fibre Channel Endpoint Security between an IBM z15 or LinuxONE III and the DS8000, by providing the following:

- Query the encryption status of target worldwide port names (WWPNs) associated with a Fibre Channel Protocol (FCP) device via the QUERY FCP command.
- Query the encryption and authentication capability of a channel path via the QUERY PATHS command.

- Track encryption state changes by recognizing Store Event Information channel report data and creating an event monitor record for each state change.

IBM Fibre Channel Endpoint Security requires a minimum driver D41C bundle level. For further details, see [IBM Support - Preventive Service Planning buckets, Upgrade 8561DEVICE, Subset 8561/ZVM](https://www.ibm.com/support/docview.wss?uid=isg1_8561DEVICE_8561-ZVM) (https://www.ibm.com/support/docview.wss?uid=isg1_8561DEVICE_8561-ZVM).

The following CP commands have been updated (as shown in [Table 8 on page 111](#)):

- [QUERY FCP](#)
- [QUERY PATHS](#)

The following new monitor record has been added:

D6R53 MRIODSEC

Store Event Information channel reports indicating encryption state changes.

For more information, see:

- [z/VM: CP Commands and Utilities Reference](#)
- [z/VM: CP Messages and Codes](#)
- [z/VM: Performance](#)

[7.2] Adjunct Virtual Machine Support

z/VM 7.2 has been updated to support adjunct virtual machines. An adjunct is a second virtual machine configuration running under your userid, distinct from the configuration created when your userid is logged on or autologged (called the principal configuration). Each configuration has its own virtual CPU(s), virtual storage (memory), and virtual devices, and can IPL a different instance of an operating system. The adjunct is intended to run CMS, to give you access to CMS files and tools, for example, to aid in debugging the operating system in the principal configuration while keeping the principal's operating system intact.

The following CP commands have been added:

- [ADJUNCT](#)
- [QUERY ADJUNCT](#)
- [SET ADJUNCTS](#)

The following CP commands have been updated:

- [CPACCESS](#)
- [CPU](#)
- [DEFINE](#)
- [DEFINE MDISK](#)
- [LINK](#)
- [LOGON](#)
- [QUERY LINKS](#)
- [QUERY VIRTUAL CPUS](#)

The following system configuration statement has been updated:

- [FEATURES Statement](#)

The following directory statement has been added:

- [ADJUNCT](#)

For more information, see:

- [z/VM: CP Commands and Utilities Reference](#)
- [z/VM: CP Planning and Administration](#)
- [z/VM: VM Dump Tool](#)

[7.2] Architecture Level Set (ALS)

z/VM 7.2 requires a new architecture level set (ALS) and supports only IBM z13[®] (z13), IBM z13s[®] (z13s), IBM LinuxONE Emperor and Rockhopper, and later servers. See the appropriate Preventive Service Planning (PSP) bucket for the minimum microcode level (MCL) and any required updates. See the server support information in *z/VM: General Information*.

Note: Preventive service planning (PSP) buckets for many IBM products, including z/VM, are no longer created or updated. For more information, see:

- [z/VM Preventive Service \(https://www.ibm.com/support/pages/zvm/service/prevserv.html#heading-link2\)](https://www.ibm.com/support/pages/zvm/service/prevserv.html#heading-link2)
- [IBM servers supported by z/VM](#)

Specific server facilities might also be required. See IBM: z/VM 7.2 Architecture Level Set (<https://www.ibm.com/support/pages/zvm/zvm720/architecture>).

[7.2] xDisk Scalability

xDisk Scalability improves the algorithm used for handling distributed lock contention in a z/VM SSI cluster. The new algorithm prevents a user from "starving" the rest of the cluster when that user causes a lot of cross-system disk locking; for example, by issuing excessive LINK or DETACH commands.

The following monitor records have been changed:

- D1R4 - MRMTRSYS - System Configuration Data
- D11R6 - MRSSIXLK - XDISK Serialization Sample
- D11R7 - MRSSIXDI - XDISK Activity Sample

[7.2] MSS Multi-Target PPRC Exploitation

z/VM supports now up to four subchannel sets that reflect the actual hardware configuration and are commonly used in a MSS Multi-Target PPRC environment. Logically z/VM groups all recognized devices into two device groups, with one being the active configuration and the other being the stand-by configuration. Most z/VM commands support only 4-digit device numbers and can refer only to devices in the active configuration. Support has been expanded to handle the real subchannel sets and 5-digit device numbers where the leading fifth digit reflects the hardware subchannel number.

The following CP commands have been updated:

- [DELETE EDEVICE](#)
- [DELETE RDEVICE](#)
- [HYPERSWAP](#)
- [LOCATE RDEV](#)
- [QUERY CHPID](#)
- [QUERY DASD](#)
- [QUERY EDEVICE](#)
- [QUERY EQID](#)
- [QUERY HYPERSWAP](#)
- [QUERY MSS](#)
- [QUERY PATHS](#)
- [QUERY \(Real Device\)](#)
- [SET EDEVICE](#)
- [SET RDEVICE DASD](#)
- [VARY PATH](#)

- [VARY \(Real Device\)](#)
- [VARY SUBCHANNEL](#)

The following CP utilities have been updated:

- [CPSYNTAX](#)
- [IOEXPLOR](#)
- [SALIPL](#)

The following system configuration statements have been updated:

- [EDEVICE Statement](#)
- [RDEVICE Statement](#)

The following VM Dump Tool subcommand has been updated:

- [RDEVBK](#)

SMAPI does not explicitly support five-digit device numbers supported either in previous z/VM releases or in the additional support for MSS Multi-Target PPRC added in 7.2. Caution is recommended when using SMAPI APIs that return information on device numbers.

For more information, see:

- [z/VM: CP Commands and Utilities Reference](#)
- [z/VM: CP Planning and Administration](#)
- [z/VM: System Operation](#)
- [z/VM: VM Dump Tool](#)

Changed command responses

With the support of up to four subchannel sets (0-3), known as multiple subchannel sets (MSS), the following command responses were changed to facilitate a fifth digit. These changes take effect even on non-exploiting installations and independently of specifying five-digit device numbers on commands with the new support added.

- QUERY EDEV / QUERY EDEV ALL / QUERY EDEV DETAILS

Response changed from this:

```
EDEV 1234 TYPE FBA ATTRIBUTES 2107
```

to this:

```
EDEV 1234 TYPE FBA ATTRIBUTES 2107
```

- QUERY EQID FOR

Response changed from this:

```
0777: EQID = 44444444
```

to this:

```
0777: EQID = 44444444
```

- QUERY EQID

Response changed from this:

```
Devices for 44444444:  
0777 00888
```

to this:

```
Devices for 44444444:
00777 00888
```

- DELETE RDEVICE

Response changed from this:

```
RDEV 0311 deleted
```

to this:

```
RDEV 0311 deleted
```

- SET RDEVICE

Response changed from this:

```
HCPZRP6722I Created RDEV for device 4711.
HCPZRP6722I Characteristics of device 4711 were set as requested.
```

to this:

```
HCPZRP6722I Created RDEV for device 4711.
HCPZRP6722I Characteristics of device 4711 were set as requested.
```

- QUERY (Real Device) / QUERY DASD

Response changed from this:

```
DASD 0191 CP SYSTEM KAH191 1.
```

to this:

```
DASD 0191 CP SYSTEM KAH191 1.
```

- LOCATE RDEV

Response changed from this:

Dev	RDEV	CPVOL	VEXBK	RSPBK	SPFBK
0192	011916A8	*	*	*	*

to this:

Dev	RDEV	CPVOL	VEXBK	RSPBK	SPFBK
0192	0188B6A8	*	*	*	*

- VARY ON/OFFLINE PATH

All related command responses (such as "path does not exist," "conflicting device information," "not operational," "reserve pending," and others) that include a real device number are extended with a leading blank to also eventually host a fifth digit.

For example:

- This response changed from this:

```
Path 90 is already online for device 0191
```

to this:

```
Path 90 is already online for device 0191
```

- This response changed from this:

```
Path 93 is not varied offline from device 0191 because it is the last path to the device.
```

to this:

Path 93 is not varied offline from device 0191 because it is the last path to the device.

[7.2] HiperDispatch default unparking setting changed to UNPARKING MEDIUM

The HiperDispatch default unparking model has changed from LARGE to MEDIUM. This reduces the tendency to use vertical-low (VL) logical cores and thereby has the potential to reduce the overhead induced in the PR/SM hypervisor and improve the use of processor cache.

If desired, the default can be changed to LARGE by using this system configuration file statement:

- [SRM Statement](#)

For more information, see:

- [z/VM: CP Planning and Administration](#)

[7.2] System Recovery Boost enabled by default

System Recovery Boost has been enabled by default, allowing z/VM to automatically take advantage of boosting sub-capacity processors to full capacity for a limited duration during startup and shutdown when running on the IBM z15 Models T01 and T02 with sub-capacity processors.

For more information, see:

- [z/VM: CP Planning and Administration](#)
- [z/VM: CP Messages and Codes](#)
- [z/VM: Performance](#)

[7.2 APAR] Performance Toolkit Support for Simultaneous Multithreading (SMT)

With the PTF for APAR VM66215, z/VM provides new reports within the Performance Toolkit feature in support of SMT. New reports display SMT metrics for each core in a partition and for each core type. Reports also display the three views of user processor time: raw time, MT-1 equivalent time, and prorated core time. These reports provide assistance in understanding processor usage and efficiency.

With this support, Performance Toolkit includes the following new performance data screens and associated commands:

- FCX331, SMT Metrics Per Core Type Log - MTCTYPLG
- FCX332, SMT Metrics Per Core Log - MTCORELG
- FCX333, User Processor Time Screen - USRPRCTM
- FCX334, User Processor Time Log Screen - USRTMLOG

This support includes updates to the following performance data screens:

- FCX124, Performance Data Selection Menu - MONITOR, MENU
- FCX154, System Settings Screen - SYSSET
- FCX173, Benchmark Log Selection Menu Screen - BENCHMRK
- FCX180, System Configuration Screen - SYSCONF
- FCX234, Processor Configuration Log Screen - PROCCONF
- FCX236, Processor Load and Configuration Logs Menu - PROCMENU
- FCX325, CPU Activity Menu - CPUMENU

For more information, see [z/VM: Performance Toolkit Reference](#).

[7.2 APAR] Guest HyperPAV Alias support for 1-End minidisks

With the PTF for APAR VM66421, clients can define and associate virtual HyperPAV alias devices with base minidisks that are defined with the MDISK directory statement from real cylinder 1 to END. The requirement to include real cylinder 0 is eliminated.

For more information, see:

- [z/VM: CP Planning and Administration](#)
- [z/VM: CP Commands and Utilities Reference](#)

[7.2 APAR] FlashCopy preserve mirror support

With the PTF for APAR VM66433, new PRESERVEMIRROR operands for z/VM FlashCopy® commands allow FlashCopy relationships between PPRC primary devices without affecting the PPRC status of the target devices. This particularly avoids PPRC suspend and duplex pending conditions that are associated with the target device of the FlashCopy.

The following CP commands have been updated:

```
FLASHCOPY vdev
FLASHCOPY ESTABLISH
```

For more information, see:

- [z/VM: CP Commands and Utilities Reference](#)

[7.2 APAR] VARY ON of real devices utilizing multi-processor support

With the PTF for APAR VM66449, the VARY ON *rdev* command can use any processor to complete its work. This significantly improves the response time when a large number of real devices are being varied online via a single command and is of particular benefit to GDPS environments.

[7.2 APAR] Non-fullpack minidisk High Performance FICON Support

With the PTF for APAR VM66450, z/VM guests can exploit High Performance FICON (HPF) on non-fullpack minidisks.

[7.2 APAR] 4 TB Real Memory Support

z/VM APAR VM66173 delivers support for up to 4 TB of real memory, allowing z/VM systems to address a full 4 TB of first-level (real) memory, doubling the previous supported limit of 2 TB. With advanced memory management capabilities available in the z/VM product, clients now have the ability to run workloads that exceed 4 TB of virtual memory across all hosted guest systems, depending on workload characteristics. In conjunction with z/VM support for 80 processors, IBM Z and LinuxOne servers can now host even more work in a single z/VM partition, or across multiple z/VM partitions on one system. APAR VM66173 also delivers various system command updates, such as automatic STANDBY memory for guests and an enhancement to the CP DEFINE STORAGE command.

With automatic STANDBY memory for guests, a system administrator can code a more generic DEFINE STORAGE command that does not need to be updated every time the guest's directory entry storage size changes.

Changes include the following:

- The following CP commands have been updated:
 - DEFINE STORAGE
 - QUERY STORAGE
 - SET PAGING
 - SET STORAGE

- The following CP utility has been updated: CPSYNTAX
- The following statement has been added to the system configuration file: PAGING
- The following system configuration statements have been updated: FEATURES, STORAGE
- The following IPL parameter has been updated: STORE=
- The following CP monitor records are new:
 - Domain 1 Record 36 - MRMTRAZN - Available Zone Information
 - Domain 3 Record 22 - MRSTORST - Central Storage Add or Remove Started
 - Domain 3 Record 23 - MRSTOREM - Central Storage Removed from Real Memory
 - Domain 3 Record 24 - MRSTORCP - Reconfigurable Storage Converted to Permanent Storage
 - Domain 3 Record 25 - MRSTOAZN - Available Zone Information (Global)

The following CP monitor records have been updated:

- Domain 0 Record 6 - MRSYTASG - Auxiliary Storage (Global)
- Domain 1 Record 7 - MRMTRMEM - Memory Configuration Data
- Domain 3 Record 1 - MRSTORSG - Real Storage Management (Global)
- Domain 3 Record 2 - MRSTORSP - Real Storage Activity (Per Processor)
- Domain 3 Record 21 - MRSTOADD - Central Storage Added to Real Memory

For more information, see:

- [z/VM: CP Commands and Utilities Reference](#)
- [z/VM: CP Planning and Administration](#)
- [z/VM: CP Messages and Codes](#)
- [z/VM: Performance](#)
- [z/VM: System Operation](#)
- [z/VM: Virtual Machine Operation](#)

[7.2 APAR] z/Architecture Extended Configuration (z/XC) support

With the PTFs for APARs VM66201 (CP) and VM66425 (CMS), z/Architecture® Extended Configuration (z/XC) support is added. CMS applications that run in z/Architecture can use multiple address spaces. A z/XC guest can use VM data spaces with z/Architecture in the same way that an ESA/XC guest can use VM data spaces with Enterprise Systems Architecture. z/Architecture CMS (z/CMS) can use VM data spaces to access Shared File System (SFS) Directory Control (DIRCONTROL) directories. Programs can use z/Architecture instructions and registers (within the limits of z/CMS support) and can use VM data spaces in the same CMS session. For more information, see [z/VM: z/Architecture Extended Configuration \(z/XC\) Principles of Operation](#).

The following CP commands are affected:

- DEFINE DIAGNOSE
- DEFSYS
- DISPLAY
- DUMP
- IPL
- LOGON
- QUERY NSS
- QUERY SET
- SAVESYS
- SET MACHINE

- SET PAGEX
- SET VTODX
- SET 370ACCOM
- STORE
- STORE (Guest Storage - ESA/XC, z/XC)
- STORE PSW
- STORE PSWA
- STORE PSWG
- STORE Registers
- TRACE
- TRACE GG
- TRACE STORE (ESA/390, z/Architecture)
- TRACE STORE (ESA/XC, zXC)
- VMDUMP
- XAUTOLOG
- SDINST

Updated monitor records:

- Domain 1 Record 15 (MRMTRUSR - Logged on User)
- Domain 4 Record 1 (MRUSELON - User Logon)
- Domain 4 Record 2 (MRUSELOF - User Logoff)
- Domain 4 Record 3 (MRUSEACT - User Activity)
- Domain 4 Record 9 (MRUSEATE - User Activity Data at Transaction End)

[7.2 APAR] Performance Toolkit Support for z/XC-Mode Virtual Machines

With the PTF for APAR VM66489, Performance Toolkit for z/VM can detect when a virtual machine is operating in z/Architecture mode or z/Architecture Extended Configuration (z/XC) mode. When z/Architecture mode or z/XC mode is detected, it is identified appropriately in reports that include a field identifying the architecture mode in which a virtual machine is running.

This support includes updates to the following performance data reports:

- FCX112, User Resource Usage
- FCX115, User Resource Details
- FCX162, User Resource Usage Log
- FCX226, User Configuration

For more information, see [z/VM: Performance Toolkit Reference](#).

[7.2 APAR] Dynamic Memory Downgrade (DMD) Enablement

With the PTF for APAR VM66271, z/VM 7.2 provides support for the dynamic downgrading of memory. *Dynamic memory downgrade (DMD)*, also known as *memory reclamation* or *storage reclamation*, extends the real storage dynamic management characteristics of z/VM to include removing up to 50% of the real storage from a running z/VM system.

This support allows a system administrator to take real memory offline from a z/VM partition, making it available to other partitions in the central processor complex (CPC). The removal is dynamic; no re-IPLing of the z/VM image is required to accomplish the change in the memory configuration. Only memory that is configured as reconfigurable can be removed without an IPL.

Memory reclamation by a first-level z/VM system can be performed on the IBM z14 (or later) family of servers (or equivalent).

Changes include the following:

- The following CP commands have been updated:
 - SET RESERVED
 - SET STORAGE
- The following system configuration statement has been updated:
 - STORAGE

For related z/VM 7.2 documentation updates, see:

- [z/VM: CP Commands and Utilities Reference](#)
- [z/VM: CP Planning and Administration](#)
- [z/VM: CP Messages and Codes](#)

For more information about dynamic memory downgrade, including recommended hardware service levels, see: [z/VM Memory Management\(https://www.ibm.com/support/pages/zvm/memman/\)](https://www.ibm.com/support/pages/zvm/memman/).

[7.2 APAR] Performance Toolkit Support for Dynamic Memory Downgrade

With the PTF for APAR VM66285, Performance Toolkit for z/VM provides support for CP Dynamic Memory Downgrade, which enables dynamic reconfiguration of permanent and reconfigurable memory. This support updates existing Performance Toolkit reports to include:

- The amount of current configured permanent memory
- The amount of current configured reconfigurable memory
- The storage increment size
- The PAGING warning threshold
- Additional system status entries that indicate dynamic changes to the system memory configuration

This support includes updates to the following performance data reports:

- FCX103, Storage Utilization
- FCX180, System Configuration. In addition, the total DPA size field has been removed.

For more information, see [z/VM: Performance Toolkit Reference](#).

[7.2 APAR] Improved Live Guest Relocation for Crypto Environments with Mixed Adapter Types

With the PTF for APAR VM66496, Live Guest Relocation (LGR) for APVIRT crypto users is supported even when the type of the shared crypto resource on the source system does not match the type on the target system. QUERY VIRTUAL CRYPTO on any system in a relocation domain reports the lowest level of crypto express adapter that is available in the shared pools of all systems in a relocation domain. APVIRT crypto users can issue the QUERY VIRTUAL CRYPTO command to determine the level of functions that can be used to enable relocation between systems in the relocation domain without using the FORCE ARCHITECTURE option.

For more information, see Live Guest Relocation of APVIRT Virtual Machines in [z/VM: CP Planning and Administration](#) and [QUERY VIRTUAL CRYPTO](#) in [z/VM: CP Commands and Utilities Reference](#).

[7.2 APAR] z/VM Support for IBM z16

With the PTFs for APAR VM66532, z/VM 7.1 and 7.2 provide support to enable guests to exploit function on IBM z16®. The following support is included:

- Embedded Artificial Intelligence Acceleration, which is designed to yield the following benefits:

Reduce the overall time that is required for CPU operations for neural-networking processing functions.

Help support applications like fraud detection.

- Compliance-ready CP Assist for Cryptographic Function (CPACF) Counters support, which provides a means for guests to track crypto compliance and instruction usage.
- Breaking-event-address register (BEAR) enhancement facility, which facilitates the debug of wild branches.
- Vector Packed Decimal Enhancements 2, which delivers new instructions that are intended to provide performance improvements.
- Reset DAT protection facility, which provides a more efficient way to disable DAT protection, such as during copy-on-write or page-change tracking operations.
- Consolidated Boot Loader, which provides guest IPL from a SCSI LUN. Guest IPL from SCSI, with or without the DUMP option, now requires a minimum guest virtual memory size of 768 MB.
- RoCE Express3 adapter, which allows guests to exploit Routable RoCE, Zero Touch RoCE, and SMC-R V2 support.
- IBM Adapter for NVMe 1.1, which is supported on IBM LinuxONE Emperor 4 only. z/VM provides guest exploitation support. In addition, z/VM 7.3 supports defining Fixed-Block Architecture (FBA) EDEVICES on IBM Adapter for NVMe devices.
- The Crypto Express8S (CEX8S) adapter, supported as a dedicated or shared resource. Dedicated guests are able to take advantage of all functions available with the CEX8S adapters, including assorted new enhancements and use of Quantum-Safe APIs. The QUERY CRYPTO and QUERY VIRTUAL CRYPTO commands now report crypto adapters that are configured in EP11 mode with the 'P' suffix instead of the 'S' suffix.

The PTFs for APAR VM66532 also support CPU/Core topology location information that is included in z/VM monitor data, which provides a better picture of the system for diagnostic purposes.

The following Infrastructure support must be installed on all members within a z/VM Single System Image (SSI) cluster before any member of the cluster is IPLed on IBM z16:

- z/VM 7.2 with the PTF for APAR VM66504
- z/VM 7.1 with the PTFs for APARs VM66206 and VM66504

The following CP commands are updated:

- [DEFINE PCIFUNCTION](#)
- [DUMP \(Registers\)](#)
- [QUERY CRYPTO](#)
- [QUERY VIRTUAL CRYPTO](#)
- [QUERY VIRTUAL PCIFUNCTION](#)
- [STORE STATUS](#)
- [TRACE mnemonic1](#)

For more information, see [“CP Commands” on page 111](#) and [z/VM: CP Commands and Utilities Reference](#).

The following system configuration statement is updated:

- [CRYPTO APVIRTUAL Statement](#)

For more information, see [“System Configuration Statements” on page 106](#) and [z/VM: CP Planning and Administration](#).

The following directory statement is updated:

- [CRYPTO Directory Statement](#)

For more information, see [“User Directory Statements” on page 109](#) and [z/VM: CP Planning and Administration](#).

The following z/VM Dump Tool subcommand is updated:

- [REGISTER Subcommand](#)

The following z/VM Dump Tool subcommand is new:

- [BREG Subcommand](#)

For more information, see *z/VM: VM Dump Tool* and [“VM Dump Tool” on page 141](#).

The following trace code is added:

- 8300 - Document the inclusion of BEAR

For more information, see [Trace Table Codes](#) in *z/VM: Diagnosis Guide*.

The following CP monitor records are updated:

- Domain 0 Record 16 - MRSYTCUP - CPU Utilization Data in a Logical Partition
- Domain 0 Record 17 - MRSYTCUM - Physical CPU Utilization Data
- Domain 4 Record 2 - MRUSELOF - User Logoff
- Domain 4 Record 3 - MRUSEACT - User Activity
- Domain 5 Record 10 - MRPRCAPM - Crypto Performance Measurement Data
- Domain 5 Record 13 - MRPRCMFC - CPU Measurement Facility
- Domain 5 Record 20 - MRPRCMFM - MT CPUMF Counters

[7.2 APAR] Host Exploitation of Crypto Interruptions

With the PTF for APAR VM66534, z/VM 7.2 supports host crypto-interruption exploitation for APVIRT cryptographic guests. The support eliminates the need for the host to poll cryptographic resources for replies that are ready to be delivered to the guest.

The following CP new function variable is new:

- CP.FUNCTION.CRYPTO.INTERRUPTIONS

The following CP command is updated:

- [QUERY CRYPTO](#)

The following CP command is new:

- [SET CRYPTO](#)

For more information, see [“CP Commands” on page 111](#) and *z/VM: CP Commands and Utilities Reference*.

The following system configuration statement is updated:

- [CRYPTO APVIRTUAL Statement](#)

For more information, see [“System Configuration Statements” on page 106](#) and *z/VM: CP Planning and Administration*.

The following CP monitor record is updated:

- Domain 5 Record 9 - MRPRCAPC - Crypto Performance Counters

[7.3] Architecture Level Set (ALS)

z/VM 7.3 requires a new architecture level set (ALS) and supports only IBM z14 family or later servers.

Note: Preventive service planning (PSP) buckets for many IBM products, including z/VM, are no longer created or updated. For more information, see:

- [z/VM Preventive Service \(https://www.ibm.com/support/pages/zvm/service/prevserv.html#heading-link2\)](https://www.ibm.com/support/pages/zvm/service/prevserv.html#heading-link2)
- [Appendix A. IBM servers supported by z/VM in *z/VM: General Information*](#).

- IBM: z/VM 7.3 Architecture Level Set (<https://www.ibm.com/support/pages/zvm/zvm730/architecture>) in case specific server facilities are required.

[7.3] Eight-member SSI support

This support increases the maximum size of a single system image (SSI) cluster from four members to eight, enabling clients to grow their SSI clusters to allow for increased workloads and providing more flexibility to use live guest relocation (LGR) for nondisruptive upgrades and workload balancing.

Changes include the following:

-
- This CP new function variable is new:
CP.LIMIT.SSI.MEMBERS

In *z/VM: CP Planning and Administration*:

- Information about how to migrate to an SSI cluster with more than four members has been added.
- The following configuration statement is new:
 - SSI_CONTROLS
- The following configuration statement have been updated:
 - SSI
- The following directory statements have been updated:
 - DIRECTORY
 - SPOOLFILE

In *z/VM: CP Commands and Utilities Reference*:

- The following CP commands have been updated:
 - DEFINE RELODOMAIN
 - QUERY SSI
 - SET SSI
- The following CP utility is new:
 - SFCOUNTR
- The following CP utility has been updated:
 - DIRECTXA

In *z/VM: Directory Maintenance Facility Commands Reference*:

- The following DirMaint command has been updated:
 - DIRECTORY including MENU format

The following CP monitor record has been updated:

- Domain 1 record 25: Monitor domain, SSI configuration

The following diagnose codes have been updated:

- X'14'
- X'D8'

The following system service has been updated:

- *SPL system service

For additional related z/VM 7.3 documentation updates, see:

- *z/VM: CP Programming Services*

- [z/VM: CP Messages and Codes](#)
- [z/VM: Directory Maintenance Facility Messages](#)
- [z/VM: Performance](#)

[7.3] NVMe emulated device (EDEVICE) support

This support enables NVMe devices that are connected through PCI Express (PCIe) adapters to be defined and managed as Fixed-Block Architecture (FBA) EDEVICES. All host and guest FBA functions are supported except for those functions that require stand-alone support such as warm start and checkpoint. Linux guests that exploit EDEVICES that are defined on NVMe adapters are not eligible for live guest relocation (LGR). NVMe adapters are available only on LinuxONE servers.

The following CP new function variable is new:

- CP.FUNCTION.EDEVICE.NVME

The following CP command is new:

- SET PCIFUNCTION

The following CP commands have been updated:

- ATTACH
- DELETE EDEVICE
- SET CU
- SET CPTRACE
- SET DUMP
- SET EDEVICE
- QUERY PCIFUNCTION
- QUERY PAV
- QUERY EDEVICE

The following system configuration statement has been updated:

- EDEVICE

The following trace codes are new:

- 1220 - Host PCI Load
- 1221 - Host PCI Store
- 1222 - NVMe I/O

The following monitor records have been updated:

- Domain 1, Record 6: MRMTRDEV - Device Configuration Data
- Domain 1, Record 27: MRMTRPCI - PCI Function Configuration Data
- Domain 6, Record 1: MRIODVON - Vary on Device
- Domain 6, Record 3: MRIODDEV - Device Activity
- Domain 6, Record 5: MRIODATD - Attach Device
- Domain 6, Record 9: MRIODATS - Attach Shared Device
- Domain 6, Record 11: MRIODSON - Vary On Subchannel
- Domain 6, Record 24: MRIODSZI - EDEV Device Activity
- Domain 6, Record 39: MRIODPAC - PCI Activity

See [Defining and Managing NVMe Devices in z/VM: CP Planning and Administration](#).

[7.3] Display Mnemonics for Instructions that are Not Supported by CP Trace

z/VM 7.3 displays mnemonics for instructions in CP TRACE output regardless of whether the instruction is fully supported by the TRACE function.

The following CP new function variable is new:

- CP.FUNCTION.TRACE.MNEMONICS

The following CP commands have been updated:

- TRACE COMMAND
- TRACE RESPONSE
- TRSOURCE ID

See [TRACE](#) in *z/VM: CP Commands and Utilities Reference*.

[7.3 APAR] Thin Stack Adapter Interrupt Support

With the PTF for APAR VM66654, z/VM 7.3 enhances the Thin Stack FCP SCSI device driver and associated I/O abstraction layers to exploit adapter interruptions and to implement improved error handling and reporting.

The following CP utility is updated:

- [SCSIDISC](#)

The following CP new function variable is added:

- CP.FUNCTION.THINSTACK

[7.3 APAR] Crypto Stateless-Command Filtering

With the PTF for APAR VM66423, z/VM 7.3 provides support for a capability of the Crypto Express8S adapter, when configured in Common Cryptographic Architecture (CCA) coprocessor mode, to enforce restrictions on classes of requests. This support is intended to be used to limit operations on shared crypto resources, such as prohibiting secure-key functions. z/VM's exploitation of this hardware capability will replace the crypto stateless command filtering performed by z/VM for APVIRT crypto users, thus eliminating the need for future z/VM updates to allow stateless CCA operations beyond those currently supported. The z/VM hypervisor specifies the policy, and the Crypto Express8S adapter enforces it. Crypto Stateless-Command Filtering requires an IBM z16 family server with driver D51C Bundle S19 applied.

The following CP message is updated with a new format:

- HCP1711I

The following CP new function variable is added:

- CP.FUNCTION.CRYPTO.HW_CCA_FILTERING

[7.3 APAR] Remove obsolete IOCP parameters DYN and NODYN

With the PTF for APAR VM66423, the IOCP parameters DYN and NODYN, which previously allowed or prevented dynamic changes to I/O configurations, no longer have any effect.

The following CP utility is updated:

- [IOCP](#)

[7.3 APAR] Enable larger (>64GB) NVMe paging allocation extents

With the PTF for APAR VM66675, z/VM 7.3 allows paging space to be allocated anywhere on an NVMe EDEVICE and to be of any size up to the available capacity. This PTF also adds the ability for the CPFMTXA utility to accept FBA allocations specified in factors of megabytes, gigabytes, and terabytes.

This support requires the corresponding ICKDSF PTF for APAR PH52513, which removes the 64G restriction for PAGE allocation on an FBA volume.

The following command is updated:

- CPFMTXA

The following existing CP new function variable is updated:

- CP.FUNCTION.EDEVICE.NVME

[7.3 APAR] Warning Track Interruption Facility

With the PTFs for APARs VM66678 (CP) and VM66709 (Performance Toolkit), z/VM 7.3 exploits a feature of Processor Resource/Systems Manager (PR/SM) called the *warning-track-interruption facility*. z/VM's exploitation of this facility helps improve guest response time and overall performance of workloads that are run on vertical-low or vertical-medium logical processors.

The following CP system configuration statement is updated (see [z/VM: CP Planning and Administration](#)):

- SRM

The following CP commands are updated (see [z/VM: CP Commands and Utilities Reference](#)):

- QUERY SRM
- SET SRM

The following CP messages are updated (see [z/VM: CP Messages and Codes](#)):

- HCP1050E
- HCP1051E

The following new trace codes have been added (see [z/VM: Diagnosis Guide](#)):

- 3601: Warning-Track-Interruption through TPEI
- 3602: Resumption After Warning-Track-Interruption Suspension

The following trace code has been updated (see [z/VM: Diagnosis Guide](#)):

- 3600: Exit to the Dispatcher

The following CP monitor records have been updated (see [z/VM Data Areas, Control Blocks, and Monitor Records](#) (<https://www.ibm.com/support/pages/zvm/pubs/ctlblk.html>)):

- Domain 0 Record 2 - MRSYTPRP - Processor Data (Per processor)
- Domain 0 Record 19 - MRSYTSYG - System Data (Global)
- Domain 1 Record 4 - MRMTRSYS - System Configuration Data
- Domain 2 Record 7 - MRSCLSRM - Set SRM Changes
- Domain 4 Record 2 - MRUSELOF - User Logoff Data
- Domain 4 Record 3 - MRUSEACT - User Activity Data

The following CP new function variable is added:

- CP.FUNCTION.SRM.WARNINGTRACK

[7.4] Architecture level set (ALS)

z/VM 7.4 requires a new architecture level set (ALS) and supports only IBM z15 family or later servers.

Note: Preventive service planning (PSP) buckets for many IBM products, including z/VM, are no longer created or updated. For more information, see:

- [z/VM Preventive Service](#) (<https://www.ibm.com/support/pages/zvm/service/prevserv.html#heading-link2>)
- [Appendix A. IBM servers supported by z/VM](#) in [z/VM: General Information](#).

- IBM: z/VM 7.4 Architecture Level Set (<https://www.ibm.com/support/pages/zvm/zvm740/architecture>) in case specific server facilities are required.

[7.4 APAR] TRSOURCE support for five-digit real device addresses

With the PTFs for APARs VM66829 (CP) and VM66830 (DVF), support is added to z/VM 7.4 to specify and display subchannel sets on trace definitions. The TRSOURCE ID command accepts and the QUERY TRSOURCE command displays five-digit real device addresses where the high-order digit indicates the subchannel set. If a four-digit address is specified, the subchannel set is assumed to be 0.

The following CP commands are updated. For details see z/VM: CP Commands and Utilities Reference.

- [TRSOURCE ID command](#)
- [QUERY TRSOURCE](#)

The following CP utility is updated. For details see z/VM: CP Commands and Utilities Reference.

- [TRACERED](#)

[7.4, 7.3 APARs] Single system image (SSI) prerequisite support for future-server compatibility

The PTFs for APARs VM66839 (7.4) and VM66832 (7.3) provide infrastructure support in z/VM for inclusion of an IBM z17[®] family server in a single system image (SSI) cluster. Proper guest relocation support requires that the PTF is installed on all the members of an SSI cluster before any member runs on an IBM z17 family server.

Users of z/VM single system image (SSI) with live guest relocation (LGR) may encounter either of the following during LGR:

- This message:

```
Message HCP1940E userid is not relocatable for the following reason(s):
HCP1944I userid: Architecture incompatibility
```

Or:

- Output from the QUERY VMRELOCATE *userid* command that includes:

```
HCP1818I Excluded members: system_names when a z17 member is
dynamically added to a relocation domain with mixed levels of z17 and non-z17 support.
```

In this case:

z17 support

refers to APAR VM66823 for z/VM 7.3 and VM66824 for z/VM 7.4.

non-z17 support

refers to any version of z/VM without either VM66823 or VM66824 applied.

dynamically added

refers to either addition to a relocation domain via CEC-swap or redefinition of an existing relocation domain to include the new member.

To avoid this issue:

For z/VM 7.3

Apply VM66823 to all members of the relocation domain to which you wish to add an IBM z17.

For z/VM 7.4

Apply VM66824 to all members of the relocation domain to which you wish to add an IBM z17.

If you are not able to apply the corrective service, these workarounds are available:

1. After a member is excluded, you can shut down / re-IPL one of the members in the existing relocation domain that does not have the IBM z17 support applied.

2. You can define a new relocation domain including the IBM z17 and use SET VMRELOCATE to change the relocation domain of the virtual machine to the new domain.
3. You can use the FORCE ARCHITECTURE operand on the VMRELOCATE command. Typically, this would not clear the excluded member, but in this case, that member will be cleared from the list and the virtual machine is able to relocate freely around the domain.

[7.4, 7.3 APARs] z/VM support for the IBM z17 family

Important: Installations that include usage of z/VM vendor products should check with the vendor whether additional service is required before IPLing z/VM 7.3 with IBM z17 support or z/VM 7.4 with feature pack 2 (service level 0200) or later on any IBM Z or LinuxONE family of servers.

Any users of HCPVINOP MACRO are required to recompile their local updates before applying the PTF for APAR VM66824 (7.4 CP) or VM66823 (7.3 CP). Users of vendor products should contact the vendor to inquire whether the vendor uses the HCPVINOP macro. If so, users should obtain recompiled source from the vendor.

A SIT002 ABEND is a strong indicator for an included part that has not been recompiled with the IBM z17 CP APAR. The part could have been included either during the build of the CPLOAD MODULE or with a CPXLOAD during operation.

This is an incompatible change.

With the PTFs for these APARs, z/VM 7.4 and 7.3 provide the features in the list that follows:

- VM66824, VM66854, and VM66877 (7.4 CP)
- VM66858 (7.4 RACF)
- VM66823, VM66853, and VM66878 (7.3 CP)
- VM66857 (7.3 RACF)

Features provided:

- Guest exploitation enablement for the following new facilities:
 - Vector-Enhancements Facility 3 — New instructions intended to provide performance improvements.
 - Vector-Packed-Decimal-Enhancement 3 — Intended to provide performance improvements of COBOL programs when compiled using the NUMCHECK option to detect and convert data.
 - Workload-Instrumentation — Provides a means of classifying and sampling workloads to enhance the z/OS® pricing model.
 - Message-Security-Assist Extensions — Enhancements that allow the use of XTS and HMAC algorithms and allow for generation of XTS and HMAC encryption keys while using AES algorithms.
 - Perform Lock Operation (PLO) — Provides operations for managing locks in storage to replace capabilities provided previously by the constrained transactional execution (CTX) facility.
 - Concurrent-Functions — Provides new instructions intended to replace the use of TX for software serialization.
 - Spyre Accelerator Adapter — Offers scalable capabilities for complex AI models and generative AI use cases. In addition to enabling access to the Telum microprocessor on-chip AI accelerator, z/VM allows Spyre AI accelerator adapters to be dynamically configured as part of a virtual machine's configuration for its use. z/VM allows operating systems that support AI platforms full exploitation of AI hardware accelerators. These environments include Red Hat OpenShift AI, IBM watsonx Assistant for Z and other offerings that complement and exploit the IBM Z and LinuxONE infrastructure supported by z/VM.
 - NETD support of the Network Express adapter and IBM Integrated Network Adapter 100G — This support provides virtual function-level access to the Network Direct (NETD) function type for a sophisticated networking experience, as well as Remote Direct Memory Access (RDMA). NETD delivers scalable, high-performance connectivity for data-intensive, latency-sensitive enterprise

workloads. This design reduces bottlenecks and provides a future-ready networking foundation for modern applications and hybrid cloud environments.

- Host support for the following new facilities:
 - Power® Consumption metrics provided within the z/VM monitor — Enhancements to the z/VM monitor to include power consumption information for an entire CPC or LPAR. This information includes power metrics for CPU, I/O, and memory usage. Consumers of the z/VM monitor, such as the z/VM Performance Data Pump, can be enhanced to calculate and approximate guest-level apportionment. Support for the z/VM Performance Data Pump power metric dashboard requires Performance Toolkit PTFs for APARs VM66826 (7.4) and VM66825 (7.3).
 - CPU Measurement Facility (CPU-MF) enhancements — Provide CPU-MF-specific support for the IBM z17 family.
 - Data Processing Unit (DPU) Next Generation I/O accelerator instrumentation provided within the z/VM monitor — Collects FCP, FICON®, and OSA instrumentation data within the z/VM monitor for the IBM z17 family DPUs.
- Real device support — Allows the following devices to be attached for guest exploitation:
 - EQDIO (OSH) devices.
 - Network Express Direct (NETD) devices of the Network Express adapter and IBM Integrated Network Adapter 100G
 - Network Express Hybrid (NETH) devices.
 - Spyre accelerator Adapter (PIAI) devices
- Dynamic I/O and HCD support is added for the following components:
 - EQDIO (OSH) CHPIDs and subchannels.
 - CL6 coupling adapter CHPIDs.
 - Network Express Direct (NETD) PCIe functions
 - Network Express Hybrid (NETH) PCIe functions.
 - Spyre accelerator Adapter (PIAI) PCIe functions
- Guest exploitation support for EQDIO devices — Allows guests to directly exploit the OSH functionality of the Network Express Adapter.
- Extension of CP virtual switch logic for Network Express Adapter EQDIO support within the z/VM virtual switch — Allows customers to configure the virtual switch to take advantage of lower latency and higher bandwidths that are provided by networking EQDIO devices within their data center. The virtual switch EQDIO exploitation includes QDIO-to-EQDIO translation, which allows guests that do not support EQDIO to directly take advantage of this networking support.

Multi-VSwitch link aggregation requires the PTFs for APARs VM66877 (7.4) and VM66878 (7.3), and driver D61C Bundle #15.

Restriction: The restriction described here has been lifted with the PTFs for APARs VM66877 (7.4) and VM66878 (7.3), and driver D61C Bundle #15:

- A z/VM virtual switch that supports Network Express OSH does not currently support guests that exploit an EQDIO uplink port. In the interim, clients are required to use either a guest-attached OSH device or existing functionality that is available with OSA-Express7S adapters.

Note: The following special considerations apply to a CHPID that is defined with the LINK_AGGREGATION parameter for Network Express (OSH) devices.

The LINK_AGGREGATION parameter on the DEFINE CHPID command, or the corresponding CHPARM in the IOCP (x02), indicates that the specified CHPID is to be used only for link aggregation. When the CHPID is defined in link aggregation mode, the device can be used only as part of a port group for z/VM virtual switch link aggregation. When the CHPID is not defined in link aggregation mode, attempts to bring up a z/VM virtual switch that is configured to use the device as part of a link aggregation port group will fail if either of the following conditions are true:

- A NETH device is also configured on the port.
- The system is managed by IBM Dynamic Partition Manager.

- Reduced support for transactional execution (TX) — Non-constrained transactions will result in unconditional termination with condition code 1 (CC1) set and no transaction diagnostic block (TDBK) stored.

With this support, non-constrained transactional execution functionality is reduced. All non-constrained transactions (TBEGIN instructions) will terminate and condition code 1 (CC1) will be set. On a future processor, constrained transactional-execution support will be removed. To prepare for the reduced non-constrained transaction support and removal of constrained transaction support, a new flag in MRUSEACT can be used to identify guest use of transactional execution after an IPL or system reset. After all guest use has been discovered and replaced, the bit will not be set.

The following CP command is added for this support:

- QUERY OSAINFO

The following CP commands are updated for this support:

- DEFINE CHPID
- DEFINE PCIFUNCTION
- DEFINE VSWITCH
- QUERY CHPID
- QUERY CONTROLLER
- QUERY OSA
- QUERY PCIFUNCTION
- QUERY TRACE
- QUERY VIRTUAL OSA
- QUERY VIRTUAL PCIFUNCTION
- QUERY VSWITCH
- SET CPTRACE
- SET PORT GROUP
- SET RDEVICE (special devices)
- SET SRM
- SET VSWITCH
- TRACE (command responses)
- TRACE *mnemonic2*
- TRACE TXSUSPEND/NOTXSUSPEND
- TRSOURCE
- VMRELOCATE

The following system configuration statements are updated for this support:

- DEFINE VSWITCH Statement
- MODIFY PORT Statement
- RDEVICE Statement

The following diagnose code is updated for this support:

- DIAGNOSE Code X'26C':
 - Subcode X'00000010': Return Controller Information
 - Subcode X'00000020': Return Virtual Switch Information

The following trace codes are added for this support:

- 1740 - Virtual ECPQC Issued
- 1741 - Virtual ECPQC Completed
- 1742 - Virtual SCPQC Issued
- 1743 - Virtual SCPQC Completed
- 1744 - Virtual STAI Issued
- 1745 - Virtual STAI Completed
- 1746 - Real ECPQC Issued
- 1747 - Real SCPQC Issued
- 1748 - Real STAI Issued

The following CP monitor records are added for this support:

- Domain 0 Record 25 - MRSYTPOW Power Consumption Information
- Domain 6 Record 54 - MRIODVSE - Virtual Switch EQDIO Activity

The following CP monitor records are updated for this support:

- Domain 0 Record 20 - MRSYTEPM - Extended Channel Measurement Data
- Domain 1 Record 4 - MRMTRSYS - System Configuration Data
- Domain 1 Record 19 - MRMTRQDC - QDIO Device Configuration
- Domain 4 Record 2 - MRUSELOF - User Logoff Data
- Domain 4 Record 3 - MRUSEACT - User Activity Data
- Domain 6 Record 21 - MRIODVSW - Virtual Switch Activity
- Domain 6 Record 22 - MRIODVSF - Virtual Switch Failover
- Domain 6 Record 25 - MRIODQDA - QDIO Device Activation
- Domain 6 Record 26 - MRIODQDS - QDIO Device Activity
- Domain 6 Record 27 - MRIODQDD - QDIO Device Deactivation
- Domain 6 Record 34 - MRIODBPD - Virtual Switch Bridge Port Deactivation

Various CP messages, abends, and dynamic I/O codes are added or updated.

For more information, see:

- [z/VM: Connectivity](#)
- [z/VM: CP Commands and Utilities Reference](#)
- [z/VM: CP Messages and Codes](#)
- [z/VM: CP Planning and Administration](#)
- [z/VM: CP Programming Services](#)
- [z/VM: Performance](#)

[7.4, 7.3 APARs] Enhanced QDIO virtual switch vNIC simulation

With the PTFs for APARs VM66877 (7.4 CP) and VM66878 (7.3 CP), and driver D61C Bundle #15, z/VM 7.4 and 7.3 provide guests with the ability to define simulated enhanced QDIO (EQDIO) network interface cards (vNICs) on the virtual switch. With this support, a guest has the option to establish and activate a network connection in either traditional QDIO or EQDIO mode. QDIO mode requires three devices to activate a network connection but EQDIO mode requires only a single device.

The following CP commands are updated for this support:

- COUPLE
- DEFINE LAN
- DEFINE NIC
- DEFINE VSWITCH
- QUERY LAN
- QUERY VIRTUAL NIC
- QUERY VSWITCH

The following directory statement is updated for this support:

- NICDEF

The following system configuration statements are updated for this support:

- DEFINE LAN
- DEFINE VSWITCH

The following diagnose code is updated for this support:

- Diagnose Code '26C' Subcode X'00000024': Return Virtual Port, Virtual NIC or HiperSockets Logical Port Information

The following CP monitor records are updated for this support:

- Domain 8 Record 1 - Virtual NIC Session Activity
- Domain 8 Record 2 - Virtual Network Guest Link State - Link Up
- Domain 8 Record 3 - Virtual Network Guest Link State - Link Down

[7.4, 7.3 APARs] Transactional execution disablement

With the PTFs for APARs VM66844 (7.4 CP) and VM66850 (7.3 CP), z/VM 7.4 and 7.3 provide support for transactional execution disablement. This support introduces a way to test application migration and detect usage of the transactional-execution facilities with z/VM 7.4 and 7.3, thus preparing z/VM 7.4 and 7.3 users for the eventual reduction and removal of support for these facilities.

The following CP commands are new:

- QUERY FACILITY
- SET FACILITY

The following system configuration file statement is new:

- SYSTEM_FACILITY

The following CP monitor record is added for this support:

- Domain 1 Record 37 - MRMTRFAC - Facility Alteration Events

The following CP monitor records are updated for this support:

- Domain 0 Record 19 - MRSYTSYG - System Wide Utilization Data
- Domain 1 Record 4 - MRMTRSYS - System Configuration Data
- Domain 4 Record 2 - MRUSELOF - User Logoff Data

- Domain 4 Record 3 - MRUSEACT - User Activity Data

Various CP messages are added or updated.

Note: For example, if the destination member of a relocation domain has a different system facility setting than the source member, the following message is displayed:

HCP1944I *userID*: Architecture incompatibility due to differing system facility settings

For more information, see:

- [Transactional execution facility in z/VM: General Information](#)
- [z/VM: CP Commands and Utilities Reference](#)
- [z/VM: CP Messages and Codes](#)
- [z/VM: CP Planning and Administration](#)
- [z/VM: Performance](#)

[7.4 APAR] Control-only access for guest crypto domains

With the PTF for APAR VM66891, z/VM supports control-only access for guest crypto domains. Control-only access for guest crypto domains enables virtual machines to submit key management requests to crypto domains for which those virtual machines have control access. Control-only access is made per domain and applies to the domain across all APs that are assigned to the APDED virtual machine. This feature is designed to allow the TKE Catcher or other key management software to run in a virtual machine and manage domains for which it does not have usage-and-control access. Access rights can be managed through the virtual machine's directory settings or dynamically at the command line by using ATTACH CRYPTO and DETACH CRYPTO commands. Current rights can be queried by using the QUERY CRYPTO command.

The following CP commands are updated for this support:

- ATTACH CRYPTO
- DETACH CRYPTO
- IPL
- QUERY CRYPTO
- QUERY VIRTUAL CRYPTO
- VARY CRYPTO

For more information, see [Summary of Changes for z/VM: CP Command and Utilities Reference](#).

The following user directory statement is updated for this support:

- CRYPTO

For more information, see [CRYPTO Directory Statement](#).

The following keywords are added to the list of restricted user IDs:

- AP
- CONTROL
- DOMAIN

For more information, see [Restricted User IDs](#).

[7.4 APAR] Removal of paging pack without an IPL

With the PTF for APAR VM66891, the dynamic configuration capabilities of z/VM memory management are enhanced, allowing a system administrator to remove a page volume from a running z/VM system without requiring an IPL. The administrator can change an existing page volume without an IPL. This can

include enlarging a volume on the same DASD server or replacing a page volume with a volume on a different server.

The following CP system configuration statements have been updated:

- CP_OWNED
- PAGING

The following CP commands have been updated:

- DRAIN (Disk)
- QUERY ALLOC
- QUERY DASD
- QUERY PAGING
- SET PAGING

The following CP monitor records have been added:

- Domain 3 Record 26 - MRSTORAS - Real Device Drain Started
- Domain 3 Record 27 - MRSTORAE - Real Device Drain Ended

The following CP monitor records have been updated:

- Domain 1 Record 7 - MRMTRMEM - Monitor Sample Configuration Record
- Domain 3 Record 1 - MRSTORSG - Real Storage Management (Global)
- Domain 3 Record 4 - MRSTOASP - Auxiliary Storage Management

For more information, see:

- [*z/VM: CP Planning and Administration*](#)
- [*z/VM: CP Commands and Utilities Reference*](#)
- [*z/VM: Performance*](#)

[7.5] HYPERSWAP for guest HyperPAV

HYPERSWAP for guest HyperPAV enables customers to extend their disaster recovery scenarios that use HYPERSWAP to also include guests with an active HyperPAV configuration. Guest HyperPAV exploited devices are no longer prevented from being eligible for HYPERSWAP.

HYPERSWAP for guest HYPERPAV lifts the restriction that prevented guest-exploited HYPERPAV devices from participating in HYPERSWAP. Guests that use 1-END minidisks can now benefit from both HyperPAV performance and continuous availability mechanisms that are enabled by HYPERSWAP.

The following CP commands are updated:

- HYPERSWAP
- QUERY HYPERSWAP
- QUERY IO_OPT
- SET IO_OPT

The following System Configuration Statement is updated:

- FEATURES ENABLE

For more information, see the following publications:

- [*z/VM: CP Commands and Utilities Reference*](#)
- [*z/VM: CP Messages and Codes*](#)

[7.5] Real memory scalability infrastructure

z/VM 7.5 introduces foundational changes that will support future large-scale memory exploitation. The changes have the following consequences for z/VM 7.5:

- 4 GB of memory is required to IPL z/VM in a partition or virtual machine.
- 6 GB of permanent memory is required before reconfigurable memory can be defined.
- The maximum memory for a z/VM partition is recommended to be defined as a multiple of 2 GB. z/VM will use memory up to a 2 GB boundary. If the maximum defined memory is not on a 2 GB boundary, then z/VM will round down to the greatest 2 GB boundary that is less than the defined maximum memory. Defined maximum memory that is above that boundary will be ignored.
- A 2 GB memory area is reserved for future control program use and will not be available for pageable virtual machine memory. Customers should consider the existing memory usage and performance requirements for their workloads to determine if additional memory should be added to a z/VM system when migrating from a prior z/VM release.

The following CP commands have been updated:

- QUERY MEMORY
- SET MEMORY

The following CP memory planning topics have been updated:

- MEMORY system configuration statement
- Real storage management

Various messages have been updated.

The following information about running guest operating systems has been updated:

- Define user to first level system
- The USER statement

For more information, see the following publications:

- [*z/VM: CP Commands and Utilities Reference*](#)
- [*z/VM: CP Planning and Administration*](#)
- [*z/VM: CP Messages and Codes*](#)
- [*z/VM: Running Guest Operating Systems*](#)

[7.5] Architecture level set (ALS)

z/VM 7.5 requires a new architecture level set (ALS) and supports only IBM z16 family or later servers.

For more information, see:

- [*z/VM: General Information Appendix A. IBM servers supported by z/VM*](#)
- [Introducing z/VM Linear Service \(https://www.ibm.com/support/pages/zvm/service/linear.html\)](https://www.ibm.com/support/pages/zvm/service/linear.html) for an explanation of linear service and to access z/VM change logs.
- [IBM: z/VM 7.5 Architecture Level Set \(https://www.ibm.com/support/pages/zvm/zvm750\)](https://www.ibm.com/support/pages/zvm/zvm750).

This satisfies the Statement of Direction from the z/VM 7.4 product announcement.

[7.5] Enable multithreading by default

z/VM 7.5 enables multithreading by default for partitions meeting these conditions:

- They are configured with 40 or fewer Integrated Facility for Linux (IFL) processors.
- They are using vertical polarization.

When no explicit MULTITHREADING statement is specified, z/VM will automatically enable multithreading using a validated configuration designed to benefit Linux workloads on IFLs.

This change improves out-of-the-box performance for supported LPAR configurations for most workloads while preserving existing behavior for systems that do not meet the enablement criteria or that explicitly disable multithreading.

The following commands are updated:

- INDICATE MULTITHREAD
- QUERY MULTITHREAD
- SET MULTITHREAD

The following configuration statement is updated:

- MULTITHREADING statement

The following CP monitor records have been updated:

- Domain 0 Record 2 (MRSYTPRP)

For more information, see:

- [z/VM: CP Commands and Utilities Reference](#)
- [z/VM: CP Planning and Administration](#)

Connectivity and networking

These topics describe changes that can affect how z/VM systems, applications, and guest operating systems communicate with each other.

High-speed network connectivity between the IBM Z platform and external networks is supported by the Network Express, the Open Systems Adapter-Express (OSA-Express) features and Remote Direct Memory Access (RDMA) over Converged Ethernet Express (Network Express) features. Internal connections for IBM Z platforms are provided through fast memory-to-memory communications by using HiperSockets and Internal Shared Memory (ISM).

Note: For information about z/VM support for hardware connectivity facilities, see “Support and exploitation of hardware and architectures, and hypervisor efficiency and scalability” on page 27.

[7.1] FOREIGNIPCONLIMIT Default Value Change

In z/VM 7.1, the default value of the FOREIGNIPCONLIMIT configuration statement is changed from 100% to 10% of the TCB pool size. Review the FOREIGNIPCONLIMIT statement to determine the appropriate value for your installation.

To change this value without having to restart TCP/IP, enter:

```
NETSTAT OBEY FOREIGNIPCONLIMIT xx
```

where xx is 0 (no limit), a whole number, or a percentage of the TCB pool size.

To make the change permanent, add the FOREIGNIPCONLIMIT statement to the TCP/IP configuration file so that the value is changed when the TCP/IP stack is restarted.

For more information, see [z/VM: TCP/IP Planning and Customization](#).

[7.1] IMAP Support Removed

The z/VM Internet Message Access Protocol (IMAP) server is no longer supported. The interfaces and associated documentation have been removed.

[7.1] Support Removed for IEEE 802.3 Ethernet Frame Types

For the z/VM Virtual Switch, 802.3 Ethernet frame formats were removed from CP initiated Layer 2 ARP communications. CP will support only Ethernet II (DIX) frame formats for ARPs and any other initiated communications. This will not prevent guests of z/VM from using 802.3 Ethernet frame formats.

For the TCP/IP server, all TCP/IP initiated ARP requests for OSD devices will use Ethernet II (DIX) frame format. LCS devices will continue to support 802.3 and DIX frame formats.

[7.1 APAR] TLS/SSL Server Elliptic Curve Support

With the PTF for APAR PI99184, z/VM 7.1 provides stronger security ciphers for the TLS/SSL server. This support introduces elliptic curve cryptography, a faster and more secure mechanism for asymmetric encryption than standard RSA or DSS algorithms.

The following changes have been made as a result of this support:

- In the *z/VM: TCP/IP User's Guide*:
 - The description of the IDENTIFY operand of the NETSTAT command is updated to include additional information about the new and deprecated cipher suites.
 - The format of the cipher details displayed by the NETSTAT IDENTIFY SSL command is updated.
- In *z/VM: TCP/IP Planning and Customization*:
 - The format of the values displayed in the Cipher Details column of the SSLADMIN QUERY SESSIONS command is updated.
 - The SSLADMIN QUERY STATUS DETAILS command is updated to include additional information about the new and existing cipher suites.
 - The VMSSL command is updated as follows:
 - Under the EXEMPT operand, the list of cipher suites disabled by default is updated.
 - Under the ENABLE operand, the table of SSLV3 and TLS cipher suite values is updated.
- In the *z/VM: TCP/IP Programmer's Reference*:
 - The CipherDetails operand of the TcpSStatus procedure includes the new and deprecated cipher suites.
 - The cipher details listed under the SecStatus C structure include additional information related to the new cipher suites.
- In *z/VM: Performance*:
 - The SSL server monitor record includes new sample data fields that track the elliptical curve key lengths.

[7.1 APAR] TCP/IP Support for OSA-Express7S 25G

With the PTF for APAR PI99085, z/VM 7.1 provides support for the new OSA-Express7S 25G adapter, which is available with the IBM z14 with Driver 36 bundle 17a or higher. The OSA-Express7S 25G adapter, which provides direct connections to clients on local area networks (LANs), features a new OSA generation and a new port speed of 25 Gb.

The following changes have been made as a result of this support:

- For OSD devices, TCP/IP now supports 25 Gigabit Ethernet.

For more information, see:

- *z/VM: Connectivity*
- *z/VM: TCP/IP Planning and Customization*

- CP message HCP2832E has been updated.

For more information, see *z/VM: CP Messages and Codes*.

- TCP/IP server message DTCOSD392E has been updated.

For more information, see [z/VM: TCP/IP Messages and Codes](#).

[7.1 APAR] Virtual Switch Priority Queuing Enhancements

With the PTF for APAR VM66219, z/VM support is enhanced to improve data transmission from a virtual NIC to a physical network via the virtual switch uplink port. Internal virtual switch data transmission is changed from a first-in, first-out (FIFO) order to a four-level priority queuing scheme. By default, the virtual switch will distinguish between virtual switch and virtual NIC transmissions to the physical network. Virtual switch transmissions required to manage an uplink port or virtual NIC are sent to the physical network ahead of any virtual NIC transmissions. This will insure virtual switch management is always maintained during high bandwidth uplink port usage.

Virtual switch support is added to exploit OSA-Express feature's priority queuing capabilities. By turning on Virtual Switch Priority Queuing, instead of activating a single QDIO output queue on the uplink port, the z/VM virtual switch will establish four QDIO output queues for outbound data transmissions. The four QDIO output queues provide four independent interfaces to the OSA-Express feature, one for each priority. The highest priority queue (Queue 0) is used by the z/VM virtual switch to provide switch management communications and the other three priorities (Queues 1-3) may be configured by a system administrator to prioritize outbound transmissions to the physical network for virtual NICs connected to the virtual switch.

The following CP commands have been updated (see [Table 8 on page 111](#)):

- DEFINE CHPID / PATH
- DEFINE VSWITCH
- QUERY CONTROLLER
- QUERY LAN
- QUERY VIRTUAL NIC
- QUERY VSWITCH
- SET VMLAN
- SET VSWITCH
- VMRELOCATE

The following CP directory statement has been updated (see [Table 7 on page 110](#)):

- NICDEF

The following CP configuration statements have been updated (see [Table 6 on page 106](#)):

- DEFINE VSWITCH
- MODIFY VSWITCH
- VMLAN

The following CP diagnosis code has been updated (see [Table 11 on page 138](#)):

- Diagnosis Code X'26C' - Access Certain System Information

The following CP monitor records have been updated:

- Domain 6 Record 21 - MRIODVSW - Virtual Switch Activity
- Domain 6 Record 22 - MRIODVSF - Virtual Switch Failure
- Domain 6 Record 23 - MRIODVSR - Virtual Switch Recovery
- Domain 6 Record 33 - MRIODBPA - Virtual Switch Bridge Port Activation
- Domain 6 Record 34 - MRIODBPD - Virtual Switch Bridge Port Deactivation
- Domain 8 Record 1 - MRVNDSES - Virtual NIC Session Activity
- Domain 8 Record 2 - MRVNDLSU - Virtual NIC Guest Link State - Link Up

- Domain 8 Record 3 - MRVNDLSD - Virtual NIC Guest Link State - Link Down

With the PTF for APAR PH04703, the TCP/IP server has also been updated in support of Virtual Switch Priority Queuing.

With the PTF for APAR VM66223, the Directory Maintenance Facility (DirMaint) NICDEF command has been updated:

New option:

PQUPLINKTX *priority*

Deleted options:

IEDN

INMN

For more information, see:

- [z/VM: CP Commands and Utilities Reference](#)
- [z/VM: CP Planning and Administration](#)
- [z/VM: Connectivity](#)
- [z/VM: CP Programming Services](#)
- [z/VM: CP Messages and Codes](#)
- [z/VM: Performance](#)
- [z/VM: Directory Maintenance Facility Commands Reference](#)

[7.1 APAR] TLS Certificate Verification

With the PTFs for APARs PH18435 (TCP/IP), VM66348 (CMS), and VM66349 (LE), the TCP/IP TLS/SSL server has been enhanced to allow authentication of client certificates, host name validation, and extraction of fields from a certificate.

Client certificate authentication support allows a server to verify a client by examining the certificate it presents, to ensure that it has been signed by a certificate authority the server trusts and that it has not expired. The client authentication support that was previously added to dynamically secured Telnet connections has been expanded to the z/VM FTP and SMTP servers. Additionally, the PORT statement in the TCPIP configuration file has been updated to allow client certificate authentication for statically secured connections.

Host name validation support allows a client to verify the identity of a server by passing a string containing a host name, domain name, or IP address on the handshake request. The string is compared to fields in the server certificate. If the string is not contained in the server certificate, the client may decide to fail the handshake.

In addition to this support, new APIs extract fields from a client or server certificate.

For additional information and availability details, see [IBM: z/VM Continuous Delivery News \(https://www.ibm.com/support/pages/zvm/newfunction/\)](https://www.ibm.com/support/pages/zvm/newfunction/).

[7.2] CLEAR TDISK Enabled by Default

TDISK clearing default has changed to enabled. The default can be turned off with the FEATURES DISABLE CLEAR_TDISK configuration statement. This change will cause any residual data that might be otherwise left on a temporary disk after use to be purged by default, enabling z/VM to be more in line with modern security guidelines.

The following system configuration statement has been updated:

- [FEATURES Statement](#)

For more information, see:

- [z/VM: CP Planning and Administration](#)

[7.2 APAR] IPv6 Layer 2 Query Support

With the PTF for APAR VM66485, z/VM 7.2 provides support to collect and report IPv6 addresses for Layer 2 VSwitches. IPv6 addresses for Layer 2 VSwitches are displayed by the QUERY VSWITCH and QUERY VIRTUAL NIC commands and by DIAG '26C'. In addition, the VSwitch Unicast IP table structure is changed from a linked list to a hash table to allow for more efficient table searches.

The following CP commands are updated:

- QUERY LAN
- QUERY VIRTUAL NIC
- QUERY VSWITCH

The following CP Diagnose codes have been updated:

- Diagnose x'26C'
- Diagnose x'2A8'

For more information, see:

- [“CP Commands” on page 111](#)
- [“DIAGNOSE Codes for Customer Use” on page 138](#)
- [z/VM: CP Commands and Utilities Reference](#)

[7.2 APAR] VSwitch Bridge Port Enhancements

With the PTF for APAR VM66557, z/VM 7.2 adds a new NICDISTRIBUTION option to the VSwitch HiperSockets Bridge. When activated, the option enables the Bridge to distinguish and manage separately the traffic that is generated by various HiperSockets connections that are on the same HiperSockets CHPID. Traffic that exits the Bridge Port to an OSA link aggregation group is more evenly distributed across the entire port group. Activation of the new option also enables the VSwitch to extract IPv4 and IPv6 address assignments for display in the QUERY VSWITCH command, monitor records, and DIAGNOSE code X'26C'.

The following CP commands are updated:

- QUERY VSWITCH in [z/VM: CP Commands and Utilities Reference](#)
- SET VSWITCH in [z/VM: CP Commands and Utilities Reference](#)

The following configuration statement is updated:

- MODIFY VSWITCH Statement in [z/VM: CP Planning and Administration](#)

The following monitor records are updated:

- Domain 8 Record 1 - MRVNDSSES - Virtual NIC Session Activity
- Domain 6 Record 35 - MRIODBPS - Virtual Switch Bridge Port Activity

The following diagnose code is updated:

- DIAGNOSE Code X'26C' - Access Certain System Information
 - Subcode X'00000020' - Return Virtual Switch Information in [z/VM: CP Programming Services](#)
 - Subcode X'00000024' - Return Virtual Port, Virtual NIC or HiperSockets Logical Port Information in [z/VM: CP Programming Services](#)

The following CP new function variable definition is new:

- CP.FUNCTION.VSWITCH.NICDISTRIBUTION

[7.3] TLS 1.1 Disabled by Default

Use of the TLS 1.1 protocol has been changed to be disabled by default unless explicitly enabled in the DCTPARMS file.

For more information, see:

- [z/VM: TCP/IP Planning and Customization](#)

[7.3] TCP/IP Changes

TCP/IP changes for z/VM 7.3 include the following:

- A new configuration statement, UDPQUEUELIMIT, replaces the NOUDPQUEUELIMIT option of the ASSORTEDPARMS statement. This new statement allows a numerical limit to be specified for the maximum number of incoming datagrams that are queued on a UDP port. The default limit is 20 datagrams. If 0 is specified, there will be no limit, which is the equivalent of NOUDPQUEUELIMIT. The NOUDPQUEUELIMIT option is still accepted in z/VM 7.3, but UDPQUEUELIMIT takes precedence.
- The ForeignIPConLimit default is changed from a percentage (10%) to a set value of 256.
- TCP/IP MIB Record - Type '00'x - Sample Data includes a new field, UdpLimitErr, to keep track of the number of incoming UDP datagrams that are discarded due to the queue limit being exceeded.

For more information, see:

- [z/VM: TCP/IP Planning and Customization](#)
- [z/VM: Performance](#)

[7.4] Removal of support for LAN Channel Station (LCS) emulation

Support for the OSE CHPID type, which is used to provide LAN Channel Station (LCS) emulation, is discontinued. TCP/IP no longer supports the LCS device driver. LCS documentation is removed from z/VM publications.

This satisfies the Statement of Direction from the z/VM 7.3 product announcement.

For more information, see the September 2024 section of the Summary of Changes topic in the following publications:

- [Summary of Changes for z/VM: Systems Management Application Programming](#)
- [Summary of Changes for z/VM: Connectivity](#)
- [Summary of Changes for z/VM: TCP/IP Planning and Customization](#)

[7.4, 7.3 APARs] z/VM TCP/IP support for enhanced QDIO

With the PTFs for APARs PH65378 and PH67661 (7.4) and PH65377 and PH67660 (7.3), z/VM 7.4 and 7.3 provide a native network device driver for the z/VM TCP/IP stack that uses enhanced QDIO (EQDIO) adapters for network transport.

Note: The EQDIO device driver requires the TCPIP user ID to be configured to IPL ZCMS by default after the IBM z17 support has been applied.

The following commands and utilities are updated:

- IFCONFIG
- IPWIZARD
- NETSTAT, including:
 - NETSTAT DEVLINKS
 - NETSTAT OSAINFO

The following TCP/IP configuration statements are new:

- DEVICE statement for EQDIO devices
- LINK statement for EQDIOETHERNET

The following TCP/IP monitor records are updated:

- TCP/IP MIB Record - Type '00'x - Sample Data
- TCP/IP LCB Record - Type '05'x - Sample Data
- TCP/IP Link Definition Record - Type '08'x - Configuration Data
- TCP/IP Link Deletion Record - Type '10'x - Event Data

Various TCP/IP messages are added or updated.

For more information, see:

- [z/VM: TCP/IP Planning and Customization](#)
- [z/VM: TCP/IP User's Guide](#)
- [z/VM: TCP/IP Messages and Codes](#)
- [z/VM: Installation Guide](#)
- [z/VM: Performance](#)

[7.5] Removal of support for the LDAP server

Support for the z/VM Lightweight Directory Access Protocol (LDAP) server has been removed from z/VM 7.5.

This satisfies the Statement of Direction from the z/VM 7.4 product announcement.

For more information, see:

- [z/VM: TCP/IP Messages and Codes](#)
- [z/VM: TCP/IP Planning and Customization](#)
- [z/VM: TCP/IP User's Guide](#)

Change to product documentation

- The *z/VM: TCP/IP LDAP Administration Guide* has been removed from the z/VM 7.5 product documentation library.

[7.5] Removal of z/VM NFS support

Support for the z/VM Network File System (NFS) server and NFS clients has been removed from z/VM 7.5.

This satisfies the Statement of Direction from the z/VM 7.4 product announcement.

For more information, see:

- [z/VM: CMS and REXX/VM Messages and Codes](#)
- [z/VM: OpenExtensions Commands Reference](#)
- [z/VM: OpenExtensions Callable Services Reference](#)
- [z/VM: TCP/IP Diagnosis Guide](#)
- [z/VM: TCP/IP Messages and Codes](#)
- [z/VM: TCP/IP Planning and Customization](#)
- [z/VM: TCP/IP User's Guide](#)

[7.5 APAR PH71335] z/VM FTP client support for SOCKS5

With the PTF for APAR PH71335, the z/VM FTP client includes support for SOCKS5 proxies. For the z/VM environment, SOCKS5 support enables the FTP client to route control and data connections through an intermediate proxy, providing better isolation from external networks. This support integrates SOCKS5 negotiation, authentication, and connection management into the existing z/VM FTP client, so that FTP traffic can be tunneled through a SOCKS5 server securely and consistently. SOCKS5 support provides

improved security, controlled network access paths, and seamless proxy operation within z/VM-managed environments.

The following TCP/IP command is updated:

- FTP Command

For more information, see:

- z/VM: TCP/IP User's Guide

System administration, operation, and ease of use

These topics describe changes that can affect how you manage the administration and operation of z/VM and guest operating systems.

Note: Enhancements in TCP/IP administration are described under “Connectivity and networking” on page 58.

[7.1 APAR] Support for UNRESPONSIVE_PROCESSOR_DETECTION

Included in the 7.2 base, and with the z/VM 7.1 PTF for APAR VM65971, a mechanism was added to allow non-master processors to detect an unresponsive master processor. If an unresponsive master processor is detected, an MCW002 abend dump is generated.

The UNRESPONSIVE_PROCESSOR_DETECTION operand is available on the FEATURES statement in the system configuration file to provide a way to disable the detection of unresponsive processors on second level test systems. See FEATURES Statement in z/VM: CP Planning and Administration.

[7.1] IBM z/VM Cloud Connector

The IBM z/VM Cloud Connector is a development toolkit that manages z/VM host and virtual machines. It provides a set of RESTful APIs to operate z/VM resources. Upper layer system management solutions can consume these RESTful APIs directly to manage z/VM. For additional information, see IBM: z/VM Cloud Connector Maintenance (<https://www.ibm.com/support/pages/zvm/sysman/cloudcon.html>).

[7.1] IBM Cloud Infrastructure Center (5635-015)

IBM Cloud® Infrastructure Center is an infrastructure management offering, built on OpenStack compatible APIs, that provides on-premises cloud deployments of z/VM Linux virtual machines on the IBM Z and LinuxONE platforms and the integration to higher-level cloud automation tools, such as IBM Cloud Automation Manager or VMware vRealize Automation/Orchestration.

Cloud Infrastructure Center provides a consistent, industry-standard user experience to define, instantiate, and manage the lifecycle of virtual infrastructure, deployment of images (operating system and applications), and policies to maximize resource utilization. It is built to require no specific platform skills from the user and minimal platform skills from the administrator to accelerate cloud deployments.

For additional information, see IBM Cloud Infrastructure Center (<https://www.ibm.com/products/cloud-infrastructure-center>).

[7.1] QUERY BYUSER Support for Class B Users

This support provides users with privilege class B the ability to issue the QUERY BYUSER command for other users, similarly to the function granted by privilege class E.

The following CP command has been updated:

- QUERY BYUSER

The following diagnose code has been updated:

- DIAGNOSE Code X'26C' - Access Certain System Information

For more information, see:

- [z/VM: CP Commands and Utilities Reference](#)
- [z/VM: CP Programming Services](#)
- [z/VM: Directory Maintenance Facility Messages](#)

[7.1] Dynamic ESM Protection Support for CPACCESS, CPTYPE, and CPVLOAD

Dynamic external security manager (ESM) protection support for the CPACCESS, CPTYPE, and CPVLOAD commands enables these commands to use the current dynamic command protection setting of the LINK command when validating the required LINK authorizations, and ensures the ESM will be called only when it is configured to handle LINK authorization requests.

The following CP commands have been updated:

- CPACCESS
- CPTYPE
- CPVLOAD

For more information, see [z/VM: CP Commands and Utilities Reference](#).

[7.1] CP Commands Cleanup

Although the following CP commands were removed in previous z/VM releases, they could still appear in the output of the COMMANDS SET or COMMANDS QUERY command. Also, issuing these deleted commands did not provide a consistent system response.

QUERY CHANNEL	SET CPASSIST
QUERY CPASSIST	SET FAVORED
QUERY DISPLAY	SET ISAM
QUERY PRIORITY	SET MINWS
QUERY QDROP	SET NOTRANS
QUERY SASSIST	SET PRIORITY
QUERY SPMODE	SET QDROP
QUERY S370E	SET SASSIST
QUERY VMSAVE	SET STBYPASS
QUERY VRFREE	SET STMULTI
QUERY V=R	SET SVCACCL
SET ACNT	SET S370E
SET AFFINITY	SET VMSAVE
SET ASSIST	SET 370E
SET CCWTRAN	

The commands have been removed from the COMMANDS SET and COMMANDS QUERY output. Issuing any of these deleted commands now results in the following error message and corresponding return code. Some commands that returned a 0 return code will now return a nonzero return code.

```
HCP003E Invalid option - option
```

[7.1 APAR] SMAPI ESM Authorization Support

With the PTF for APAR VM66167, z/VM 7.1 SMAPI provides the following ESM interaction:

- When an ESM is present, programs can use the ESM for all SMAPI authorization decisions at the same granularity used with SMAPI's existing authorization mechanism. The ESM will log the decision (or not) based on its active policy, without SMAPI's knowledge or intervention.
- When an ESM defers its authorization decision to SMAPI, one of the following actions will be taken based on a configuration option:
 - SMAPI's authorization decision will use the existing SMAPI authorization process. SMAPI will call the ESM to log the decision in the ESM-managed security log. SMAPI has no knowledge if the ESM audit logging is enabled or disabled.
 - SMAPI will treat the request as unauthorized.

Properties in the DMSSICNF COPY file control the ESM authorization setting. If you are migrating from a release prior to z/VM 7.1, the contents of your DMSSICNF COPY file will include duplicates of properties found in the IBMCNF COPY file. You can remove from DMSSICNF COPY any properties that are also found in IBMCNF COPY.

For more information, see:

- [z/VM: Systems Management Application Programming](#)
- [z/VM: CMS Macros and Functions Reference](#)
- [z/VM: RACF Security Server Security Administrator's Guide](#)

[7.1 APAR] Virtual Console Output Routing Control

With the PTF for APAR VM65715, z/VM 7.1 provides privilege class G users a new TERMINAL command option, PRECEDENCE, to control guest console routing. This option is used to determine whether a guest application can consume its virtual console output via IUCV (*MSG or *MSGALL) when it has a secondary user.

The following CP commands have been updated:

- QUERY TERMINAL
- TERMINAL

For more information, see:

- [z/VM: CP Commands and Utilities Reference](#)

[7.1 APAR] Allow Device Range on DEFINE HYPERPAVALIAS and DEFINE PAVALIAS

With the PTF for APAR VM66249, z/VM 7.1 provides privilege class G users the ability to create multiple virtual alias devices for guest PAV and HyperPAV base devices by allowing a range of device numbers on a single DEFINE command.

Note: The AS operand is accepted before the *vdev*.

The following CP commands have been updated:

- DEFINE
- DEFINE HYPERPAVALIAS
- DEFINE PAVALIAS

For more information, see:

- [z/VM: CP Commands and Utilities Reference](#)

[7.1 APAR] STHYI support for zCX containers

With the PTF for APAR VM66329, z/VM 7.1 provides enhancements to the STHYI instruction to report zIIP processor type configuration information in support of z/OS zCX containers.

The following instruction has been updated:

- [“STHYI Instruction” on page 139](#)

For more information, see:

- [z/VM: CP Programming Services](#)

[7.1 APAR] Fast Minidisk Erase

With the PTFs for APARs VM66288 (CP), VM65784 (DirMaint), and PH14249 (ICKDSF), the CPFMTXA utility is enhanced to erase data on minidisks more quickly, and the Directory Maintenance Facility (DirMaint) is enhanced to use this new support in CPFMTXA. This can be especially beneficial when DirMaint is used to delete a user ID and its minidisks.

The CP utility CPFMTXA has been updated (see [Table 9 on page 135](#)):

For more information, see:

- [z/VM: CP Commands and Utilities Reference](#)
- [z/VM: CP Messages and Codes](#)

[7.2] Removal of Obsolete Commands

The following CP commands have been deleted:

- CPTRAP
- QUERY CPTRAP

[7.2] Removing PAGING63 IPL Parameter

The PAGING63 IPL parameter is removed since this IPL parameter blocks use of newer paging technologies (for example, Encrypted, EAV, HyperPAV, and HPF Paging) and has not been recommended for use since z/VM 6.4.

The following CP commands have been updated:

- QUERY PAGING
- SET ENCRYPT
- SET IPLPARMS
- SET PAGING

The following system configuration statement has been updated:

- ENCRYPT

The following monitor records have been updated:

- MRMTRMEM: MTRMEM_SYSPG63 changed to "Reserved and unavailable"
- MRMTRSYS: MTRSYS_ENCPG63 changed to "Reserved and unavailable"
- MRSTORSG: STORSG_SYSPG63 changed to "Reserved and unavailable"

For more information, see:

- [z/VM: CP Commands and Utilities Reference](#)
- [z/VM: CP Planning and Administration](#)

[7.2] DirMaint Default Changes

The Directory Maintenance Facility (DirMaint), function level 720, has a default value of NO for the NEEDPASS_RESPECT configuration statement. When the value is NO, DirMaint does not prompt for passwords. For compatibility, NEEDPASS_RESPECT can be set to YES. Specifying YES indicates to DirMaint that password prompting should occur based on the user's DIRM NEEDPASS command setting.

User applications written to send passwords when issuing DirMaint commands may need to be updated to remove the password being passed. In addition, when NEEDPASS_RESPECT is set to NO, the ALLOW_ASUSER_NOPASS_FROM configuration settings are no longer necessary and are ignored. All users can enter DirMaint commands without password prompting.

In addition, DirMaint function level 720 uses two configuration properties to control how quickly requests handled by DirMaint are processed. The default values for these properties are changed in the CONFIG SAMPDVH file, which is copied to the CONFIG DATADVH file during the upgrade process. If your installation previously specified different values for these properties, consider removing them and accepting the new defaults. Specifically:

- The default for DVHWAIT_BATCH_INTERVAL is decreased to 0 seconds (00:00) from 1 second (00:01). This property causes DirMaint to wait the specified number of seconds before processing the next request. Setting this value to 0 seconds increases the throughput of the DirMaint servers.
- The default for DVHWAIT_CLUSTER_INTERVAL is decreased to 1 second (00:01) from 15 seconds (00:15). This property specifies the amount of time the DirMaint server waits after it has detected that the source directory is currently in use by one or more satellite servers. The recommended DirMaint configuration of ONLINE_VIA_DELTA and the use of DIAGNOSE code X'84' for directory update-in-place reduce the need for a large wait interval. The lowered value increases the throughput of DirMaint servers in an SSI environment.

APAR VM66044 is included with DirMaint function level 720. With this support, the DirMaint server uses the RACF command to communicate with RACF for most RACF commands, and uses the RAC command for the RVARY, SETR, SETROPTS, and SETEVENT commands. By default, the RACF command is given universal read access. If the RACF profile is being controlled in the VMCMD class, you must allow DIRMAINT to use the command. The procedure is documented in the section "Enabling DirMaint to Access the RACF Profile in the VMCMD Class" in *z/VM: Directory Maintenance Facility Tailoring and Administration Guide*.

For more information, see:

- [z/VM: Directory Maintenance Facility Commands Reference](#)
- [z/VM: Directory Maintenance Facility Messages](#)
- [z/VM: Directory Maintenance Facility Tailoring and Administration Guide](#).

[7.2 APAR] DirMaint Health Checker

With the PTF for APAR VM66175, the Directory Maintenance Facility (DirMaint), function level 720, provides an automated set of procedures to validate the configuration and health of the DirMaint servers on a daily basis and on demand. The tests are orchestrated by the DirMaint server and run on the DIRMAINT, DATAMOVE, and SATELLITE servers. Installation support personnel is notified of the results of the tests.

The DirMaint configuration files control whether the tests are automatically run. Defaults are provided that automatically run the tests once a day as the result of DirMaint New Day processing (driven by the DVHNDAY exec). The installation may specify the following:

- whom to contact with the results of the tests
- whether to send the results: always, on a significant warning/error, or on any warning
- which DirMaint servers to test
- which tests to run
- modifications to individual test parameters in order to change defaults

In addition to being automatically run, the health checker can be invoked by the new IVP command. If submitted to the DirMaint machine, the health checker will check the health of the DirMaint server and any configured DATAMOVE and SATELLITE servers. The command can also be invoked from the console of a DATAMOVE or SATELLITE server to only check the health of that server.

The following DirMaint subcommands are updated:

DATAMOVE
SATELLITE

The following DirMaint subcommand is added:

IVP

For more information, see:

- [z/VM: Directory Maintenance Facility Commands Reference](#)
- [z/VM: Directory Maintenance Facility Messages](#)
- [z/VM: Directory Maintenance Facility Tailoring and Administration Guide](#).
- [z/VM: Getting Started](#).

[7.2 APAR] EDEVICE Optional LUN Specification

With the PTF for APAR VM66420, the LUN operand on the SET EDEVICE command and the EDEVICE system configuration statement is optional after the first path is established.

The following CP commands have been updated:

SET EDEVICE

The following system configuration statement has been updated:

EDEVICE

For more information, see:

- [z/VM: CP Planning and Administration](#)
- [z/VM: CP Commands and Utilities Reference](#)

[7.2 APAR] CP QUERY DEVICES command

With the PTF for APAR VM66469, the new CP QUERY DEVICES command displays device setting information. The command reports real device settings that are established by the DEVICES configuration statement and the SET DEVICES command. The objective of the CP QUERY DEVICES command is to allow clients to confirm that device settings are as intended.

The following CP commands have been updated:

QUERY

For more information, see:

- [z/VM: CP Commands and Utilities Reference](#)

[7.2 APAR] Spool information enhancements

With the PTF for APAR VM66479, z/VM enhances spool subsystem interfaces to provide additional information. These extensions to the existing interfaces allow clients to manage spool files and volumes more effectively. This support enables spool management software, such as the IBM Operations Manager for z/VM, to facilitate client DASD migration and backup activities.

This support includes changes to the following:

- DIAGNOSE Code X'D8' — Read Spool File Blocks on System Queues
- The Spool System Service (*SPL).

For more information, see [z/VM: CP Programming Services](#).

[7.2 APAR] EDEVICE Path Management Enhancements

With the PTF for APAR VM66507, z/VM 7.2 improves the following aspects of EDEVICE path management:

- Path selection
- Path state tracking
- Path health checking

Updates to the following commands enable the user to display and clear detailed information associated with individual path activity:

- QUERY EDEVICE
- SET EDEVICE

The following CP monitor record has been updated:

- Domain 6 Record 24 - MRIODSZI - SCSI Device Activity

For more information, see:

- “CP Commands” on page 111
- [z/VM: CP Commands and Utilities Reference](#)

[7.2 APAR] HELP File Enhancements

With the PTFs for APARs VM66511 (CP), VM66512 (CMS), and VM66513 (VMSES), the z/VM Help facility adds information for CP User Directory Statements and for CP System Configuration Statements previously documented only in *z/VM: CP Planning and Administration*. HELP files of type HELPDIRE are added to support the new DIRECTORY HELP component. HELP files of type HELPSYSC are added to support the new SYSCONFIG HELP component.

The following HELP files are added:

<i>Table 5. Help files added for CP User Directory Statements and CP System Configuration Statements</i>		
File name	File type	Description
DIRECTOR	HELPABBR	Abbreviations and synonyms for user directory statements file names
SYSCONFI	HELPABBR	Abbreviations and synonyms for system configuration statements file names
DIRECTOR	HELPCP	Overview of the user directory files
SYSCONFI	HELPCP	Overview of the system configuration files
ACCOUNT	HELPDIRE	ACCOUNT directory statement
ACIGROUP	HELPDIRE	ACIGROUP directory statement
ADJUNCT	HELPDIRE	ADJUNCT directory statement
APPCPASS	HELPDIRE	APPCPASS directory statement
BUILD	HELPDIRE	BUILD directory statement
CATEGORI	HELPDIRE	A list of directory statements by category
CLASS	HELPDIRE	CLASS directory statement
COMMAND	HELPDIRE	COMMAND directory statement
CONSOLE	HELPDIRE	CONSOLE directory statement

Table 5. Help files added for CP User Directory Statements and CP System Configuration Statements (continued)

File name	File type	Description
CPU	HELPDIRE	CPU directory statement
CRYPTO	HELPDIRE	CRYPTO directory statement
D8ONECMD	HELPDIRE	D8ONECMD directory statement
DASDOPT	HELPDIRE	DASDOPT directory statement
DATEFORM	HELPDIRE	DATEFORMAT directory statement
DEDICATE	HELPDIRE	DEDICATE directory statement
DIRECTOR	HELPDIRE	DIRECTORY directory statement
GLOBALDE	HELPDIRE	GLOBALDEFS directory statement
GLOBALOP	HELPDIRE	GLOBALOPTS directory statement
IDENTITY	HELPDIRE	IDENTITY directory statement
INCLUDE	HELPDIRE	INCLUDE directory statement
IOPRIORI	HELPDIRE	IOPRIORITY directory statement
IPL	HELPDIRE	IPL directory statement
IUCV	HELPDIRE	IUCV directory statement
LINK	HELPDIRE	LINK directory statement
LOAD	HELPDIRE	LOAD directory statement
LOADDEV	HELPDIRE	LOADDEV directory statement
LOGONBY	HELPDIRE	LOGONBY directory statement
MACHINE	HELPDIRE	MACHINE directory statement
MAXSTORA	HELPDIRE	MAXSTORAGE directory statement
MDISK	HELPDIRE	MDISK directory statement
MINIOPT	HELPDIRE	MINIOPT directory statement
NAMESAVE	HELPDIRE	NAMESAVE directory statement
NICDEF	HELPDIRE	NICDEF directory statement
NOPDATA	HELPDIRE	NOPDATA directory statement
OPTION	HELPDIRE	OPTION directory statement
POOL	HELPDIRE	POOL directory statement
POSIXGLI	HELPDIRE	POSIXGLIST directory statement
POSIXGRO	HELPDIRE	POSIXGROUP directory statement
POSIXINF	HELPDIRE	POSIXINFO directory statement

Table 5. Help files added for CP User Directory Statements and CP System Configuration Statements (continued)

File name	File type	Description
POSIXOPT	HELPDIRE	POSIXOPT directory statement
PROFILE	HELPDIRE	PROFILE directory statement
SCREEN	HELPDIRE	SCREEN directory statement
SHARE	HELPDIRE	SHARE directory statement
SPECIAL	HELPDIRE	SPECIAL directory statement
SPOOL	HELPDIRE	SPOOL directory statement
SPOOLFIL	HELPDIRE	SPOOLFILE directory statement
STDEVOPT	HELPDIRE	STDEVOPT directory statement
STORAGE	HELPDIRE	STORAGE directory statement
SUBCONFI	HELPDIRE	SUBCONFIG directory statement
SYSAFFIN	HELPDIRE	SYSAFFIN directory statement
USER	HELPDIRE	USER directory statement
VMRELOCA	HELPDIRE	VMRELOCATE directory statement
XAUTOLOG	HELPDIRE	AUTOLOG and XAUTOLOG directory statements
XCONFACC	HELPDIRE	XCONFIG ACCESSLIST directory statement
XCONFADD	HELPDIRE	XCONFIG ADDRSPACE directory statement
XCONFIG	HELPDIRE	XCONFIG directory statement
DIRECTOR	HELPMENU	Menu of directory statements topics
SYSCASSO	HELPMENU	Menu of ASSOCIATE system configuration statements
SYSCDEFI	HELPMENU	Menu of DEFINE system configuration statements
SYSCDISA	HELPMENU	Menu of DISABLE system configuration statements
SYSCENAB	HELPMENU	Menu of ENABLE system configuration statements
SYSCMODI	HELPMENU	Menu of MODIFY system configuration statements
SYSCONFI	HELPMENU	Menu of system configuration statements
SYSCRDEV	HELPMENU	Menu of RDEVICE system configuration statements

Table 5. Help files added for CP User Directory Statements and CP System Configuration Statements (continued)

File name	File type	Description
SYSCSET	HELPMENU	Menu of SET system configuration statements
SYSCSYST	HELPMENU	Menu of SYSTEM system configuration statements
SYSCUSER	HELPMENU	Menu of USER system configuration statements
SYSCXLIN	HELPMENU	Menu of XLINK system configuration statements
ACTIVISL	HELPSYSC	ACTIVATE ISLINK system configuration statement
ALTEROPE	HELPSYSC	ALTERNATE_OPERATORS system configuration statement
ASSOCEXI	HELPSYSC	ASSOCIATE EXIT system configuration statement
ASSOCMES	HELPSYSC	ASSOCIATE MESSAGES system configuration statement
BEGINEND	HELPSYSC	BEGIN and END system configuration statements
CHARADEF	HELPSYSC	CHARACTER_DEFAULTS system configuration statement
CPACCESS	HELPSYSC	CP_ACCESS system configuration statement
CPADDONI	HELPSYSC	CP_ADDON_INITIALIZE_ROUTINES system configuration statement
CPOWNED	HELPSYSC	CP_OWNED system configuration statement
CPXLOAD	HELPSYSC	CPXLOAD system configuration statement
CRYPTAPV	HELPSYSC	CRYPTO APVIRTUAL system configuration statement
CU	HELPSYSC	CU system configuration statement
DEFINALI	HELPSYSC	DEFINE ALIAS system configuration statement
DEFINCOM	HELPSYSC	DEFINE COMMAND system configuration statement
DEFINDIA	HELPSYSC	DEFINE DIAGNOSE system configuration statement
DEFINEXI	HELPSYSC	DEFINE EXIT system configuration statement

Table 5. Help files added for CP User Directory Statements and CP System Configuration Statements (continued)

File name	File type	Description
DEFINLAN	HELPSYSC	DEFINE LAN system configuration statement
DEFINVSW	HELPSYSC	DEFINE VSWITCH system configuration statement
DEVICES	HELPSYSC	DEVICES system configuration statement
DISABCOM	HELPSYSC	DISABLE COMMAND system configuration statement
DISABDIA	HELPSYSC	DISABLE DIAGNOSE system configuration statement
DISABEXI	HELPSYSC	DISABLE EXITS system configuration statement
DISTRIBU	HELPSYSC	DISTRIBUTE system configuration statement
DRAIN	HELPSYSC	DRAIN system configuration statement
EDEVICE	HELPSYSC	EDEVICE system configuration statement
EMERGMES	HELPSYSC	EMERGENCY_MESSAGE_CONSOL ES system configuration statement
ENABLCOM	HELPSYSC	ENABLE COMMAND system configuration statement
ENABLDIA	HELPSYSC	ENABLE DIAGNOSE system configuration statement
ENABLEXI	HELPSYSC	ENABLE EXITS system configuration statement
ENCRYPAG	HELPSYSC	ENCRYPT system configuration statement
ENFORBYV	HELPSYSC	ENFORCE_BY_VOLID system configuration statement
EQUATE	HELPSYSC	EQUATE system configuration statement
EXTERSYN	HELPSYSC	EXTERNAL_SYNTAX system configuration statement
FEATURES	HELPSYSC	FEATURES system configuration statement
FORMDEFA	HELPSYSC	FORM_DEFAULT system configuration statement
HOTIORAT	HELPSYSC	HOT_IO_RATE system configuration statement

Table 5. Help files added for CP User Directory Statements and CP System Configuration Statements (continued)

File name	File type	Description
IMBED	HELPSYSC	IMBED system configuration statement
INITMITI	HELPSYSC	INIT_MITIME system configuration statement
IODF	HELPSYSC	IODF system configuration statement
JOURNALI	HELPSYSC	JOURNALING system configuration statement
LOGOCONF	HELPSYSC	LOGO_CONFIG system configuration statement
MODIFCOM	HELPSYSC	MODIFY COMMAND system configuration statement
MODIFDIA	HELPSYSC	MODIFY DIAGNOSE system configuration statement
MODIFEXI	HELPSYSC	MODIFY EXIT system configuration statement
MODIFLAN	HELPSYSC	MODIFY LAN system configuration statement
MODIFPOR	HELPSYSC	MODIFY PORT system configuration statement
MODIFPRI	HELPSYSC	MODIFY PRIV_CLASSES system configuration statement
MODIFVSW	HELPSYSC	MODIFY VSWITCH system configuration statement
MULTITHR	HELPSYSC	MULTITHREADING system configuration statement
OPERACON	HELPSYSC	OPERATOR_CONSOLES system configuration statement
PAGING	HELPSYSC	PAGING system configuration statement
PRINTTIT	HELPSYSC	PRINTER_TITLE system configuration statement
PRIVCLAS	HELPSYSC	PRIV_CLASSES system configuration statement
PRODUCT	HELPSYSC	PRODUCT system configuration statement
RDEVI327	HELPSYSC	RDEVICE system configuration statement for graphic display devices
RDEVI37X	HELPSYSC	RDEVICE system configuration statement for communication controllers

Table 5. Help files added for CP User Directory Statements and CP System Configuration Statements (continued)

File name	File type	Description
RDEVI380	HELPSYSC	RDEVICE system configuration statement for 3800 printers
RDEVIAFP	HELPSYSC	RDEVICE system configuration statement for advanced function printers
RDEVICE	HELPSYSC	RDEVICE system configuration statement
RDEVICOM	HELPSYSC	RDEVICE system configuration statement for special devices
RDEVIDAS	HELPSYSC	RDEVICE system configuration statement for DASD
RDEVIPRT	HELPSYSC	RDEVICE system configuration statement for impact printers
RDEVIPUN	HELPSYSC	RDEVICE system configuration statement for card punches
RDEVIRDR	HELPSYSC	RDEVICE system configuration statement for card readers
RDEVITAP	HELPSYSC	RDEVICE system configuration statement for tape units
RDEVITER	HELPSYSC	RDEVICE system configuration statement for terminals
RDEVIUNS	HELPSYSC	RDEVICE system configuration statement for unsupported devices
RECQUAL	HELPSYSC	Record qualifiers that can be specified on system configuration statement
RELOCDOM	HELPSYSC	RELOCATION_DOMAIN system configuration statement
SAY	HELPSYSC	SAY system configuration statement
SETSHUTD	HELPSYSC	SET SHUTDOWNTIME system configuration statement
SETSIGNA	HELPSYSC	SET SIGNAL system configuration statement
SETVARIA	HELPSYSC	SET VARIABLE system configuration statement
SRM	HELPSYSC	SRM system configuration statement
SSI	HELPSYSC	SSI system configuration statement

Table 5. Help files added for CP User Directory Statements and CP System Configuration Statements (continued)

File name	File type	Description
START	HELPSYSC	START system configuration statement
STORAGE	HELPSYSC	STORAGE system configuration statement
SYSTEALI	HELPSYSC	SYSTEM_ALIAS system configuration statement
SYSTEDAT	HELPSYSC	SYSTEM_DATEFORMAT system configuration statement
SYSTEIDD	HELPSYSC	SYSTEM_IDENTIFIER system configuration statement
SYSTEIDE	HELPSYSC	SYSTEM_IDENTIFIER_DEFAULT system configuration statement
SYSTEMRES	HELPSYSC	SYSTEM_RESIDENCE system configuration statement
SYSTEMUSE	HELPSYSC	SYSTEM_USERIDS system configuration statement
THROTTLE	HELPSYSC	THROTTLE system configuration statement
TIMEZBOU	HELPSYSC	TIMEZONE_BOUNDARY system configuration statement
TIMEZDEF	HELPSYSC	TIMEZONE_DEFINITION system configuration statement
TOLERCON	HELPSYSC	TOLERATE_CONFIG_ERRORS system configuration statement
TRANSTAB	HELPSYSC	TRANSLATE_TABLE system configuration statement
USERDEFA	HELPSYSC	USER_DEFAULTS system configuration statement
USERFORM	HELPSYSC	USERFORM system configuration statement
USERVOLE	HELPSYSC	USER_VOLUME_EXCLUDE system configuration statement
USERVOLI	HELPSYSC	USER_VOLUME_INCLUDE system configuration statement
USERVOLL	HELPSYSC	USER_VOLUME_LIST system configuration statement
USERVOLR	HELPSYSC	USER_VOLUME_RDEV system configuration statement
VMLAN	HELPSYSC	VMLAN system configuration statement

Table 5. Help files added for CP User Directory Statements and CP System Configuration Statements (continued)

File name	File type	Description
XLINKDEV	HELPSYSC	XLINK_DEVICE_DEFAULTS system configuration statement
XLINKSYE	HELPSYSC	XLINK_SYSTEM_EXCLUDE system configuration statement
XLINKSYI	HELPSYSC	XLINK_SYSTEM_INCLUDE system configuration statement
XLINKVOE	HELPSYSC	XLINK_VOLUME_EXCLUDE system configuration statement
XLINKVOI	HELPSYSC	XLINK_VOLUME_INCLUDE system configuration statement

[7.2 APAR] DirMaint Performance Enhancements

The PTF for APAR VM66298 provides enhancements to DirMaint that are intended to improve the performance of the DirMaint servers and enhance the automated IVP (installation verification program) to problems.

The performance enhancements improve the throughput of DirMaint requests in the environment where DirMaint is managing multiple z/VM systems using satellite servers by doing the following:

- Reducing the types of requests that require DirMaint servers to obtain the intersystem locking disk for serialization of changes to the source directory. Commands that do not change source-directory-related files no longer obtain the lock. This reduces the possibility of delays in updating the object directories due to either DirMaint or the satellite servers requiring the lock while the other server requires it.
- Improving throughput of requests that require the DirMaint server to interact with the satellite servers or DATAMOVE servers. Responses from satellite and DATAMOVE servers are given priority over new requests from non-DirMaint servers.

Enhancements to the automated IVP are intended to prevent future problems, detect current problems, or reduce the complexity of interacting with DirMaint to perform debugging operations. New tests have been added to verify that the following are true:

- DirMaint and satellite servers are configured for UPDATE_IN_PLACE
- Non-informational messages have not been generated by the server within the last 24 hours
- Server termination messages (DVHxxx2194T or DVHxxx3895t) have not been generated by the server within the last 24 hours
- DATAMOVE machines do not own disks that are related to previously failed or canceled work units

[7.3] Updates to QUERY LOADDEV and QUERY DUMPDEV commands

The responses to the QUERY DUMPDEV and QUERY LOADDEV commands are updated. See [QUERY DUMPDEV](#) and [QUERY LOADDEV](#).

[7.3] Support for four-character time zone IDs

z/VM 7.3 has been enhanced to support four-character time zone identifiers within the Control Program.

The following CP commands have been updated:

- DEFINE TIMEZONE
- SET TIMEZONE
- QUERY TIME

- QUERY TIMEZONE

The following system configuration statements have been updated:

- TIMEZONE BOUNDARY
- TIMEZONE DEFINITION

Changed command responses

With the support for four-character time zone IDs, the following command responses were changed to facilitate a fourth character. These changes take effect even when the time zone ID is less than four characters long:

- The QUERY TIMEZONE response has one character added after the previous 3 characters for the time zone identifier. This position may contain a fourth character if the time zone identifier is 4 characters long, or it may be a blank if the time zone identifier is 3 or less characters long.

```
12:33:08 EST West 05.00.00 Active
```

- The first line of the QUERY TIME response has one character added after the time zone identifier. This position may contain a fourth character if the time zone identifier is 4 characters long, or it may be a blank if the time zone identifier is 3 or less characters long.

```
12:32:50 TIME IS 12:32:50 EST FRIDAY 03/17/23
```

- The response from QUERY LOGMSG has one character added after the time zone identifier. This position may contain a fourth character if the time zone identifier is 4 characters long or it may be a blank if the time zone identifier is 3 or less characters long.
- The LOGON message has one character added after the time zone identifier. This position may contain a fourth character if the time zone identifier is 4 characters long or it may be a blank if the time zone identifier is 3 or less characters long.

```
12:51:10 LOGON AT 12:51:10 EST FRIDAY 03/17/23  
OPERATOR AT GDLVM7 VIA RSCS 03/17/23 12:56:57 EST FRIDAY
```

- The 2nd and 3rd lines of the QUERY CPLEVEL response may now have 4 characters for the time zone identifier at the end of these lines. Since the time zone identifier is at the end of these lines, the offsets of the items in these messages are unchanged.

```
13:03:30 Generated at 03/17/23 13:10:56 EST  
13:03:30 IPL at 03/17/23 12:51:09 EST
```

[7.3 APAR] QUERY MONITOR SAMPLE enhancements

With the PTF for APAR VM66452, z/VM 7.3 provides the date and time of the next Monitor sample interval in the **QUERY MONITOR SAMPLE** response. The information makes it easier to understand when monitor sample data collection will occur next and to assess how much data has already been gathered.

The following CP command is updated:

- QUERY MONITOR

For more information, see [“CP Commands” on page 111](#) and [z/VM: CP Commands and Utilities Reference](#).

[7.3 APAR] *VMEVENT Enhancements

With the PTF for APAR VM66679, z/VM 7.3 provides the following new and changed *VMEVENT data for use in operations automation, resource monitoring, and auditing:

- New disconnect and reconnect events. Reconnect events include logon-by and terminal information as part of the event message.
- Additional logon-by and terminal information is added to the existing logon event.

- Class 0 type 3 and class 1 type 3 provide a full-precision (32-bit) timeout interval for the logoff timeout service.
- An enhancement to the reporting of "runnable." The runnable event is now reported only when "runnable" is a result of a state change. Superfluous reports of "runnable" when there is no need to report an event are eliminated.

The following CP System Service is updated:

- *VMEVENT. See [“CP System Services” on page 141](#) and [Receiving *VMEVENT Events in z/VM: CP Programming Services](#).

The following CP new function variable is new:

- CP.FUNCTION.VMEVENT

[7.3 APAR] Large Guest Reset Time Mitigation

With the PTF for APAR VM66673, z/VM 7.3 provides support for up to 2TB virtual memory within a single virtual machine under a set of restrictions while also providing a mitigation for long logoff times of guests with a large amount of instantiated virtual memory.

The following commands are updated:

- [INDICATE PAGING](#)
- [LOCATE VMDBK](#)
- [LOGOFF](#)
- [QUERY NAMES](#)

The following CP new function variable is added:

- CP.FUNCTION.FAST_GUEST_LOGOFF

[7.3 APAR] Increase crashkernel area size

With the PTF for APAR VM66677, z/VM 7.3 increases the size of crashkernel area allocated by stand-alone dump programs in preparation for a future enhancement.

The following CP messages are updated:

- HCP955W
- HCP4523W
- HCP8641E

The minimum real memory size required to IPL z/VM as a first-level system is 512 MB. See the SDINST entry in [Table 9 on page 135](#).

[7.3 APAR] z/VM Performance Data Pump

With the PTF for APAR VM66687, z/VM 7.3 supports z/VM Performance Data Pump.

z/VM Performance Data Pump (Data Pump) converts machine-readable z/VM monitor and SFS data into a generic text-based data stream. Modern tools can use the data stream to display real-time performance dashboards, aggregate real-time data for long-term usage analysis, or integrate with existing enterprise observability solutions.

z/VM Performance Data Pump is licensed with Performance Toolkit for z/VM but does not support, depend upon, or interact with Performance Toolkit for z/VM in any way.

For more information, see [z/VM Performance Data Pump in z/VM: Performance](#). See also [z/VM Performance Data Pump \(https://www.ibm.com/support/pages/zvm/related/perfkit/datapump/\)](#).

[7.3 APAR] Package TERSE with z/VM

With the PTF for APAR VM66725, z/VM 7.3 provides the TERSE command, which can be used to compress and/or decompress CMS disk files.

For more information, see the following topic:

[TERSE in z/VM: CMS Commands and Utilities Reference](#)

[7.3 APAR] FCP SCSI List-directed IPL alternate paths

With the PTFs for APARs VM66727 and VM66758, z/VM 7.3 provides the ability to specify alternate paths for list-directed SCSI IPL. If IPL fails for the primary device path, alternate device paths are used automatically. The new ALTERNATE operand of the **SET DUMPDEV** and **SET LOADDEV** commands and the LOADDEV directory statement can specify up to three alternate device paths. The responses to the **QUERY DUMPDEV** and **QUERY LOADDEV** commands indicate the alternate device paths.

Message HCP1611E is added.

The following CP commands have been updated; for additional information, see [“CP Commands” on page 111](#).

- [IPL in z/VM: CP Commands and Utilities Reference](#)
- [QUERY DUMPDEV in z/VM: CP Commands and Utilities Reference](#)
- [QUERY LOADDEV in z/VM: CP Commands and Utilities Reference](#)
- [SET DUMPDEV in z/VM: CP Commands and Utilities Reference](#)
- [SET LOADDEV in z/VM: CP Commands and Utilities Reference](#)

The following CP new function variable is added:

CP.FUNCTION.SCSI.IPL.ALTERNATE_PATH

The following User Directory Statements have been updated:

- IPL
- LOADDEV

[7.3 APAR] VM/Pass-Through Facility 370 Accommodation Removal

Effective December 15, 2023, and with the PTF for APAR VM66733 for VM/Pass-Through Facility (PVM), the PVM server no longer requires SET 370ACCOM ON. The PVM server will execute in a MACHINE ESA mode virtual machine and can operate in either CMS or zCMS environments. In addition, support for configuring the following obsolete devices and functions has been removed with no replacements available:

- BSCA: Bi-Sync device driver
- ISFC (CSECOM): CSE Support
- R3270: Remote 3270 device support
- ROCF: Remote Operator Console Facility
- S3270: SNA 3270 device support
- TRACE command: System Trace File Interface (Diagnose X'E0') support
- 3088: DIAG/NODIAG options
- 327X: Direct attached 3270 device
- 328X: Attached printer support

PVM continues to support the following connectivity configurations:

- CTCA: Channel-to-channel adapters
- TCPIP: Secure or non-secure TCPIP

- APPC: Advanced Program-to-Program Communications
- 3088: Via FICON adapters
- IUCV: Inter User Communication Vehicle (IUCV) to communicate with a PVM to VTAM® gateway (PVMG) server
- PCCF: For cross-systems IUCV communications
- GRAF: Graphics for direct-attached display stations

Multiple Pass-Through VM(MPVM), CMS PASSTHRU, and Cooperative Viewing Facility(CVIEW) continue to be supported environments.

[7.3 APAR] MONWRITE CLOSE enhancements

With the PTF for APAR VM66726, the z/VM 7.3 MONWRITE command can specify the file mode for the monitor files it produces when the CLOSE option is specified. Previously, the command could specify the mode of the monitor file or the CLOSE option but not both.

The following CP command has been updated:

- [MONWRITE](#) in *z/VM: CP Commands and Utilities Reference*.

[7.3 APAR] SCP identification enhancements

With the PTF for APAR VM66758, the z/VM Control Program (CP) can display identification information that is provided by guest operating systems. The CP display is similar to the HMC Systems Management "Partitions" display.

The following CP command is new:

- [QUERY SCPID](#) (See [QUERY SCPID](#) in *z/VM: CP Commands and Utilities Reference*.)

The identification information is also provided in the following monitor records:

- Updated record: Domain 1 sample configuration record 15 (MRMTRUSR), "Logged on User"
- New record: Domain 4 event record 14 (MRUSESCP), "SCP Identification"

With the PTF for APAR VM66759, z/VM's Control Monitor System (CMS) is enhanced. A user can change the CMS system identification information that a guest sends to the hypervisor.

The following CMS command is new:

- [SET SCPID](#) (See [SET SCPID](#) in *z/VM: CMS Commands and Utilities Reference*.)

The following CP new function environment variable is added:

- CP.FUNCTION.QUERY.SCPID

[7.4] Removal of obsolete crypto support

Support for the following obsolete user directory operands related to crypto has been removed:

- The CRYPTO operand on the CPU directory statement
- The CSU, KEYENTRY, MODIFY, and SPECIAL operands on the CRYPTO directory statement

These operands should be removed from the USER DIRECT file prior to running the DIRECTXA MODULE that is supplied with z/VM 7.4 and prior to IPLing a z/VM 7.4 CPLOAD MODULE. Directory manager (such as DirMaint) directory updates will fail if the obsolete directory statements are not removed from existing entries in the user directory.

The following keyword combinations are no longer allowed in the same CRYPTO user directory entry:

- APVIRTUAL and DOMAIN
- APVIRTUAL and APDEDICATED

The CRYPTO and NOCRYPTO options are not allowed with the CPU operation of the DIAGNOSE code X'84' (Directory Update-In-Place) instruction. The DIAGNOSE code X'84' instruction no longer issues return code 246.

For more information, see the September 2024 section of the Summary of Changes topic in the following publications:

- [Summary of Changes for z/VM: CP Command and Utilities Reference](#)
- [Summary of Changes for z/VM: CP Planning and Administration](#)
- [Summary of Changes for z/VM: CP Programming Services](#)

[7.4] Removal of use of DVHWAKE module

DirMaint has been updated in z/VM 7.4 to remove the use of the DVHWAKE MODULE. While the DVHWAKE MODULE is still shipped with DirMaint, any customized user exits should be updated to use the CMS WAKEUP command.

[7.4 APAR] Two-speed Monitor sampling

With the PTF for APAR VM66829, support is added to z/VM 7.4 to collect z/VM Monitor data at two different sampling rates. Particular guests can collect detailed data for a relatively brief period and preserve the data in case a situation arises that requires the data for analysis. Other guests can collect data less frequently and over longer time periods for customary purposes such as real-time monitoring or feeding the z/VM Performance Data Pump.

The following CP commands are updated. For details see z/VM: CP Commands and Utilities Reference.

- [MONITOR](#)
- [MONITOR SAMPLE](#)
- [QUERY MONITOR](#)

The following CP utility is updated. For details see z/VM: CP Commands and Utilities Reference.

- [MONWRITE](#)

The following CP new function environment variable is added:

- CP.LIMIT.MONITOR.SUBINTERVAL

[7.4, 7.3 APARs] SMAPI support for enhanced QDIO

With the PTFs for APARs VM66828 (7.4) and VM66822 (7.3), z/VM 7.4 and 7.3 provide support that allows users to develop or enhance system management tools that are related to enhanced QDIO (EQDIO) devices.

The following APIs are updated:

- Network_IP_Interface_Create
- Network_IP_Interface_Query
- Virtual_Network_Adapter_Query_Extended
- Virtual_Network_OSA_Query
- Virtual_Network_Vswitch_Create_Extended
- Virtual_Network_Vswitch_Query_Extended
- Virtual_Network_Vswitch_Set_Extended

For more information, see:

- [z/VM: Systems Management Application Programming](#)

[7.4, 7.3 APARs] z/VM Performance Data Pump enhancements

Performance Toolkit statement of support: The Performance Toolkit Data Pump dashboards have been updated to provide information that is specific to the new architectures delivered with the IBM z17 family of servers. The 3270 and web interfaces of the Performance Toolkit are stabilized at the IBM z16 architecture level and will not reflect new hardware and facilities delivered with the IBM z17 or any future families of servers.

With the PTFs for APARs VM66826 (7.4) and VM66825 (7.3), z/VM 7.4 and 7.3 provide support for a new z/VM Performance Data Pump dashboard. The dashboard provides a graphical representation of IBM z17 family power consumption metrics from the z/VM monitor stream. The display includes information for the following components:

- CPC
- LPAR
- CPU
- I/O
- Memory

The information can be used to calculate or approximate guest level apportionment.

Information about setting up Data Pump is available. See [z/VM Performance Data Pump](#) in *z/VM: Performance*.

Information is available about other services that process the Data Pump output stream, including links to Grafana sample dashboards. See [z/VM Performance Data Pump \(https://www.ibm.com/support/pages/zvm/related/perfkit/datapump/\)](https://www.ibm.com/support/pages/zvm/related/perfkit/datapump/).

[7.4 APAR] Unified DIFF and PATCH support for CMS

With the PTF for APAR VM66872, z/VM 7.4 provides the new utilities UDIFF and UPATCH, which are an implementation within z/VM of Linux DIFF/PATCH functionality.

UDIFF compares two files and generates an output file with detected differences (such as modified records, added records, and removed records) as well as a "context" consisting of surrounding records, so that the unique position of the changes is explicit.

UPATCH is the companion application, which takes the patch and source files as input and generates an output file. The output of UPATCH matches the contents of the file used as input to UDIFF.

The UDIFF and UPATCH implementation uses the unified diff file format, which is the most widespread format currently in use within the technology industry. The unified diff format is utilized by text editors, source code management software, operating systems, and other critical software.

[7.4 APAR] Fast LOGOFF control

With the PTF for APAR VM66877, z/VM 7.4 provides control of the behavior of a virtual machine's memory reset during LOGOFF. With fast logoff control, clients can avoid inadvertent memory over-commitment by preventing a logged off virtual machine from being logged back on until the virtual machine's memory reset is complete.

The following CP commands are new:

- QUERY LOGOFF
- SET LOGOFF

The following system configuration statement is new:

- SET LOGOFF

[7.5] Memory overcommitment control

The memory overcommitment control feature enhances automatic system resource management. Memory overcommitment is limited to a customer-defined level. The feature detects and reports activities that affect memory overcommitment and controls them to maintain system performance and availability. The feature can prevent paging space overcommitment and the associated system failures. DirMaint has been enhanced to support the new RESPOOL operand on the user directory OPTION statement.

The following CP command topics are new:

- OVERCOMMIT
- QUERY OVERCOMMIT

The following CP command topics are updated:

- AUTOLOG
- DEFINE RESPOOL
- DEFINE MEMORY
- QUERY RESPOOL
- SET RESPOOL
- VMRELOCATE
- XAUTOLOG

The following system configuration statement is new:

- OVERCOMMIT

The following user directory statement is updated:

- OPTION

Some CP messages are new. Some CP messages are updated.

The following monitor records have been updated:

- Domain 1 Record 29 (MRMTRCPD - Pool Definition)
- Domain 1 Record 13 (MRUSECPC - CPU Pool Change)
- Domain 3 Record 26 (MRSTOOVC)

For more information, see the following publications:

- [*z/VM: CP Commands and Utilities Reference*](#)
- [*z/VM: CP Planning and Administration*](#)
- [*z/VM: CP Messages and Codes*](#)

[7.5] Memory terminology simplification

z/VM 7.5 changes z/VM storage-based terminology to memory-based terminology for CP commands and system configuration statements. Alternative memory-based commands and system configuration statements are created for any CP command or statement that uses any term derived from the word "storage." Although the memory-based alternative commands are the default, the current storage-based commands and statements continue to be supported. In addition, all CP-issued messages and responses have alternative memory-based message and responses. These memory-based responses and messages are issued if the memory-based commands or statements are used or if the new TERMINOLOGY MEMORY setting is ON. Otherwise, the original storage-based responses and messages are issued. SMAPI and DirMaint interfaces and commands are not changed at this time.

This satisfies a previous Statement of Direction.

The following commands are added or updated:

- DEFINE STORAGE
- SET STORAGE
- QUERY STORAGE
- QUERY VIRTUAL STORAGE
- DEFINE RESPOOL
- DEFINE VSWITCH
- QUERY VSWITCH
- LOGON
- MONITOR EVENT
- MONITOR SAMPLE
- QUERY DYNAMIC I/O
- QUERY EDEV
- QUERY FRAMES
- QUERY SXSPAGES
- QUERY SXSSTORAGE/SXSSTORE
- SET MDCACHE
- SET RESPOOL
- SET VSWITCH
- VMRELOCATE MOVE
- XAUTOLOG
- QUERY STGEXEMPT
- QUERY STGLIMIT
- SET STGEXEMPT
- SET STGLIMIT
- SET NVS
- QUERY NVS
- DELETE RESPOOL
- QUERY RESPOOL
- ATTACH

The following configuration statements are added or updated:

- STORAGE
- DEFINE VSWITCH
- TRANSLATE_TABLE

Several CP messages are added or updated.

For more information, see:

- [*z/VM: CP Commands and Utilities Reference*](#)
- [*z/VM: CP Planning and Administration*](#)
- [*z/VM: CP Messages and Codes*](#)

[7.5] Default changes

z/VM 7.5 default settings for minidisk cache and abend processing are changed:

- The z/VM system initial defaults have been changed to adjust several defaults related to minidisk caching, abend handling, and performance posture to better reflect modern workloads and operational expectations.
- The initial default settings for abend processing is changed from NOLIMIT and SOFT to a limit of 10 soft abends and SOFTONLY.

This satisfies a previous Statement of Direction.

The following CP commands have been updated:

- QUERY ABEND
- SET ABEND
- SET MDCACHE

The following user directory statement has been updated:

- MINIOPT directory statement

Various messages have been updated.

For more information, see the following publications:

- [*z/VM: CP Commands and Utilities Reference*](#)
- [*z/VM: CP Planning and Administration*](#)
- [*z/VM: CP Messages and Codes*](#)

[7.5] Fence 3380 from VM system use

z/VM 7.5 has removed support for 3380 devices, except when a unique 3380 device is attached directly to a single guest for use specifically by that guest. This feature fences 3380 devices, including those emulated by 3390s, from being attached to the system for use, such as for IPL, paging, spool, and minidisks.

The following methods and functions no longer support 3380 devices:

- Commands & User Directory Statements:
 - LINK command & statement
 - MDISK statement
 - DEFINE MDISK command
 - ATTACH to SYSTEM command
- System-Level Function & Configuration File Statements:
 - VM System Load / IPL
 - SYSRES volumes (System Resident, Checkpoint, Warmstart)
 - SALIPL utility
 - CP_OWNED config statements
 - USER_VOLUME_INCLUDE config statements
 - USER_VOLUME_LIST config statements
 - USER_VOLUME_RDEV config statements
 - XLINK related config statements

Guests can still use 3380 devices via:

- ATTACH rdev command
- DEDICATE vdev rdev in user directory.

This satisfies a previous Statement of Direction.

[7.5] Semantic versioning support for CP

z/VM 7.5 introduces a four-element semantic version identifier for the z/VM CP component (M.N.O.P), eliminating legacy mod-level reporting and enabling clearer dependency and compatibility identification. This enhancement aligns z/VM with the current industry standard and allows for easier communication with external teams not deeply involved with the mainframe.

z16 family driver D51C Bundle 58 and z17 family driver D61C Bundle 23 are required to ensure HMC information for a z/VM 7.5 LPAR is correct in semantic versioning format.

The following CP command has been added:

- QUERY VERSION

The following CP command has been updated:

- QUERY SCPID

This satisfies a previous Statement of Direction.

[7.5] XEDIT respects the WIDTH option if it is specified

z/VM 7.5 changes XEDIT to respect the WIDTH option if it is specified. It previously did not honor it in all cases. This may affect applications that rely on the previous behavior, such as RDRLIST, which specifies a WIDTH value but relies on XEDIT to set LRECL, ZONE and VERIFY based on the file type. The LRECL and the right ZONE value will be set to the WIDTH. The right VERIFY value will be set to the smaller of the WIDTH and the file type value, which for unknown file types is 80. These settings can be adjusted by the XEDIT PROFILE.

Security

These topics describe changes in security features of z/VM.

[7.1 APAR] PVM Secure Connectivity

With the PTF for APAR VM66331, VM/Pass-Through Facility (PVM) Version 2 Release 1.1 is updated to support secure connectivity via TCP/IP. PVM TCPIP links can communicate securely when configured with an x.509 digital certificate that will be used to encrypt/decrypt all data flowing over the link using TLS protocols.

Traffic that was previously unencrypted and potentially exposed to sniffers on a network can now be protected. This is especially important when data being transferred includes user IDs and passwords.

For more information, see [VM/Pass-Through Facility: TCP/IP Line Driver Support](#).

[7.1 APAR] Multi-Factor Authentication for z/VM within the RACF server

With the PTF for APAR VM66338, Multi-Factor Authentication (MFA) within RACF provides for the establishment of a user's identity by utilizing more than one type of authentication. This provides greater security by allowing for an additional form of proof in the event that one token (for example, a password) becomes compromised. Previously, authentication of identity during the logon process could be met only by using a password or passphrase. MFA enables support for an external service to authenticate tokens that have been generated after a successful multi-factor authentication.

To be notified when this function becomes available, see [IBM: z/VM Continuous Delivery News \(https://www.ibm.com/support/pages/zvm/newfunction/\)](https://www.ibm.com/support/pages/zvm/newfunction/).

[7.1 APAR] CP support for MFA

With the PTF for APAR VM66324, z/VM provides the necessary CP support to enable multi-factor authentication in external security managers (ESMs).

The following CP command has been updated:

- LOGON

For more information, see:

- [Table 8 on page 111](#)
- [z/VM: CP Commands and Utilities Reference](#)

[7.2 APAR] Change TLS Server to IPL ZCMS

The PTF for z/VM 7.2 APAR PH24751 is the ordering mechanism for the Federal Information Processing Standard (FIPS) 140-2 validated level of z/VM System SSL. As part of this PTF, IBM recommends that any application using System SSL (such as the TLS server or the z/VM LDAP server) be updated to IPL ZCMS instead of CMS.

Note: Other utilities, such as the LDAP client utilities (db2pwwden, ldapchpw, ldapcmpr, ldapdlet, ldapexop, ldapmdfy, ldapmrnd, and ldapsrch) that use System SSL independently of the TLS server, must also be run in a ZCMS environment if they are using TLS (if they are connecting to a TLS-secured port, for example).

For more information, see:

- [z/VM: TCP/IP Planning and Customization](#)
- [z/VM: TCP/IP User's Guide](#)

[7.2 APAR] TLS/SSL OCSP Support

With the PTF for APAR PH28216, z/VM provides general peer certificate cross-checking against an external source, through the Online Certificate Status Protocol (OCSP) and CRL (Certificate Revocation List) Distribution Point (CDP) mechanisms that are part of the z/VM System SSL Cryptographic library, when the peer certificate is built with the extensions for CDP and OCSP. OCSP was codified in RFC 6960 and CDP was documented as part of RFC 5280.

Updated support includes:

- Addition of the OCSPParms tag to DTCPARMS
- Refactoring of the VMSSL information, based on the :Parms. tag.

For information about these and other changes made as a result of this support, see:

- [z/VM: TCP/IP Planning and Customization](#)
- [z/VM: TCP/IP Messages and Codes](#)

[7.2 APAR] RACF Enhancements

With the PTFs for APARs VM66459, VM66460, and VM66214, RACF has been enhanced as follows:

- The RACF command enhancements enable the RACF command processor to perform remote command execution inside an SSI cluster. This allows clients to use the SETROPTS, SETEVENT, and RVARY commands the same way as they are currently supported by the RAC command. This enhancement closes the gap for automation solutions which are required to execute RACF commands while also receiving commands through SMSG (such as the DirMaint-RACF interface).
- A new SMF record exit, ICHRSWX1, is called after SMF records have been written to disk. This exit can then be used to relay SMF records to other guests. Critical SMF records can be dynamically monitored and, if necessary, specific actions can be taken.

For more information, see:

- [z/VM: RACF Security Server System Programmer's Guide](#)
- [z/VM: RACF Security Server Command Language Reference](#)

[7.2 APAR] System SSL z/OS 2.3 Equivalence

With the PTFs for APAR PH33088, the z/VM 7.1 and 7.2 System SSL cryptographic libraries are upgraded to z/OS 2.3 equivalence.

For more information, see:

- [z/VM: TCP/IP User's Guide](#)
- [z/VM: TCP/IP Planning and Customization](#)

[7.2 APAR] RACF MFA fixpack

The PTF for APAR VM66528 provides resolution to the following MFA support issues within the RACF server:

- RACF termination on an IUCV communication error with the TCP/IP stack when using MFA
- Clarification of RACF MFA error messages

[7.2 APAR] Query SSL GSKKMAN Certificates

With the PTFs for APARs PH40080 (TCP/IP), VM66561 (CMS), and VM66581 (VMSES/E), z/VM provides support in TCP/IP for querying certificates within a specific GSKKMAN certificate database. The query lists certificate labels and displays certain attributes of the certificates.

Changes include the following:

- The following TCP/IP command has been added to provide a front-end interface to the GSKKMAN utility for querying SSL certificates:
 - [CERTMGR Command](#) (in [z/VM: TCP/IP User's Guide](#))
- The following CMS command has been updated to set the default database for querying SSL certificates from the GSKADMIN user ID:
 - [DEFAULTS command](#) (in [z/VM: CMS Commands and Utilities Reference](#))

For additional related z/VM 7.2 documentation updates, see:

- [z/VM: TCP/IP Messages and Codes](#)
- [z/VM: TCP/IP Planning and Customization](#)

[7.3] RACF support for z/VM 7.3

Select RACF utilities for database installation, maintenance, and operations along with select RACF reports are now allowed to run if the RACF service machine's 490 minidisk was IPLed; IPLing CMS is no longer required. In addition, The **RACUT100**, **RACUT200**, and **RACFCONV** utilities require the IPL of the 490 minidisk to support reserve and release of the RACF database.

[7.3] RACF database sharing no longer permitted with z/OS

z/VM 7.3 prohibits the sharing of RACF databases between z/VM and z/OS systems. While databases remain compatible, sharing between operating systems has long been discouraged due to distinct security and administrative requirements of the different platforms. z/VM 7.3 formally flags a RACF database as belonging either to z/VM or z/OS and will reject its use if flagged as the latter. Refer to the following for more information:

- Section 5.2.3, "Sharing a RACF Database," in the Program Directory for RACF Security Server for z/VM, function level 730, which is available from [IBM z/VM Program Directories \(https://www.ibm.com/support/pages/zvm/progdir\)](https://www.ibm.com/support/pages/zvm/progdir)
- [z/VM: RACF Security Server System Programmer's Guide](#)
- APAR documentation for z/OS 2.5 APAR OA62875.

This satisfies the IBM Statement of Direction issued 14 April 2020 as part of the z/VM 7.2 Preview Announce.

z/OS has issued similar Statements of Direction.

[7.3] ESM control of DEFINE MDISK

Use of the CP DEFINE MDISK command may now be controlled by an external security manager such as the RACF for z/VM Security Server. This extends existing controls of Diagnose x'E4' to cover creation and overlay of minidisks, which may be pertinent for disaster recovery scenarios.

- The following CP command was updated:
 - MDISK
- The following CP new function variable is new:
 - CP.ESM.CONTROL.DEFINE.MDISK
- There is corresponding support in RACF for z/VM.

For information about configuring RACF for z/VM to control the DEFINE MDISK command, see "Protecting the DEFINE.MDISK Command" in [z/VM: RACF Security Server Security Administrator's Guide](#).

[7.3 APAR] CMS Password/Key Management Utility - Keyvault

With the PTFs for APARs VM66453 (CMS), VM66457 (VMSES/E), and PH51239 (TCP/IP), z/VM 7.3 provides support for a CMS password/key management utility called KEYVAULT, which allows applications to securely store and retrieve user ID keys (logon passwords). z/VM Centralized Service Management (z/VM CSM) and the TCP/IP FTP client are updated to use the new KEYVAULT utility for automated remote host login procedures.

This support includes the following:

- New CMS utility: [KEYVAULT utility](#)
- Updated VMSES/E command: [SERVMGR EXEC](#) (and subcommands)
- Updated TCP/IP command: [FTP Command](#)
- New FTP subcommand: [VAULTDB](#)
- NOVAULTDB option added to the [FTP Command](#)

[7.3 APAR] Security Settings and Compliance Interfaces

With the PTF for APAR VM66646, z/VM 7.3 provides security settings and compliance API and command interfaces for compliance status extractors. The output from these new extractor interfaces contains security-relevant configuration data that can be analyzed for Payment Card Industry Data Security Standard (PCI DSS) compliance or for adherence to security configuration baselines. The API is provided through a new Systems Management interface that passes data to the extractor program.

Systems Management API:

- [System_Compliance_Information_Query](#)

CMS utility:

- [COMPEXTR command](#)

[7.3 APAR] Guest Secure IPL

With the PTFs for APARs VM66434 (CP), VM66424 (DirMaint), and VM66650 (SMAPI), z/VM 7.3 supports guest secure IPL (load and dump) for both ECKD and SCSI devices. A z/VM user can request that the machine loader validate the signed IPL code by using the security keys that were previously loaded by the customer into the HMC certificate store. The validation ensures that the IPL code is intact, unaltered, and originates from a trusted build-time source.

Support is provided for the following guest operating systems:

- This support provides the ability for a Linux guest to exploit hardware to validate the code being booted, helping to ensure it is signed by the client or its supplier.

Linux on IBM zSystems™ instances that previously were able to perform secure boot first level on an IBM z15 or IBM LinuxONE III prior to Driver D41C Bundle S73a, or an IBM z16 or IBM LinuxONE 4 prior to Driver D51C Bundle S18, will no longer be able to use secure boot until appropriate additional support is applied to the Linux image. Details are available about the required service level of Linux to properly IPL securely first or second level after driver D41C Bundle S73a or Driver D51C Bundle S18 has been applied. See 230428 Machine Alert for 8561, 8562, 3931, 3932 (<https://www-40.ibm.com/servers/resourcelink/lib03020.nsf/pagesByDocid/272B3DD994A65B538525899F005FA0E6?OpenDocument>).

- z/OS is supported in audit mode only. Full exploitation requires Virtual Flash Memory support, which is not available to a guest. In audit mode, the IPL code is checked but the IPL continues even if the code is not valid.

z/VM and the z/VM stand-alone dump utility do not support performing host IPL via List-Directed IPL from ECKD. In addition, Secure IPL of the z/VM host and z/VM stand-alone dump are not supported.

Guest Secure IPL requires an IBM z16 family server with drive D51C Bundle S19 applied.

The following CP new function variable is new:

- CP.FUNCTION.SECURITY.IPL

The following CP commands are updated:

- INDICATE USER
- IPL
- QUERY DUMPDEV
- QUERY LOADDEV
- SET DUMPDEV
- SET LOADDEV

For more information, see “CP Commands” on page 111 and *z/VM: CP Commands and Utilities Reference*.

The following user directory statements are updated:

- IPL Directory Statement
- LOADDEV Directory Statement
- OPTION Directory Statement

For more information, see “User Directory Statements” on page 109 and *z/VM: CP Planning and Administration*.

The following CP monitor records are updated:

- Domain 1 Record 4 - MRMTRSYS - System Configuration Data
- Domain 1 Record 15 - MRMTRUSR - Logged on User
- Domain 4 Record 2 - MRUSELOF - User Logoff
- Domain 4 Record 3 - MRUSEACT - User Activity

The following DirMaint commands are updated:

- MENU operand of DIRMAINT EXEC
- IPL

The following SMAPI APIs are added:

- Image_IPL_Characteristics_Define_DM
- Image_IPL_Characteristics_Query_DM

[7.3 APAR] System SSL z/OS 2.5 Equivalence

With the PTFs for APARs PH56199 (TCP/IP) and VM66698 (LE), z/VM 7.3 provides an update to the cryptographic services library, which includes certificate diagnostic enhancements and improved algorithmic support and allows for enablement of TLS 1.3, for secure connectivity to the z/VM platform.

[7.3 APAR] Digital Signature Verification of z/VM Service Packages

With the PTF for APAR VM66732, z/VM 7.3 uses public-key cryptography to verify the authenticity and integrity of signed service packages.

The following utility is updated:

- GETSHOPZ

For more information, see the [z/VM: Service Guide](#).

[7.4 APAR] RACF utility enhancements I

With the PTF for APAR VM66873, z/VM 7.4 provides the ability to use RACF utilities RACUT200 and RACUT400 non-interactively (by passing them input parameters from the command line) rather than interactively (by responding to system prompts, as was previously required). The amount of input that users must enter is reduced by setting default values for certain parameters and by allowing abbreviations for certain parameters.

[7.4 APAR] QUERY DASD and QUERY TAPE enhancements

With the PTF for APAR VM66891, z/VM enhancements are provided to responses for the QUERY DASD and QUERY TAPES commands as follows:

QUERY DASD DETAILS

The z/VM system name and the SSI name are added to the response.

QUERY DASD SPACE-EFFICIENT

The space-efficient capability level ("phase") is added to the response.

QUERY TAPES DETAILS

The width of LIBPORT response value is increased from one to two characters.

The following CP commands are updated for this support:

- QUERY DASD
- QUERY TAPES

[7.4 APAR] RACF utility enhancements II

With the PTF for APAR VM66892, z/VM provides an enhancement for the RPIDIRCT EXEC that reduces the complexity of creating and enabling policy on a RACF for z/VM system. The RPIDIRCT EXEC has been updated with a new option and new control file which allows for the creation of a default security policy. This significantly reduces the level of expertise needed to update a SYSUT1 file to meet security needs, which in turn streamlines the creation of a new and viable RACFVM database. It also eliminates the need for administrators of DIRMAINT to create a CONFIGRC DATADVH file.

[7.4 APAR] Simplified DirMaint RACF connector

With the PTF for APAR VM66892, z/VM provides simplification for configuration of the DirMaint RACF connector, which is utilized as part of the RACF installation-and-configuration process. It enables the user to generate these two files:

- CONFIGRC DATADVH file containing configuration statements that are either:
 - a copy of current settings in the CONFIGRC SAMPDVH sample file
- or

- based on entries the user specifies in an RPIDIRM SYSUT1 file
- DIRMACID EXEC file based on the ACIGROUP statement in the RPIDIRM SYSUT1 file. This exec can be used to remove all ACIGROUP statements from a specified user's directory statements.

[7.4 APAR] Certificate manager command enhancements

With the PTF for APAR PH68728, the z/VM TCP/IP CERTMGR and GSKKYMANT commands are enhanced. GSKKYMANT uses a stash file instead of requiring password entry for each invocation, so the certificate management process can be automated more easily. Clients can use CERTMGR or GSKKYMANT to receive certificates and create certificate renewal requests. Enhancements to the CERTMGR command allow clients to import and export certificates.

The following TCP/IP commands are updated:

- [CERTMGR Command](#)
- [GSKKYMANT Command](#)

For more information, see:

- [z/VM: TCP/IP User's Guide](#)

[7.5] RACF simplification

RACF/VM enablement is simplified with the use of CP exit-based invocation rather than CP nucleus modification. Security Manager enablement and configuration are now dynamic, and third-party ESMs can be integrated using standardized exits.

In addition:

- RACF specific modules are now contained in the base CPLOAD module.
- RACF configuration are performed by SYSTEM CONFIG statements or SET ESM/RACF commands.
- CP modifications to configure RACF are no longer required or allowed.
- RACF command sessions can no longer be password protected.
- SETRACF command is withdrawn in favor of CP SET ESM INACTIVE.

The following CP commands are updated:

- QUERY ESM
- QUERY RACF
- SET ESM
- SET IPLPARMS
- SET RACF

The following CP configuration statements are added:

- ESM
- RACF

The following new CP exit numbers were assigned for ESM:

- 6000 - ESM Init
- 6001 - ESM SSI Scan HROTABLE
- 6002 - ESM diagnose x'A0'
- 6003 - ESM QUERY ESM DETAILS output
- 6011 - ESM request authorization
- 6012 - ESM IUCV connect from ESM server for *RPI
- 6013 - ESM IUCV message pending

- 6014 - ESM IUCV sever from ESM server
- 6015 - ESM IUCV quiesce from ESM server
- 6016 - ESM IUCV resume from ESM server
- 6020 - ESM Password verification
- 6021 - ESM Password prompt
- 6030 - ESM INACTIVE screening

For more information, see:

- [z/VM: CP Commands and Utilities Reference](#)

[7.5] Host secure boot

The host secure boot feature introduces cryptographic validation of SAPL during list-directed IPL. The validation uses signed binaries that are verified by the hardware loader. Secure boot stops execution when verification fails, which prevents the execution of untrusted code. After successful verification of SAPL, which is z/VM's stand-alone loader program, the machine loader passes control to SAPL, which validates each module it subsequently loads. This feature provides foundational support for a subsequent z/VM 7.5 feature pack that will introduce cryptographic validation during IPL of a signed CPLOAD MODULE, which ensures that the module also is loaded securely.

The following CP command topics are updated:

- QUERY CPLEVEL
- QUERY CPLOAD
- QUERY CPSERVICE
- QUERY IPLPARMS
- SET LOADDEV

The following CP utility topic is updated:

- SALIPL

The following monitor record is updated:

- Domain 1 Record 4 MRMTRSYS System Configuration Data

For more information, see the following publications:

- [z/VM: CP Commands and Utilities Reference](#)
- [z/VM: CP Messages and Codes](#)

Application development and deployment

These topics describe changes that can affect how you develop and deploy applications on z/VM.

[7.1] GDDMXD/VM Support Removed

The z/VM Graphical Data Display Manager (GDDM) interface to the X Window System (GDDMXD/VM) is no longer supported. The interfaces and associated documentation have been removed.

[7.1] Change to the Default LOGONBY User ID

z/VM is changing from the default WD5JU8QP password for 50+ users to a LOGONBY model. This change introduces IBMVM1 as the default LOGONBY user ID for these 50+ users. This allows you to change one password and effectively change the access for all of these 50+ users. Note that this affects any SMAPI call via INET/INET6 servers -- which use either AF_INET (IPv4) or AF_INET6 (IPv6) family sockets to connect with clients -- that use MAINT as the authorized user, because by default MAINT no longer has

a password. Requests submitted with MAINT as the authorized user are not affected if the SMAPI call is submitted via IUCV.

For more information, see *z/VM: Systems Management Application Programming*.

[7.2] Re-link-edit required for Reusable Server Kernel applications

If you have any Reusable Server Kernel (RSK) applications, you must re-link-edit them after you install z/VM 7.2 to ensure that they will work correctly.

For information about link-editing RSK applications, see *z/VM: Reusable Server Kernel Programmer's Guide and Reference*.

[7.2 APAR] CP New Feature Interrogation API

With the PTF for APAR VM66439, a new API is provided to interrogate whether a named capability is present in the running CP system. This enhancement simplifies scripting and automation written by customers and vendors sensitive to the function level of CP. It facilitates adaptation of vendor products to varying CP code levels.

The following CP command has been updated:

QUERY VARIABLE

For more information, see:

- *z/VM: CP Commands and Utilities Reference*
- *z/VM New Function Variable List* (<https://www.ibm.com/support/pages/zvm/newfunction/varlist.html>)

[7.2 APAR] SMAPI Query Processors API

With the PTF for APAR VM66568, a new Systems Management API (SMAPI) provides information about the real processors available on a z/VM system.

The following API has been added: *System_Processor_Query* in *z/VM: Systems Management Application Programming*.

[7.3] Language Environment upgrade

The z/VM Language Environment runtime libraries have been upgraded to z/OS 2.5 equivalence.

For more information, see *z/VM: Language Environment User's Guide*.

[7.3] User Directory TODENABLE

Some capabilities that previously required OPTION TODENABLE in the user's directory definition will be standard for all users in z/VM 7.3. Specifically, all virtual machines on z/VM 7.3 will be able to alter their virtual time-of-day (TOD) clocks using the SET CLOCK instruction. In addition, class G users no longer need TODENABLE to set the virtual clock to a specified value using the SET VTOD command with the DATE, TIME, and SYSTEM options. TODENABLE is still required for the FROMUSER and MSGPROC options of SET VTOD, which involve access to another virtual machine's clock.

[7.3 APAR] SMAPI FCP EQID API

With the PTF for APAR VM66626, z/VM Systems Management API (SMAPI) has been enhanced to provide a *System_FCP_EQID_Set* API, which enables modification of device equivalency IDs (EQID) for real FCP Adapter devices. This API is particularly beneficial for customers with FCP devices dedicated to z/VM guests and who desire to utilize Live Guest Relocation (LGR) in an SSI environment.

[7.3 APAR] CMS Tape Block Size Increase

With the PTF for APAR VM66724, z/VM 7.3 increases the block size supported by CMS native tape I/O functions from 65,535 (64K-1) bytes to approximately 1 megabyte (1,114,094 bytes).

The following CMS macros are updated:

- RDTAPE
- WRTAPE

For more information, see [z/VM: CMS Macros and Functions Reference](#).

[7.4 APAR] DirMaint and SMAPI LOADDEV ALTERNATE directory support

With the PTFs for APARs VM66874 (DirMaint) and VM66872 (SMAPI), z/VM 7.4 provides the ability for DirMaint and SMAPI to support the addition, modification, and deletion of LOADDEV ALTERNATE statements in the user directory.

The following APIs are updated:

- Image_IPL_Characteristics_Define_DM
- Image_IPL_Characteristics_Query_DM

The following DIRMAINT commands are updated for this support:

- DIRMAINT LOADDEV
- DIRMAINT LOADDEV MENU

[7.4 APAR] SMAPI support for querying linear service

With the PTF for APAR VM66872 (CMS), z/VM 7.4 provides the ability for the user to query and access this information:

- Linear Service and RSU details for a specified component ID or all components
- Service level and production-level details for a specified component ID or all components, making it easier to identify the latest installed service on a z/VM 7.4 system for a specific component or all components
- A list of all APARs and PTFs for a specific component ID

The following API is updated:

- System_Service_Query

[7.4 APAR] DirMaint support for control-only access for guest crypto domains

With the PTF for APAR VM66895, DirMaint provides support for the new CONTROL keyword on the CRYPTO directory statement and enhances the DIRMAINT CRYPTO command, providing the ability to authorize a virtual machine for control-only access to specified crypto domains.

[7.4 APAR] Systems Management support for renaming a userid

With the PTFs for APARs VM66893 (SMAPI) and VM66895 (DirMaint), z/VM introduces a new SMAPI API, IMAGE_RENAME_DM, which renames an existing virtual machine user ID or profile in the z/VM directory, eliminating the need for manual invocation of the DirMaint CHNGID command.

[7.4 APAR] CRYPTO APVIRT NONE

With the PTF for APAR VM66891, z/VM provides a new option, NONE, on the CRYPTO APVIRTUAL system configuration statement. When a CRYPTO APVIRTUAL NONE statement exists in the SYSTEM CONFIG file, z/VM does not attempt to assign crypto resources to the shared pool when the system IPLs. This allows all crypto resources on the system to be available for dedicated use.

The following system configuration statement is updated for this support:

- CRYPTO APVIRTUAL

[7.5, 7.4 APARs] Enhanced QDIO support in DirMaint and SMAPI

With the PTFs for 7.5 APARs VM66944 and VM66946, z/VM 7.5 Virtual Network SMAPI and Dirmaint APIs are enhanced to introduce support for the Enhanced QDIO (EQDIO) virtual network adapter. This feature extends existing virtual networking capabilities by allowing EQDIO NICs to be created, queried, and connected using both standard and extended SMAPI interfaces.

With the PTF for APAR VM66948, this support is provided for DirMaint on z/VM 7.4.

The following Directory Maintenance Facility command has been updated:

- NICDEF

Various Directory Maintenance Facility messages have been updated.

The following System Management APIs have been updated:

- Virtual_Network_Adapter_Connect_LAN
- Virtual_Network_Adapter_Connect_Vswitch_DM
- Virtual_Network_Adapter_Connect_Vswitch
- Virtual_Network_Adapter_Connect_Vswitch_Extended
- Virtual_Network_Adapter_Create
- Virtual_Network_Adapter_Create_DM
- Virtual_Network_Adapter_Create_Extended
- Virtual_Network_Adapter_Create_Extended_DM
- Virtual_Network_Adapter_Query
- Virtual_Network_Adapter_Query_Extended
- Virtual_Network_LAN_Create
- Virtual_Network_Vswitch_Create
- Virtual_Network_Vswitch_Create_Extended
- Virtual_Network_Vswitch_Query_Extended

For more information, see the following publications:

- [*z/VM: Directory Maintenance Facility Commands Reference*](#)
- [*z/VM: Directory Maintenance Facility Messages*](#)
- [*z/VM: Systems Management Application Programming*](#)

System diagnosis

These topics describe changes that can affect how you diagnose problems on z/VM.

[7.1] Improvements to the z/VM Dump Process

Dump processing has been enhanced to reduce the time and space required to create, process, and transmit hard abend and snap dumps. The two largest dump components, the CP frame table and user PGMBKs, have been omitted for the majority of abends but can be included when using the SET DUMP or SNAPDUMP command. Excluding these components results in dumps that are considerably smaller, thus requiring less space in both the system SPOOL and CMS file system. Support to write hard abend and snap dumps to tape has been removed.

The following CP commands have been updated:

- QUERY ALL

- QUERY DUMP
- QUERY Real Device
- QUERY TAPES
- SET DUMP
- SNAPDUMP
- VMDUMPTL
- DUMPLOAD utility

Also see “[7.1 APAR] Additional Dump Processing Improvements” on page 100.

For more information, see:

- [*z/VM: CP Commands and Utilities Reference*](#)
- [*z/VM: CP Planning and Administration*](#)
- [*z/VM: CP Messages and Codes*](#)
- [*z/VM: Diagnosis Guide*](#)
- [*z/VM: System Operation*](#)
- [*z/VM: VM Dump Tool*](#)

[7.1] Stand-Alone Dump to Tape Support Removed

Tape is no longer supported as a media option for stand-alone dumps.

The following utilities have been updated:

- DUMPLOAD utility
- DUMPLD2
- XLINK FORMAT

The following utility has been deleted:

- HCPSADMP

Various messages associated with stand-alone dumps have been deleted.

For more information, see:

- [*z/VM: CP Commands and Utilities Reference*](#)
- [*z/VM: CP Planning and Administration*](#)
- [*z/VM: CP Messages and Codes*](#)
- [*z/VM: Diagnosis Guide*](#)
- [*z/VM: VM Dump Tool*](#)

[7.1 APAR] Additional Dump Processing Improvements

With the PTF for APAR VM66176, additional dump processing improvements are implemented to reduce the CPU time spent deciding what storage to include in a hard abend or snap dump.

[7.2 APAR] Fast Dump Distiller

With the PTF for APAR VM66430, clients can distill a hard abend or snap dump to create an abridged dump, which can be submitted to IBM customer support for diagnosis. The abridged dump alleviates the problems and delays that can occur when submitting a large hard abend dump or snap dump to IBM. The original dump remains available as a spool file and can be loaded into a CMS file for transmission to IBM later, if necessary.

The following CP utility has been updated: DUMPLOAD.

For more information, see:

- [z/VM: CP Commands and Utilities Reference](#)
- [z/VM: CP Messages and Codes](#)

[7.2 APAR] Improve I/O Time for Dump Processing

With the PTF for APAR VM66431, z/VM exploits IBM Z High Performance FICON I/O technology (zHPF), when available, during the process of writing CP hardabend and snap dumps to CP dump/spool space. This reduces the amount of time a system is unavailable while a dump is being taken, before the system is re-IPLed. It shortens unplanned outages on systems with large amounts of real memory.

[7.2 APAR] Preserve Partial Hard Abend Dump

With the PTF for APAR VM66560, z/VM preserves partial dumps that are caused when an IPL of the partition ends the dump process before the dump completes. Previously, partial dumps that were ended by an IPL of the partition were not preserved after the IPL.

Documentation for the following CP utilities is updated:

- DUMpload. For more information, see [DUMpload](#) in [z/VM: CP Commands and Utilities Reference](#).
- DUMPLD2. For more information, see [DUMPLD2](#) in [z/VM: CP Commands and Utilities Reference](#).

Documentation for the following z/VM Dump Tool is updated:

- DUMPTYPE. For more information, see [DUMPTYPE Subcommand](#) in [z/VM: VM Dump Tool](#).

The following CP messages are updated:

- HCP8243I
- HCP8169I
- HCQ004E

The following CP messages are new:

- HCP9270E
- HCQ167E
- HCQ168W

For more information about CP messages, see [z/VM: CP Messages and Codes](#).

[7.4 APAR] FICON RAS improvements

With the PTF for APAR VM66891, RAS updates to z/VM FICON support are provided to mitigate impactful hardware and software issues and improve diagnostics. z/VM implemented the link-recovery-threshold facility on a system where this support is available. This prevents a channel path with a flapping link condition from tying up system resources by disabling and re-enabling the channel path repeatedly, which can potentially cause a system hang condition. Instead, the facility would make the channel path not operational, thus avoiding unnecessary work for the system. In addition, a new error message will inform clients about why the path is not operational, providing suggestions about what might be wrong on the FICON link and what needs to be fixed.

Improved error messages require IBM z17 family driver D61C bundle S18 and IBM z16 family driver D51C bundle S55.

The following CP command has been updated:

- VARY PATH

New informational message has been added:

Message HCPIOX1283I has been added to provide additional information as to why a channel path is not responding.

For more information, see:

- [z/VM: CP Commands and Utilities Reference](#)
- [z/VM: CP Messages and Codes](#)

[7.4 VM66877] Soft abend improvements

With the PTF for APAR VM66877, z/VM 7.4 provides support that allows the number of soft abend dumps to be limited and enables a soft abend dump to be skipped if it would result in a hard abend. With this support, clients can keep their systems up when soft abends occur. Non-fatal problems can be prevented from causing system outages and dump space can be preserved for SNAPDUMP or hard abend dumps by limiting the number of soft abend dumps. A soft abend history table can be reviewed to assess whether there might be any problems with the system.

The following CP commands are updated:

- QUERY ABEND
- SET ABEND

Various CP messages are updated.

For more information, see:

- [z/VM: CP Commands and Utilities Reference](#)
- [z/VM: CP Messages and Codes](#)

For z/VM 7.5, soft abend dump size is increased by approximately 200 pages. Also, depending on which CP functions are exploited, there is an additional increase in soft abend dump size:

1. If EDEVICES are configured, soft abend dump size is increased further by approximately 500 pages.
2. If PCIe functions are configured, soft abend dump size is increased further by approximately 100 pages.
3. If the TRACESIZE option is specified on the SET VMLAN or SET VSWITCH command, soft abend dump size is increased further by the number of pages specified, for each virtual network or virtual switch.

[7.5] Allow TRSOURCE to initiate a SNAPDUMP

z/VM 7.5 augments the TRSOURCE facility to allow a SNAPDUMP to be taken when a trace point is encountered. In certain situations, the data captured can be used to diagnose a problem more quickly and easily than by previously available methods (such as by capturing partial data using TRSOURCE DATALINKs that may or may not be helpful).

The number of SNAPDUMPs initiated when a particular trace point is encountered can be limited to a specified number between one and 99. If no limit is specified, the default is two. If the limit is reached, the TRSOURCE must be removed (using TRSOURCE DROP) and then reestablished to allow more SNAPDUMPs to be taken.

The following CP commands are updated:

- QUERY TRSOURCE
- SNAPDUMP
- TRSOURCE ID

For more information, see:

- [z/VM: CP Commands and Utilities Reference](#)

Product documentation

These topics describe changes to the format, location, or availability of the z/VM product documentation. For information about which z/VM publications have been updated for the new release, see [z/VM: General Information](#).

[7.1] Continuous Delivery Capability for z/VM Documentation

IBM has enabled the z/VM documentation for Continuous Delivery capability, to update topics in IBM Documentation and publications in PDF format as the need arises.

Links to the PDFs are provided in [IBM z/VM documentation \(https://www.ibm.com/docs/en/zvm\)](https://www.ibm.com/docs/en/zvm).

- The PDF file name has the format `xxxxx_v7ry`, where `xxxxx` is the publication (title) ID and `y` is the release number. The file name will remain constant for the duration of the release, regardless of how many times the publication is updated.
 - PDF files are easily replaced with new editions on the web page.
 - PDF links (which link to the file name) are preserved when the target publications are updated with new editions.
- The publications have new order numbers for 7.x. The publication edition is identified by the order number suffix (starting with -00 for the 7.1 GA publications).

This web page provides the latest edition of each z/VM 7.x publication. For previous editions, see [IBM: z/VM Internet Library \(https://www.ibm.com/support/pages/zvm/library\)](#).

- The date when a PDF file was last updated is indicated on the web page and in the edition notice of the publication.

[7.1] Deleted Publications

The following publications have been deleted from the z/VM 7.1 library:

- *z/VM: Enabling z/VM for OpenStack (Support for OpenStack Newton Release)*, SC24-6253
- *z/VM: Glossary*, GC24-6195

[7.2] IBM Knowledge Center is now IBM Documentation

All IBM product documentation now resides in [IBM Documentation \(IBM Docs\)](#):

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

- To take a quick look at some of the features of **IBM Docs**, click on the black **Guided tour** button to the right of the **Search in IBM Documentation** field on the [IBM Docs welcome page \(https://www.ibm.com/docs\)](https://www.ibm.com/docs).
- To search for a product, click on the black **View all products in IBM Documentation** button on the [IBM Docs welcome page](#). This takes you to the [IBM Documentation products page](#):

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

Type the product name in the **Filter within the product catalog** field (or click on the first letter of the product name in the menu below that) and then click on the product name shown in the search results.

- You can find the z/VM 7.2 documentation here:

<https://www.ibm.com/docs/en/zvm/7.2>

To display the table of contents, click on the right arrow (➤) in the lower-left corner.

Previously, IBM Knowledge Center (<https://www.ibm.com/support/knowledgecenter>) was the repository for all IBM product documentation. For supported products, the IBM Knowledge Center URLs are redirected to the corresponding IBM Documentation URLs permanently.

z/VM Education How-to Guides

Short videos that provide guides about different z/VM-related tasks are part of the IBM Support and Training YouTube channel. You can find, like, and subscribe to a playlist of these videos at [z/VM Education How-to Guides \(https://ibm.biz/zvmhowto-yt\)](https://ibm.biz/zvmhowto-yt).

Chapter 3. Changes to external interfaces

These topics identify changes to specific external interfaces in the z/VM components (except Language Environment). External interfaces are commands, routines, macros, DIAGNOSE codes, directory control statements, and so on. If an external interface has changed, you might need to change the way that you use it. Each change is identified as either **upwardly compatible** or **incompatible**. For definitions of these terms, see [“Compatibility Terms”](#) on page 4.

Changes to external interfaces are identified in the following major topics:

- [“CP changes”](#) on page 105
- [“CMS changes”](#) on page 142
- [“GCS changes”](#) on page 149
- [“REXX/VM changes”](#) on page 150
- [“VMSES/E changes”](#) on page 150

Notes:

1. There are no changes to AVS or TSAF external interfaces.
2. For information about changes to Language Environment, see *z/VM: Language Environment User's Guide*.
3. As mentioned in [“\[7.5\] Fence 3380 from VM system use”](#) on page 88:

The following methods and functions no longer support 3380 devices:

- Commands & User Directory Statements:
 - LINK command & statement
 - MDISK statement
 - DEFINE MDISK command
 - ATTACH to SYSTEM command
- System-Level Function & Configuration File Statements:
 - VM System Load / IPL
 - SYSRES volumes (System Resident, Checkpoint, Warmstart)
 - SALIPL utility
 - CP_OWNED config statements
 - USER_VOLUME_INCLUDE config statements
 - USER_VOLUME_LIST config statements
 - USER_VOLUME_RDEV config statements
 - XLINK related config statements

Guests can still use 3380 devices via:

- ATTACH rdev command
- DEDICATE vdev rdev in user directory.

CP changes

Changes to CP interfaces are identified in the following topics:

- [“System Configuration Statements”](#) on page 106
- [“User Directory Statements”](#) on page 109

- “CP Commands” on page 111
- “CP Utilities” on page 135
- “Dynamic I/O Return Codes” on page 137
- “DIAGNOSE Codes” on page 138
- “CP System Services” on page 141
- “VM Dump Tool” on page 141

For information about changes to CP monitor records, see [z/VM Data Areas, Control Blocks, and Monitor Records \(https://www.ibm.com/support/pages/zvm/pubs/ctlblk.html\)](https://www.ibm.com/support/pages/zvm/pubs/ctlblk.html).

System Configuration Statements



Warning: Care should be taken when adding new operands to existing statements in the system configuration file. When a statement is processed by a CPLOAD module that does not include support for the new operands on the statement, an error message is displayed and the entire statement will be ignored. This will cause features and settings that were previously in effect on your system to no longer be in effect. Backing out to a previous CPLOAD module or running a mixed-release / mixed-service level SSI cluster are situations where an older CPLOAD module may be used. To avoid issues caused by an existing statement being ignored, code each new operand on a separate statement until it is supported by all releases of CP that will use this system configuration file. Also, ensure the new statement is within a "TOLERATE_CONFIG_ERRORS YES" section of the file if you wish to avoid being prompted during CP initialization.

Table 6 on page 106 lists system configuration statements that have changed. For additional information, see [z/VM: CP Planning and Administration](#).

Table 6. Changes to System Configuration Statements

Statement	Changes
CP_OWNED	Upwardly compatible: • [7.4 VM66891] Updated usage note.
CRYPTO APVIRTUAL	Upwardly compatible: • [7.1 VM66248] Supports new AP types for Crypto Express7S: CEX7A, CEX7C, and CEX7S. • [7.2 VM66532] Supports new AP types for Crypto Express8S: CEX8A, CEX8C, and CEX8P. • [7.2 VM66534] New operand POLLING, which controls whether crypto polling is on or off. • [7.3] The default value of the POLLING operand has been changed to OFF. • [7.4 VM66891] New operand NONE, which prevents assignment of crypto resources to the system shared pool when the system is IPLed. New usage notes and example added. New message HCP1720I.
DEFINE LAN	Upwardly compatible: • [7.3 VM66878, 7.4 VM66877] Support for EQDIO simulated adapters is documented in the usage notes and in the TYPE QDIO and the IP ETHERNET operands.

Table 6. Changes to System Configuration Statements (continued)

Statement	Changes
DEFINE VSWITCH	Upwardly compatible: • [7.1 VM66219] New operand: PRIQUEUEING. • [7.3 VM66823, 7.4 VM66824] Updated operand QUEUESTORAGE, new operand LOG. Updated description and usage notes for EQDIO devices. • [7.3 VM66878, 7.4 VM66877] Support for EQDIO simulated adapters is documented in the TYPE QDIO operand and in usage notes. • [7.5] QUEuestorage operand is deprecated in favor of QUEUEMemory operand.
EDEVICE	Upwardly compatible: • [7.2] edev operand updated to support 4- and 5-digit hexadecimal numbers. • [7.2 VM66420] LUN operand optional after specified on the first path. • [7.3] New attributes for NVMe PCIe-function emulated devices: – NVME – ALIAS – PCIFUNCTION – rpfid
ENCRYPT	INCOMPATIBLE: • [7.2] Remove IPL parameter: PAGING63.
FEATURES	 Warning: Care should be taken when adding new features to existing FEATURES statement in the system configuration file. For details, see “System Configuration Statements” on page 106. INCOMPATIBLE: • [7.2] Updated operand: RECOVERY_BOOST. The default has changed to ENABLE. • [7.2] Updated options on the ENABLE and DISABLE operands: CLEAR_TDISK. The default has changed to ON to enable automatic clearing. Upwardly compatible: • [7.1 VM65971] New ENABLE and DISABLE operand: UNRESPONSIVE_PROCESSOR_DETECTION. • [7.1 VM66283] New ENABLE and DISABLE operand: RECOVERY_BOOST • [7.2] New option ADJUNCTs for DISABLE and ENABLE operands. The default is to enable the Adjuncts feature. • [7.2 VM66173] Added recommendation to use the new PAGING features statement instead of using the PAGING_ALIAS and PAGING_HPF features statements. • [7.3] The ENABLE PCI and DISABLE PCI options are tolerated but ignored. • [7.5] New ENABLE option HYPERSWAP_HYPERPAV_1END.

Table 6. Changes to System Configuration Statements (continued)

Statement	Changes
IPL	Upwardly compatible: • [7.2 VM66173] New operand: STORE=INITIAL. Updated operand: STORE=nnnn updated to specify the amount of permanent storage to initialize.
MEMORY	Upwardly compatible: • [7.5]: – New, preferred alias for the STORAGE system configuration statement. – Updated usage notes. – Updated message: HCP2585E.
MODIFY PORT	Upwardly compatible: • [7.3 VM66823, 7.4 VM66824] Updated operand descriptions and usage notes.
MODIFY VSWITCH	Upwardly compatible: • [7.1 VM66219] New operand: PQUPLINKTX. • [7.2 VM66557] New operand: NICDISTRIBUTION.
MULTITHREADING	Upwardly compatible: • [7.1 VM66265] Updated usage notes with logical processors changes. • [7.5] Updated description, usage notes.
OVERCOMMIT	Upwardly compatible: • [7.5] New statement to establish memory overcommitment checking parameters during z/VM IPL.
PAGING	Upwardly compatible: • [7.4 VM66891] New operand: DRAINPROTECT. Updated operand description: WARNING.
RDEVICE (DASD)	Upwardly compatible: • [7.2] rdev, rdev1-rdev2 updated to support 4- and 5-digit hexadecimal numbers.
RDEVICE (Special Devices)	Upwardly Compatible: • [7.3 VM66823, 7.4 VM66824] New operand: TRACESIZE.
SET LOGOFF	Upwardly compatible: • [7.4 VM66877] New statement for controlling the behavior of a virtual machine's memory reset during LOGOFF.

Table 6. Changes to System Configuration Statements (continued)

Statement	Changes
SRM	INCOMPATIBLE: • [7.2] The HiperDispatch default unparking setting is now UNPARKING MEDIUM. If desired, the default can be changed to LARGE by using this statement. Upwardly compatible: • [7.3 VM66678] New operand and associated usage notes: WARNINGTRACK. New message variation: HCP1051E.
SSI	Upwardly compatible: • [7.3] Updated operand: SLOT. Updated usage note and example.
STORAGE	Upwardly compatible: • [7.2 VM66173] New operands: AFTER_RESTART, AFTER_SHUTDOWN_REIPL, PERMANENT, RECONFIGURABLE. • [7.2 VM66271] Updated operand: RECONFIGURABLE. Allows up to 50% of real memory to be reconfigurable storage. • [7.3] The EDEVICE operand must specify at least one emulated and one FCP device. Updated message: HCP6706E. New messages: HCP8707E and HCP8708I. • [7.5] The STORAGE alias is deprecated. The preferred alias is MEMORY.
SYSTEM_USERIDS	INCOMPATIBLE: • [7.4] Default changes, updated usage notes and examples. – NOAUTOLOG is now the default for parameters EREP1 and EREP2. – EREP1 defaults to OPEREREP. – Recording is forced off for NOAUTOLOG EREP1 and EREP2 userids. – Recording is forced off for a EREP1 or EREP2 userid that is not defined in the user directory.
TIMEZONE_BOUNDARY	Upwardly compatible: • [7.3] The <i>zoneid</i> operand can be up to 4 characters long.
TIMEZONE_DEFINITION	Upwardly compatible: • [7.3] The <i>zoneid</i> operand can be up to 4 characters long.
TRANSLATE_TABLE	• [7.5] DISPlay_storage option is deprecated in favor of DISPlay_memory option.
VMLAN	Upwardly compatible: • [7.1 VM66219] Updated operand: DNA DISABLE.

User Directory Statements

Table 7 on page 110 lists user directory statements that have changed. For additional information, see [z/VM: CP Planning and Administration](#).

Table 7. Changes to User Directory Statements

Statement	Changes
CPU	INCOMPATIBLE: • [7.1] DEDICATE and NODEDICATE operands accepted for compatibility, but provide no function; documentation removed. • [7.4] CRYPTO operand is no longer accepted. Usage note is deleted.
CRYPTO	INCOMPATIBLE: • [7.4] Obsolete operands CSU, KEYENTRY, MODIFY, and SPECIAL are no longer tolerated. The following keyword combinations are no longer allowed in the same CRYPTO user directory entry: – AVIRTUAL and APDEDICATED – APVIRTUAL and DOMAIN Usage notes are updated. Upwardly compatible: • [7.1 VM66248] Supports crypto resources that are defined on a Crypto Express7S. • [7.2 VM66532] Supports crypto resources that are defined on a Crypto Express8S. • [7.4 VM66891] Modified to allow: – Specification of control-only domains – Specification of ranges of AP and domain numbers – Specification of the DOMAIN and APDED operands in any order
DIRECTORY	INCOMPATIBLE: • [7.5] A CPUID in the *nnnnn-xxxx format is no longer supported and will result in an error from DIRECTXA. Upwardly compatible: • [7.3] Updated syntax note, description, and usage note. New and updated examples.
IPL	Upwardly compatible: • [7.3 VM66434] New LOADDEV operand and new examples. • [7.3 VM66727] Additional usage note added.
LOADDEV	Upwardly compatible: • [7.3 VM66434] New operands BOOTREC, DEVICE, SECURE, NOSECURE. • [7.3 VM66727] New operand ALTERNATE. • [7.3 VM66749] Updated operand descriptions: ALTERNATE, DEVICE, PORTNAME.
MINIOPT	Upwardly compatible: • [7.5] Updated usage note.

Table 7. Changes to User Directory Statements (continued)

Statement	Changes
NICDEF	Upwardly compatible: • [7.1 VM66219] New operand: PQUPLINKTX. • [7.3 VM66878, 7.4 VM66877] New NIC TYPE value: EQDIO. Support for EQDIO simulated adapters is documented in the DEVICES and MACID operands and in usage notes and examples.
OPTION	Upwardly compatible: • [7.3 VM66434] New operand SECUREIPLREQUIRED. • [7.5] New operand RESPOOL.
SPOOLFILE	Upwardly compatible: • [7.3] Updated usage note.
TODENABLE	[7.3] Some capabilities that previously required OPTION TODENABLE in the user's directory definition will be standard for all users in z/VM 7.3.

CP Commands

Table 8 on page 111 lists CP commands that have changed. For additional information, see [z/VM: CP Commands and Utilities Reference](#).

Table 8. Changes to CP Commands

Command	Changes
ATTACH	Upwardly compatible: • [7.1 VM66263] Updated usage note. Updated messages: HCP138E and HCP139E. • [7.1 VM66266] New operand: CRYPTO. • [7.2 VM66173] Updated usage note. • [7.3] New messages: HCP6201E and HCP6863E. • [7.4 VM66891] New CONTROL operand added. Updated to allow DOMAIN and APDED to be specified in any order. New and updated usage notes for crypto resources. New and updated examples for crypto resources. New and changed message variations: HCP1738E, HCP1748E, HCP1749E. • [7.5] The XSTORE operand is deprecated.
AUTOLOG	Upwardly compatible: • [7.5] New message HCP991I; changed message HCP059E.
COUPLE	Upwardly compatible: • [7.3 VM66878, 7.4 VM66877] Support for EQDIO simulated adapters is documented in usage notes.
CPACCESS	Upwardly compatible: • [7.2] Updated messages: HCP101E, HCP102E, HCP103E, HCP104E, HCP105E, HCP106E.

Table 8. Changes to CP Commands (continued)

Command	Changes
CPU	Upwardly compatible: • [7.2] New operand * in support of adjunct support. • [7.2] Updated usage note and responses in support of adjunct support.
CPXLOAD	Upwardly compatible: • [7.3] OPTION operands MP, NOMP, NONMP are tolerated but ignored. • [7.5] Updated usage notes.
DEDICATE	INCOMPATIBLE: • [7.1] This command has been removed.
DEFINE (in general)	Upwardly compatible: • [7.1 VM66249] New message variations: HCP6706E. • Also see specific DEFINE commands listed below. • [7.1 VM66266] New operand: CRYPTO.
DEFINE CHPID / PATH	Upwardly compatible: • [7.3 VM66823, 7.4 VM66824] New CHPID type options: COUPLING_OVER_ROCE_25G and CL6; OSA_Hybrid and OSH. Updated CHPID type options: AID <i>nnnn</i>; PORT <i>nn</i>; CSYSstem <i>csysname</i>; NETID <i>id</i> and NETID *; SHARED.
DEFINE CPU	Upwardly compatible: • [7.1] Removed message: HCP1468E.
DEFINE CRYPTO	Upwardly compatible: • [7.1 VM66266] Command updated and documentation added.
DEFINE DIAGNOSE	Upwardly compatible: • [7.2 VM66201] The command supports z/XC virtual machines.
DEFINE HYPERPAVALIAS	Upwardly compatible: • [7.1 VM66249] New operand: AS. New variable: <i>vdev1-vdev2</i>.
DEFINE LAN	Upwardly compatible: • [7.3 VM66878, 7.4 VM66877] Support for EQDIO simulated adapters is documented in the usage notes and in the TYPE QDIO and the IP ETHERNET operands.
DEFINE MDISK	Upwardly compatible: • [7.2] Updated messages: HCP101E, HCP102E, HCP103E, HCP104E, HCP105E, HCP106E. • [7.3] A new note was added under "Authorization".
DEFINE MEMORY	Upwardly compatible: • [7.5] New, preferred alias for the DEFINE STORAGE command.

Table 8. Changes to CP Commands (continued)

Command	Changes
DEFINE NIC	Upwardly compatible: • [7.3 VM66878, 7.4 VM66877] New NIC TYPE value: EQDIO. Support for EQDIO simulated adapters is documented in the DEVICES operand and in usage notes.
DEFINE PAVALIAS	Upwardly compatible: • [7.1 VM66249] New operand: AS. New variable: <i>vdev1-vdev2</i>.
DEFINE PCIFUNCTION	Upwardly compatible: • [7.2 VM66532] Usage note is updated to indicate support for RoCE Express 3 PCI functions. • [7.3 VM66823, 7.4 VM66824] New options: TYPE NETH; PROMiscuous_mode; TYPE NETD and TYPE PAIA; PHYSical.
DEFINE RELODOMAIN	Upwardly compatible: • [7.3] Updated message: HCP003E.
DEFINE RESPOOL	Upwardly compatible: • [7.5] STORage option is deprecated in favor of Memory option. New operands EXEMPT, REFerence, RESident; new message HCP1001E.
DEFINE STORAGE	Upwardly compatible: • [7.2 VM66173] New operands: INCREMENT, INITIAL, MAXIMUM, STANDBY REMAINDER. Updated operands: AS, RESERVED, STANDBY <i>size, size</i>. New and updated usage notes and responses. Updated messages: HCP094E, HCP099E. • [7.5] New message HCP991I, new message variation HCP094E. • [7.5] The DEFINE STORAGE alias is deprecated. The preferred alias is DEFINE MEMORY.
DEFINE TIMEZONE	Upwardly compatible: • [7.3] The <i>zoneid</i> operand can be up to 4 characters long.
DEFINE VSWITCH	Upwardly compatible: • [7.1 VM66219] New operand: PRIQUEUEING. • [7.1 VM66219] New message: HCP3230I. Updated message: HCP2838I. • [7.3 VM66823, 7.4 VM66824] Updated operand QUEUESTORAGE. New message HCP3226E. Updated description and usage notes for EQDIO devices. • [7.3 VM66878, 7.4 VM66877] Support for EQDIO simulated adapters is documented in the TYPE QDIO operand and in usage notes. • [7.5] QUEuestorage operand is deprecated in favor of QUEUEMemory operand.
DEFSYS	Upwardly compatible: • [7.2 VM66201] The command supports z/XC virtual machines.

Table 8. Changes to CP Commands (continued)

Command	Changes
DELETE EDEVICE	Upwardly compatible: • [7.2] <i>rdev</i>, <i>rdev1-rdev2</i> updated to support 4- and 5-digit hexadecimal numbers. Added message HCP009E. • [7.3] New variations of message HCP8704E. Updated usage notes.
DELETE RDEVICE	Upwardly compatible: • [7.2] <i>rdev</i>, <i>rdev1-rdev2</i> updated to support 4- and 5-digit hexadecimal numbers. Added message HCP009E.
DELETE RESPOOL	Upwardly compatible: • [7.5] CPUPOOL option is deprecated in favor of RESPOOL option.
DETACH (in general)	Upwardly compatible: • [7.1] Removed messages: HCP890E, HCP892E. • Also see specific DETACH commands listed below. • [7.1 VM66266] New operand: CRYPTO.
DETACH CRYPTO	Upwardly compatible: • [7.1 VM66266] Command updated and documentation added. • [7.4 VM66891] New usage note.
DISPLAY (Guest Storage - ESA/XC, z/XC)	Upwardly compatible: • [7.2 VM66201] The command supports z/XC virtual machines.
DISPLAY (Registers)	Upwardly compatible: • [7.2 VM66201] The command supports z/XC virtual machines.
DISPLAY PSW	Upwardly compatible: • [7.2 VM66201] The command supports z/XC virtual machines.
DISPLAY PSWG	Upwardly compatible: • [7.2 VM66201] The command supports z/XC virtual machines.
DRAIN (Disk)	Upwardly compatible: • [7.4 VM66891] New PAGE options: PASSIVE, ACTIVE. New usage notes. Updated response. New messages: HCP6891I, HCP6893I.
DUMP (in general)	Upwardly compatible: • [7.2 VM66201] Updated message: HCP6150E.
DUMP ESA/XC Storage	See DUMP (Guest Storage - ESA/XC, z/XC)
DUMP (Guest Storage - ESA/XC, z/XC)	Upwardly compatible: • [7.2 VM66201] The command supports z/XC virtual machines.
DUMP PSW	Upwardly compatible: • [7.2 VM66201] The command supports z/XC virtual machines.

Table 8. Changes to CP Commands (continued)

Command	Changes
DUMP PSWG	Upwardly compatible: • [7.2 VM66201] The command supports z/XC virtual machines.
DUMP (Registers)	Upwardly compatible: • [7.2 VM66201] The command supports z/XC virtual machines. • [7.2 VM66532] The command supports the new BEAR operand.
FLASHCOPY	Upwardly compatible: • [7.2 VM66433] New operands: PRESERVEMIRROR, NOPRESERVEMIRROR. New message: HCP2471E. New message variation: HCP3201E.
FLASHCOPY ESTABLISH	Upwardly compatible: • [7.2 VM66433] New operands: PRESERVEMIRROR, NOPRESERVEMIRROR. New message: HCP2471E. New message variation: HCP3201E.
HYPERSWAP	Upwardly compatible: • [7.2] <i>rdev</i>, <i>rdev.numDevs</i>, and <i>sourceRdev</i> updated to support 4- and 5-digit hexadecimal numbers. • [7.2 7.3 VM66798, 7.4 VM66819] New message: HCP6434I. • [7.5] New operand CHECK. New responses; new messages HCP6435E, HCP6436E, HCP6437E, HCP6438E, HCP6439E, HCP6440I; updated usage note.
INDICATE LOAD	Upwardly compatible: • [7.1] The responses are updated to display a 4-digit processor count. Also, references to dedicated processors are removed.
INDICATE MULTITHREAD	Upwardly compatible: • [7.5] Updated response.
INDICATE PAGING	Upwardly compatible: • [7.3 VM66673] New response and example to indicate a user ID logging off and in the process of releasing its memory.
INDICATE USER	INCOMPATIBLE: Upwardly compatible: • [7.3 VM66434] New SECUREIPL information in response.
IOEXPLOR	Upwardly compatible: • [7.3] New output field for Storage Class: Tier 1 or 2 Flash.

Table 8. Changes to CP Commands (continued)

Command	Changes
IPL	Upwardly compatible: • [7.2 VM66201] The command supports z/XC virtual machines. • [7.3 VM66434] New operands: LOADDEV, DUMPDEV. New messages: HCP1612E, HCP1614E, HCP1615E, HCP1616E, HCP1617E. Updated messages: HCP2813E, HCP2815E. New usage note. • [7.3 VM66727] Additional usage note added. • [7.4 VM66891] New variation of message HCP1713E. • [7.5] – New messages: HCP8508I, HCP8509I, HCP8510I, HCP8511I, HCP8511E, HCP8512I, HCP8512E, HCP8513I, HCP8513E, HCP8514I, HCP8515I, HCP8516I, HCP8522I, HCP8523I, HCP8523E, HCP8524I, HCP8524E, HCP8525I, HCP8525E, HCP8526I, HCP8526E. – Updated message: HCP955W. – New wait states: HCP8511W, HCP8512W, HCP8513W, HCP8522W, HCP8523W, HCP8525W, HCP8526W,
LINK	Upwardly compatible: • [7.2] Updated messages: HCP101E, HCP102E, HCP103E, HCP104E, HCP105E, HCP106E. • [7.2] New forms of responses that include ADJUNCT support.
LOCATE (in general)	INCOMPATIBLE: • See specific LOCATE commands listed below. Upwardly compatible: • Also see specific LOCATE commands listed below.
LOCATE RDEV	Upwardly compatible: • [7.2] <i>rdev</i>, <i>rdev1-rdev2</i> updated to support 4- and 5-digit hexadecimal numbers.
LOCATE VMDBK	Upwardly compatible: • [7.3 VM66673] New response and example to indicate a user ID logging off and in the process of releasing its memory.
LOGOFF	Upwardly compatible: • [7.3 VM66673] New usage note describing the processing for a user ID logging off and in the process of releasing its memory.

Table 8. Changes to CP Commands (continued)

Command	Changes
LOGON / LOGIN	Upwardly compatible: • [7.1] Removed messages: HCP890E, HCP892E. • [7.1 VM66324] New operand: FALLBack. • [7.2] Updated messages: HCP101E, HCP102E, HCP103E, HCP104E, HCP105E, HCP106E. • [7.2 VM66201] The command supports z/XC virtual machines. • [7.3 VM66434] New message HCP1615E. • [7.4] Updated format for service level response. • [7.5] Storage option is deprecated in favor of Memory option.
MONITOR (in general)	Upwardly compatible: • [7.4 VM66829] New messages: HCP6225I, HCP6232E, HCP6264I. New message variation: HCP6255I. • Also see specific MONITOR commands listed below.
MONITOR EVENT	Upwardly compatible: • [7.5] STORAge option is deprecated in favor of MEMOrY option.
MONITOR SAMPLE	Upwardly compatible: • [7.4 VM66829] New SUBINTERVAL option and usage notes. • [7.5]: – ENable STORAge option is deprecated in favor of ENable MEMOrY option. – DISable STORAge option is deprecated in favor of DISable MEMOrY option. – SUBINTerval STORAge option is deprecated in favor of SUBINTerval MEMOrY option.
OVERCOMMIT	Upwardly compatible: • [7.5] New command to set or change memory overcommitment checking parameters.
QUERY (in general)	Upwardly compatible: • [7.2 VM66469] New operand and associated responses: DEVICES. • [7.3 VM66850, 7.4 VM66844] New operand and associated responses: FACILITY. • [7.4 VM66877] New operand and associated response: LOGOFF. • Also see specific QUERY commands listed below.
QUERY ABEND	Upwardly compatible: • [7.4 VM66877] New operand: HISTORY. Updated purpose, responses, examples. • [7.5] Updated response.

Table 8. Changes to CP Commands (continued)

Command	Changes
QUERY ALL	Upwardly compatible: • [7.1] Responses no longer show a tape assigned as a system dump device.
QUERY ALLOC	Upwardly compatible: • [7.4 VM66891] Updated responses to indicate whether a page volume is being actively drained.
QUERY BYUSER	Upwardly compatible: • [7.1] Added support for class B users.
QUERY CHPID	INCOMPATIBLE: • [7.2] Output includes an extra blank when the query response contains a 4-digit device. Upwardly compatible: • [7.2] New operand and associated responses: SS. • [7.3 VM66823, 7.4 VM66824] Support for new TYPE operands OSH and CL6.
QUERY CONTROLLER	Upwardly compatible: • [7.1 VM66219] New operand: PRIQUEUING. • [7.1 VM66219] Removed NO_ENSEMBLE and NO_INMN. • [7.3 VM66823, 7.4 VM66824] New responses.
QUERY CPLEVEL	Upwardly compatible: • [7.4] Updated format for service level response. • [7.5] Response contains changed values for the new product level. • [7.5] New operand: SECURITY. New messages: HCP002E, HCP8512I, HCP8515I, HCP8522I. New response.
QUERY CLOAD	Upwardly compatible: • [7.5] New operands: SECURITY, IPLMSGs. New messages: HCP8510I, HCP8511I, HCP8511E, HCP8513I, HCP8514I, HCP8515I, HCP8516I, HCP8522I, HCP8526I. New responses.
QUERY CPSERVICE	INCOMPATIBLE: • [7.5] Starting with z/VM release 7.5, IBM-provided CLOAD MODULEs do not include APAR, PTF or local modification metadata that can be queried using the QUERY CPSERVICE command. Upwardly compatible: • [7.5] New usage note, updated response.

Table 8. Changes to CP Commands (continued)

Command	Changes
QUERY CRYPTO	Upwardly compatible: • [7.1 VM66248] Response updated with new AP types for Crypto Express7S: CEX7A, CEX7C, and CEX7S. • [7.1 VM66266] Usage notes, responses, descriptions updated for Dynamic Crypto support. • [7.2 VM66532] Response is updated with new AP types for Crypto Express8S: CEX8A, CEX8C, CEX8P. • [7.2 VM66534] New operand APVIRTual POLLing and associated responses. • [7.4 VM66891] New operand ACCESS. New syntax notes. New and updated usage notes. New and updated responses.
QUERY DASD	Upwardly compatible: • [7.2] <i>rdev</i>, <i>rdev1-rdev2</i> updated to support 4- and 5-digit hexadecimal numbers. • [7.3 VM66746] Removal of usage note and response regarding I/O restrictions when QUICKDSP is set on. • [7.4 VM66891] Responses are updated for the following: – QUERY DASD DRAINING, to indicate whether a page volume is being actively drained – QUERY DASD SPACE-EFFICIENT, to include the capability level ("phase") – QUERY DASD DETAILS, to include the z/VM system name and the SSI name.
QUERY DUMP	INCOMPATIBLE: • [7.1] This command no longer supports the XF operand. Upwardly compatible: • [7.1] Responses have been updated to show the new FRMTBL and PGMBKS settings.
QUERY DUMPDEV	INCOMPATIBLE: • [7.3] New first line in response. Upwardly compatible: • [7.3 VM66434] Responses contain additional information. • [7.3 VM66727] Responses contain additional information.
QUERY DYNAMIC_I/O	Upwardly compatible: • [7.5] STORage option is deprecated in favor of MEMory option.

Table 8. Changes to CP Commands (continued)

Command	Changes
QUERY EDEVICE	INCOMPATIBLE: • [7.2] Output includes an extra blank when the query response contains a 4-digit device. Upwardly compatible: • [7.2] <i>rdev</i>, <i>rdev1-rdev2</i> updated to support 4- and 5-digit hexadecimal numbers. • [7.2 VM66507] New operand and associated usage notes and response: PATHINFO. • [7.3] New usage notes and responses. • [7.5] STORAge option is deprecated in favor of MEMory option.
QUERY EQID	INCOMPATIBLE: • [7.2] Output includes an extra blank when the query response contains a 4-digit device. Upwardly compatible: • [7.2] <i>rdev</i>, <i>rdev1-rdev2</i> updated to support 4- and 5-digit hexadecimal numbers. Added message HCP009E.
QUERY FCP	Upwardly compatible: • [7.1 VM66242] New ENCRYPTION_STATUS operand. Two new responses. Updated message: HCP6004E.
QUERY FRAMES	Upwardly compatible: • [7.2 VM66173] Additional information returned in responses. Updated usage note. • [7.5]: – LogicalFreeStorage response is deprecated in favor of LogicalFreeMemory response. – RealFreeStorage response is deprecated in favor of RealFreeMemory response.
QUERY HYPERSWAP	INCOMPATIBLE: • [7.2] Output includes an extra blank when the query response contains a 4-digit device. Upwardly compatible: • [7.2] <i>rdev</i>, <i>rdev.numDevs</i> updated to support 4- and 5-digit hexadecimal numbers. Updated response 3. • [7.5] New response HYPERPAV_1END.
QUERY IO_OPT	Upwardly compatible: • [7.5] New response.
QUERY IPLPARMS	Upwardly compatible: • [7.5] New operand INITIAL. New message HCP002E. Updated responses.

Table 8. Changes to CP Commands (continued)

Command	Changes
QUERY LAN	Upwardly compatible: • [7.1 VM66219] Updated Purpose and operand descriptions. • [7.1 VM66219] Updated examples to show PQUPLINKTX. • [7.2 VM66485] Updated examples to show Unicast IP address count. • [7.3 VM66878, 7.4 VM66877] Added LAN type EQDIO as a possible response.
QUERY LINKS	Upwardly compatible: • [7.2] Updated response to show ADJUNCT.
QUERY LOADDEV	INCOMPATIBLE: • [7.3] New first line in response. Upwardly compatible: • [7.3 VM66434] Responses contain additional information. • [7.3 VM66727] Responses contain additional information.
QUERY MEMEXEMPT	Upwardly compatible: • [7.5] New, preferred alias for the QUERY STGEXEMPT command.
QUERY MEMLIMIT	Upwardly compatible: • [7.5] New, preferred alias for the QUERY STGLIMIT command.
QUERY MEMORY	Upwardly compatible: • [7.5] New, preferred alias for the QUERY STORAGE command. QUERY MEMORY usage notes are updated to indicate that 6G of PERM memory is required before RECONFIG memory may be defined.
QUERY MONITOR	Upwardly compatible: • [7.3 VM66452] Updated response for QUERY MONITOR SAMPLE to indicate the date and time of the next sample. • [7.4 VM66829] New SUBINTERVAL option and responses.
QUERY MSS	Upwardly compatible: • [7.2] Updated usage notes and responses.
QUERY MULTITHREAD	Upwardly compatible: • [7.5] Updated INITIAL operand, usage notes, and responses.
QUERY NAMES	Upwardly compatible: • [7.3 VM66673] New response to indicate a user ID logging off and in the process of releasing its memory.
QUERY NSS	Upwardly compatible: • [7.2 VM66201] The command supports z/XC virtual machines.

Table 8. Changes to CP Commands (continued)

Command	Changes
QUERY OSA	Upwardly compatible: • [7.3 VM66823, 7.4 VM66824] New TYPE option: OSH.
QUERY OSAINFO	Upwardly compatible: • [7.3 VM66823, 7.4 VM66824] New variation of QUERY command to obtain information about an EQDIO device that is connected to a VSwitch.
QUERY OVERCOMMIT	Upwardly compatible: • [7.5] New command to display the memory overcommitment checking settings and current projected memory and paging space use for the z/VM system or the projected memory and paging space use for a specific virtual machine.
QUERY PAGING	INCOMPATIBLE: • [7.2] Removed IPL parameter: PAGING63. Upwardly compatible: • [7.2 VM66173] New and updated usage notes. New information returned in responses. • [7.4 VM66891] New usage note. Updated responses.
QUERY PATHS	INCOMPATIBLE: • [7.2] Output includes an extra blank when the query response contains a 4-digit device. Upwardly compatible: • [7.1 VM66242] Updated response to identify the channel paths are enabled for encryption and authentication. • [7.2] <i>rdev</i>, <i>rdev1-rdev2</i> updated to support 4- and 5-digit hexadecimal numbers.
QUERY PCIFUNCTION	Upwardly compatible: • [7.1 VM66180] Updated response to include NVME in the TYPE field. • [7.2 VM66532] Updated response to include RoCE Express 3 adapter. • [7.3] New ATTACH operand: SYSTEM. New detail response that describes the health and configuration of an NVMe PCIe-function emulated device. • [7.3 VM66823, 7.4 VM66824] Updated response to include NETH, NETD, and PAIA in the TYPE field.
QUERY PROCESSORS	Upwardly compatible: • [7.1] Displayed processor address increased to 4 digits. Also, references to dedicated processors removed from response. • [7.1 VM66265] Updated usage notes.

Table 8. Changes to CP Commands (continued)

Command	Changes
QUERY (Real Device)	INCOMPATIBLE: • [7.2] Output includes an extra blank when the query response contains a 4-digit device. Upwardly compatible: • [7.1] Responses no longer show a tape assigned as a system dump device. • [7.2] <i>rdev</i>, <i>rdev1-rdev2</i> updated to support 4- and 5-digit hexadecimal numbers.
QUERY RECORDING	Upwardly compatible: • [7.4] Updated usage notes describing change in command output based on corresponding changes made to the recording command.
QUERY RESPOOL	Upwardly compatible: • [7.5] CPUPool option is deprecated in favor of RESPOOL. Updated responses.
QUERY SCMBKS	Upwardly compatible: • [7.5] Updated note.
QUERY SCPID;	Upwardly compatible: • [7.3] New command to display identification information of guest operating systems. • [7.5] TYPE OStype accepts new value MVSSADMP. Updated responses; output reflects the semantic version format.
QUERY SET	Upwardly compatible: • [7.2 VM66201] The command supports z/XC virtual machines.
QUERY SHARE	Upwardly compatible: • [7.1] References to dedicated processors removed from response.
QUERY SRM	Upwardly compatible: • [7.1] Responses are updated to display the expanded 5-digit CPUAD setting. • [7.3 VM66678] New operand and associated response: WARNINGTRACK. Updated operand and associated response: ALL.
QUERY SSI	Upwardly compatible: • [7.3] New operands: CONTROLS, SSI_CONTROLS. New usage note. New and updated responses.
QUERY STORAGE	Upwardly compatible: • [7.2 VM66173] New operands: IPL, RECONFIGURATION. New and updated usage notes and responses. New message: HCP003E. Messages HCP100E and HCP263E are no longer applicable. • [7.5] The QUERY STORAGE alias is deprecated. The preferred alias is QUERY MEMORY.

Table 8. Changes to CP Commands (continued)

Command	Changes
QUERY STGEXEMPT	Upwardly compatible: • [7.5] The QUERY STGEXEMPT alias is deprecated. The preferred alias is QUERY MEMEXEMPT.
QUERY STGLIMIT	Upwardly compatible: • [7.5] The QUERY STGLIMIT alias is deprecated. The preferred alias is QUERY MEMLIMIT.
QUERY SXSPAGES	Upwardly compatible: • [7.1] New usage note: Trace pages associated with trace frames are in system execution space (SXS) and backed by a below-2GB-frame. • [7.5] Free Storage references are changed to FreeMemory.
QUERY SXSMEMORY	Upwardly compatible: • [7.5] New, preferred alias for the SXSSTORAGE command.
QUERY SXSSTORAGE	Upwardly compatible: • [7.2 VM66173] New information returned in response. Updated usage note. • [7.5] The QUERY SXSSTORAGE alias is deprecated. The preferred alias is QUERY SXSMEMORY.
QUERY TAPES	Upwardly compatible: • [7.1] Responses no longer show a tape assigned as a system dump device. • [7.4 VM66891] Response for QUERY TAPES DETAILS is enhanced to increase the LIBPORT field from one to two characters. • [7.4 VM66891] The width of LIBPORT response value is increased from one to two characters.
QUERY TERMINAL	Upwardly compatible: • [7.1 VM65715] New operands: PRECEDENCE SECUSER and PRECEDENCE STARMMSG.
QUERY TIME	Upwardly compatible: • [7.3] Updated response in support of four-character time zone identifiers.
QUERY TIMEZONES	Upwardly compatible: • [7.3] Updated operand description in support of four-character time zone identifiers
QUERY TRACE	Upwardly compatible: • [7.3 VM66823, 7.4 VM66824] Response note updated with transactional execution support information.

Table 8. Changes to CP Commands (continued)

Command	Changes
QUERY TRSOURCE	Upwardly compatible: • [7.4 VM66829] Updated explanation of the DEVICES response. • [7.5] Updated response.
QUERY VARIABLE	Responses can change when variables are added or changed. For a list of new function variables, see “New Function Variables” on page 2 and z/VM New Function Variable List (https://www.ibm.com/support/pages/zvm/newfunction/varlist.html).
QUERY VIRTUAL CPUS	Upwardly compatible: • [7.1] References to dedicated virtual CPUs are removed. • [7.2] New operand: ADJUNCT.
QUERY VIRTUAL CRYPTO	Upwardly compatible: • [7.1 VM66248] Responses are updated with new AP types for Crypto Express7S: CEX7A, CEX7C, and CEX7S. • [7.1 VM66266] Responses are updated for dynamic crypto support. • [7.2 VM66496] Responses add virtual crypto adapter number and type. • [7.2 VM66532] Responses are updated with new AP types for Crypto Express8S: CEX8A, CEX8C, and CEX8P. • [7.4 VM66891] New and updated responses.
QUERY VIRTUAL DASD	Upwardly compatible: • [7.3] HCP003E replaces HCP022E. Option DETAILS can be specified as DETAIL or DETAILS.
QUERY VIRTUAL MEMORY	Upwardly compatible: • [7.5] New, preferred alias for the QUERY VIRTUAL STORAGE command.
QUERY VIRTUAL NIC	Upwardly compatible: • [7.1 VM66219] Updated operand: DETAILS. • [7.1 VM66219] New operand: PQUPLINKTX. • [7.2 VM66485] Example updated to display IPv6 addresses for Layer 2 NICs under Unicast MAC Addresses. • [7.3 VM66878, 7.4 VM66877] Added virtual NIC type EQDIO in an example response.
QUERY VIRTUAL OSA	Upwardly compatible: • [7.3 VM66823, 7.4 VM66824] New responses for an EQDIO device.
QUERY VIRTUAL PCIFUNCTION	Upwardly compatible: • [7.1 VM66180] Updated response to include NVME in the TYPE field. • [7.2 VM66532] Updated response to include RoCE Express 3 adapter. • [7.2 VM66532] Updated response to include RoCE Express 3 adapter. • [7.3 VM66823, 7.4 VM66824] Updated response to include NETH, NETD, and PAIA in the TYPE field.

Table 8. Changes to CP Commands (continued)

Command	Changes
QUERY VIRTUAL STORAGE	Upwardly compatible: • [7.5] The QUERY VIRTUAL STORAGE alias is deprecated. The preferred alias is QUERY VIRTUAL MEMORY.
QUERY VSWITCH	Upwardly compatible: • [7.1 VM66219] New operands: PRIQUEUEING and PQUPLINKTX. Updated operand: DETAILS. • [7.2 VM66485] Examples were updated to show Unicast IP address count and IPv6 addresses under Unicast MAC addresses for Layer 2 VSwitches. Response was updated to show Unicast IP address count for Layer 2 and Layer 3 VSwitches. • [7.2 VM66557] Responses contain new information in the Bridge Port section to display the NIC distribution setting and optionally packet counters when NIC distribution is ON. The general Bridgeport attributes (MFS, Buffer Limits, Trace Pages and NIC distribution) are displayed for Inactive and Standby Bridgeports. • [7.3 VM66742] New error condition "VSWITCH CONNECT Required" for uplink and bridge port devices. New message HCP3233E. • [7.3 VM66823, 7.4 VM66824] New responses for OSH devices. • [7.3 VM66878, 7.4 VM66877] Added adapter type EQDIO as a possible response. • [7.5] Updated notes and responses referring to QueueMemory instead of deprecated QueueStorage.
RECORDING	Upwardly compatible: • [7.4] Updated usage notes describing change in command behavior. EREP logrec is now forced off for userids that are not in the user directory when VM tries to reestablish the previously saved states during a warm start IPL. This will show up in the QUERY RECORDING output.
SAVESYS	Upwardly compatible: • [7.2 VM66201] The command supports z/XC virtual machines. Updated message: HCP1368.
SET (in general)	Upwardly compatible: • [7.2 VM66534] The CRYPTO operand is reinstated. • [7.3] New operand and associated responses: PCIFUNCTION. • [7.3 VM66850, 7.4 VM66844] New operand and associated responses: FACILITY. • [7.4 VM66877] New operand and associated responses: LOGOFF. • [7.5] New operands: ESM and RACF. Note: Also see specific SET commands listed below.

Table 8. Changes to CP Commands (continued)

Command	Changes
SET ABEND	Upwardly compatible: • [7.4 VM66877] Updated purpose. New operand: LIMIT. Updated operands: SOFT, SOFT <i>aaannn</i>, SOFTONLY, SOFTONLY <i>aaannn</i>. New usage notes. Updated usage note. • [7.5] Default values are changed to SOFTONLY and LIMIT 10.
SET AGELIST	Upwardly compatible: • [7.2 VM66173] New usage note. Message HCP094E is no longer applicable.
SET CPTRACE	Upwardly compatible: • [7.3] New PCI trace codes: 1220, 1221, 1222. • [7.3 VM66823, 7.4 VM66824] New EQDIO trace codes: 1740-1748.
SET CRYPTO	Upwardly compatible: • [7.2 VM66534] The command is reinstated. The command controls whether crypto polling is on or off. New message: HCP1713E. • [7.3] The default value of the POLLING operand has been changed to OFF.
SET CU	Upwardly compatible: • [7.3] Updated usage note.
SET DUMP	Upwardly compatible: • [7.1] New operands and associated responses: FRMTBL and PGMBKS. • [7.1] Messages removed: HCP1105E, HCP1107E, HCP1851E, HCP1917E. • [7.3] New explanation for message HCP006E.
SET DUMPDEV	Upwardly compatible: • [7.3 VM66434] New operands: BOOTREC, DEVICE, ECKD, SECURE, NOSECURE. Updated usage note. New messages: HCP021E, HCP1613E. Updated messages: HCP2768E, HCP2813E, HCP6706E. • [7.3 VM66727] New operand: ALTERNATE. New usage note. New message: HCP1611E. New message variation for HCP2816I. • [7.3 VM66749] Updated operand descriptions: ALTERNATE, DEVICE, PORTNAME. Updated message HCP1611E.

Table 8. Changes to CP Commands (continued)

Command	Changes
SET EDEVICE	Upwardly compatible: • [7.2] <i>edev</i> updated to support 4- and 5-digit hexadecimal numbers. • [7.2 VM66420] <i>LUN</i> operand optional after specified on the first path. New message variation: HCP8703E. • [7.2 VM66507] New operand: PATHINFO. • [7.3] New TYPE FBA ATTRIBUTE for NVMe devices. • [7.3] New variations of messages: HCP040E, HCP377E, HCP8704E.
SET ENCRYPT	INCOMPATIBLE: • [7.2] Removed IPL parameter: PAGING63.
SET ESM	Upwardly compatible: • [7.5] New SET ESM command allows new CP Exits to be enabled, providing ESM functionality.
SET IO_OPT	Upwardly compatible: • [7.5] New option HYPERSWAP_HYPERPAV_1END.
SET IPLPARMS	INCOMPATIBLE: • [7.2] Removed IPL parameter: PAGING63 (usage note updated). Upwardly compatible: • [7.5] Added IPL parameter: NOESM.
SET LOADDEV	Upwardly compatible: • [7.3 VM66434] New operands: BOOTREC, DEVICE, ECKD, SECURE, NOSECURE. Updated usage notes. New messages HCP021E, HCP1613E. Updated messages HCP2768E, HCP2813E, HCP6706E. • [7.3 VM66727] New operand: ALTERNATE. New usage note. New messages: HCP769E, HCP1611E. New message variations for HCP796E and HCP2816I. • [7.3 VM66749] Updated operand descriptions: ALTERNATE, DEVICE, PORTNAME. Updated message HCP1611E. • [7.5] Updated usage note.
SET MACHINE	Upwardly compatible: • [7.2 VM66201] The command supports z/XC virtual machines.
SET MDCACHE	Upwardly compatible: • [7.5] Updated purpose, operands. • [7.5] SStorage option is deprecated in favor of MEMory option.

Table 8. Changes to CP Commands (continued)

Command	Changes
SET MEMEXEMPT	Upwardly compatible: • [7.5] New, preferred alias for the SET STGEXEMPT command.
SET MEMLIMIT	Upwardly compatible: • [7.5] New, preferred alias for the SET STGLIMIT command.
SET MEMORY	Upwardly compatible: • [7.5] New, preferred alias for the SET STORAGE command. • [7.5] Usage notes updated to indicate that 6G of PERM memory is required before RECONFIG memory may be defined. Updated message HCP2585E.
SET MULTITHREAD	Upwardly compatible: • [7.5] Updated INITIAL operand. Responses, message HCP1321E.
SET PAGEX	Upwardly compatible: • [7.2 VM66201] The command supports z/XC virtual machines.
SET PAGING	INCOMPATIBLE: • [7.2] Removed IPL parameter: PAGING63. Upwardly compatible: • [7.2 VM66173] New operand: WARNING. Updated operands: ALIAS, HPF. New usage notes. Updated response. Updated message: HCP1137E. • [7.4 VM66891] New operand: DRAINPROTECT. Updated response. Updated operand description: WARNING.
SET PCIFUNTION	Upwardly compatible: • [7.3] New command to reset or deconfigure a real PCI function or to report an error with the function to the Support Element.
SET PORT GROUP	Upwardly compatible: • [7.3 VM66823, 7.4 VM66824] Updated usage notes in support of EQDIO devices. New variation of message HCP2832E.
SET RACF	Upwardly compatible: • [7.5] New SET RACF command allows dynamic configuration of the RACF/VM feature.
SET RDEVICE DASD	Upwardly compatible: • [7.2] <i>rdev</i>, <i>rdev1-rdev2</i> updated to support 4- and 5-digit hexadecimal numbers.
SET RDEVICE Special Devices	Upwardly compatible: • [7.3 VM66823, 7.4 VM66824] New operand: TRACESIZE.

Table 8. Changes to CP Commands (continued)

Command	Changes
SET RESERVED	Upwardly compatible: • [7.2 VM66271] New recommendation regarding use of operand SYSMAX when a system has reconfigurable storage.
SET RESPOOL	Upwardly compatible: • [7.5] New operands MEMORY EXEMPT, NONEXEMPT, REFERENCE, RESIDENT. New usage notes, examples, and message HCP1001E. • [7.5]: – CPUPool option is deprecated in favor of RESPool option. – STORage is deprecated in favor of MEMory.
SET SHARE	Upwardly compatible: • [7.1] Reference to dedicated processors removed from response.
SET SRM	Upwardly compatible: • [7.1] CPUPAD operand setting and response expanded to 5 digits. Message HCP1050E removed. • [7.1 VM66265] Updated operand: CPUPAD. • [7.3 VM66678] New operand and associated response and usage notes: WARNINGTRACK. New message variation: HCP1050E. • [7.3 VM66823, 7.4 VM66824] Message added: HCP263E.
SET SSI	Upwardly compatible: • [7.3] Updated operand: SLOT. New usage note. Updated examples. New message: HCP6650E.
SET STGEXEMPT	Upwardly compatible: • [7.5] The SET STGEXEMPT alias is deprecated. The preferred alias is SET MEMEXEMPT.
SET STGLIMIT	Upwardly compatible: • [7.5] The SET STGLIMIT alias is deprecated. The preferred alias is SET MEMLIMIT.

Table 8. Changes to CP Commands (continued)

Command	Changes
SET STORAGE	Upwardly compatible: • New message: HCP1133I. • [7.1] New operand: PERMANENT • [7.2 VM66173] New HALT and RECONFIGURABLE operands and associated options. New usage notes and responses. New messages: HCP2580I, HCP2581I, HCP2582I, HCP2583I, HCP2584I, HCP2585E, HCP2586E, HCP2587E, HCP2588E, HCP2590E, HCP2591E, HCP2592I, HCP2593E, HCP2593I, HCP2594I, HCP2598E, HCP2599E. Updated messages: HCP025E, HCP100E, HCP1133I, HCP2579E. Deleted messages: HCP1134I, HCP1135E. • [7.2 VM66271] Updated operand size (and related message HCP2585E) to allow up to 50% of real memory to be reconfigurable storage. • [7.5] The SET STORAGE alias is deprecated. The preferred alias is SET MEMORY.
SET SVC76	Upwardly compatible: • [7.1 VM66248] New usage note: Linux does not use SVC76 to record hardware errors. Therefore, if the guest has explicitly identified itself to z/VM as running Linux, then the setting of this command is ignored and it is treated as if the setting is always VM.
SET TIMEZONE	Upwardly compatible: • [7.3] The <i>zoneid</i> operand can be up to four characters long
SET TRACEFRAMES	Upwardly compatible: • [7.1] New usage note: Trace pages associated with trace frames are in system execution space (SXS) and backed by a below-2GB-frame.
SET VMLAN	Upwardly compatible: • [7.1 VM66219] Updated operand: DNA DISABLE.
SET VSWITCH	Upwardly compatible: • [7.1 VM66219] New operands: PRIQUEUEING and PQUPLINKTX. • [7.1 VM66219] Updated messages: HCP2838I and HCP3022E. • [7.2 VM66557] New operand NICDISTRIBUTION. • [7.3 VM66823, 7.4 VM66824] Updated operand: QUEUESTORAGE. Updated description and usage notes for EQDIO devices. New message HCP3226E. • [7.5] QUEuestorage operand is deprecated in favor of QUEUEMemory operand.
SET VTOD	Upwardly compatible: • [7.2 VM66201] The command supports z/XC virtual machines. Removed message: HCP6152E. • [7.3] SYSTEM, DATE, and TIME options no longer require authorization by the TODENABLE operand of the OPTION directory statement.

Table 8. Changes to CP Commands (continued)

Command	Changes
SET 370ACCOM	Upwardly compatible: • [7.2 VM66201] The command supports z/XC virtual machines. Updated message: HCP2632E.
SNAPDUMP	Upwardly compatible: • [7.1] New operand: FRMTBL. • [7.1] Message HCP9269E removed. • [7.3] Updated usage note. • [7.5] Updated usage notes and messages HCP9265I and HCP9266I.
STORE (in general)	Upwardly compatible: • [7.2 VM66201] Updated message: HCP6150E. • Also see specific STORE commands listed below.
STORE (Guest Storage - ESA/XC, z/XC)	Upwardly compatible: • [7.2 VM66201] The command supports z/XC virtual machines.
STORE PSW	Upwardly compatible: • [7.2 VM66201] The command supports z/XC virtual machines.
STORE PSWA	Upwardly compatible: • [7.2 VM66201] The command supports z/XC virtual machines.
STORE PSWG	Upwardly compatible: • [7.2 VM66201] The command supports z/XC virtual machines.
STORE (Registers)	Upwardly compatible: • [7.2 VM66201] The command supports z/XC virtual machines.
STORE STATUS	Upwardly compatible: • [7.2 VM66532] The breaking-event-address register (BEAR) is stored at decimal address 4920 for a z/Architecture mode guest.
TERMINAL	New operand: PRECEDENCE.
TRACE (in general)	Upwardly compatible: • [7.2 VM66201] The command supports z/XC virtual machines. Updated messages: HCP6150E and HCP6159E. • Also see specific TRACE commands listed below. • [7.3] Updated usage notes for instruction mnemonics not supported by CP trace. • [7.3 VM66823, 7.4 VM66824] Command response descriptions updated with transactional execution support information.
TRACE <i>mnemonic1</i>	Upwardly compatible: • [7.2 VM66532] New mnemonics: LPSWEY, RDP.

Table 8. Changes to CP Commands (continued)

Command	Changes
TRACE <i>mnemonic2</i>	Upwardly compatible: • [7.3 VM66823, 7.4 VM66824] New mnemonics: ECPCQ, SCPCQ, STAI.
TRACE GG	Upwardly compatible: • [7.2 VM66201] The command supports z/XC virtual machines.
TRACE RESPONSE	Upwardly compatible: • [7.3] Updated information for instruction mnemonics not supported by CP trace.
TRACE STORE (ESA/390, z/Architecture)	Upwardly compatible: • [7.2 VM66201] The command supports z/XC virtual machines.
TRACE STORE (ESA/XC, z/XC)	Upwardly compatible: • [7.2 VM66201] The command supports z/XC virtual machines.
TRACE TXSUSPEND/ NOTXSUSPEND	Upwardly compatible: • [7.3 VM66823, 7.4 VM66824] Purpose updated with transactional execution support information.
TRSOURCE	Upwardly compatible: • [7.3 VM66823, 7.4 VM66824] Purpose updated with transactional execution support information.
TRSOURCE ID	INCOMPATIBLE: Upwardly compatible: • [7.3] Updated usage notes for instruction mnemonics not supported by CP trace. • [7.4 VM66829] Updated explanation of the DEVICE operand. • [7.5] New operands SNAP <i>limit</i>, THEN SNAP <i>limit</i>, ELSE SNAP <i>limit</i>. Updated examples and message HCP6160E.
UNDEDICATE	INCOMPATIBLE: • [7.1] This command has been removed.
VARY (in general)	INCOMPATIBLE: • See specific VARY commands listed below. Upwardly compatible: • Also see specific VARY commands listed below. • [7.1 VM66266] New operand: CRYPTO.
VARY CORE	INCOMPATIBLE: • [7.1] A processor cannot be dedicated to a user. Upwardly compatible: • [7.1] Processor address range updated to 0000-003F. • [7.1 VM66265] Processor address range updated to 0000-004F.

Table 8. Changes to CP Commands (continued)

Command	Changes
VARY CRYPTO	Upwardly compatible: • [7.4 VM66891] Updated explanation of the FORCE operand.
VARY PATH	Upwardly compatible: • [7.2] <i>rdev</i>, <i>rdev1-rdev2</i> updated to support 4- and 5-digit hexadecimal numbers. • [7.4 VM66891] New message: HCP1284I.
VARY PROCESSOR	INCOMPATIBLE: • [7.1] A processor cannot be dedicated to a user. Upwardly compatible: • Processor address range updated to 0000-003F. • [7.1 VM66265] Processor address range updated to 0000-004F.
VARY (Real Device)	Upwardly compatible: • [7.2] <i>rdev</i>, <i>rdev1-rdev2</i> updated to support 4- and 5-digit hexadecimal numbers. New message: HCP6297E.
VARY SUBCHANNEL	Upwardly compatible: • [7.2] <i>rdev</i>, <i>rdev1-rdev2</i> updated to support 4- and 5-digit hexadecimal numbers. New message: HCP009E. • [7.2 7.3 VM66798, 7.4 VM66819] New usage note about the VARY OFFLINE SUBCHANNEL command.
VMDUMP	Upwardly compatible: • [7.2 VM66201] The command supports z/XC virtual machines. Updated message: HCP6150E.
VMRELOCATE	Upwardly compatible: • [7.1] Removed message: HCP1967I. • [7.1 VM66219] Updated message: HCP1982I. • [7.2] New message: HCP1965I. • [7.2 VM66496] New usage note. • [7.3 VM66823, 7.4 VM66824] New message variation: HCP1995I. • [7.5] Updated operand descriptions, usage notes, response. FORCE STORAGE operand is deprecated in favor of FORCE MEMORY operand. New message HCP991I, updated message HCP1810I.
XAUTOLOG	Upwardly compatible: • [7.2 VM66201] The command supports z/XC virtual machines. • [7.5] New FORCE operand, new message HCP991I, updated messages HCP059E, HCP1509E. Storage <i>nu</i> operand is deprecated in favor of Memory <i>nu</i> operand.

CP Utilities

Table 9 on page 135 lists CP utilities that have changed. For additional information see [z/VM: CP Commands and Utilities Reference](#).

Table 9. Changes to CP Utilities

Utility	Changes
CPEREPXA	[7.4] Removed.
CPFMTXA	Upwardly compatible: • [7.1 VM66263] Operand descriptions updated indicating seven decimal digits are supported; updated usage notes. • [7.1 VM66288] New ERASE and NOMSG operands, and new messages HCP6211E, HCP6212E, HCP6213E, and HCP8612E. The NOMSG operand requires ICKDSF APAR PH14249. • [7.3 VM66675] New operands. Updated usage note defining devices that cannot reside above 64GB. Adds the ability to accept FBA allocations specified in factors of megabytes, gigabytes, and terabytes.
CPSYNTAX	Upwardly compatible: • [7.2] New message: HCP6706E. • [7.2 VM66173] New message: HCP2585E.
DIRECTXA	Upwardly compatible: • [7.1 VM66219] Updated message: HCP1882E. • [7.3] New messages: HCP677E, HCP678E. Deleted message: HCP495E. • [7.4] Deleted messages: HCP796E, HCP1798E.
DUMPLD2	INCOMPATIBLE: • [7.1] The TAPE operand has been removed. Various messages related to dumping to tape have been removed. • [7.2] Updated so that if the dump spool file is processed, it will be in USER HOLD after DUMPLD2 completes. In the past, the final HOLD status of the file was dependent on the KEEP setting of the spool file. This update makes the behavior of DUMPLD2 consistent with that of DUMpload. Upwardly compatible: • [7.2 VM66560] New and updated message variations: HCP8243I.
DUMpload	INCOMPATIBLE: • [7.1] The TAPE operand has been removed. Various messages related to dumping to tape have been removed. Upwardly compatible: • [7.2 VM66430] New option: DISTILL. New messages: HCP8186I, HCP8187I, and HCP8188I. • [7.2 VM66560] New message variation: HCP8169I
HCPLDR	Upwardly compatible: • [7.5] Response contains changed value for the new release level.

Table 9. Changes to CP Utilities (continued)

Utility	Changes
HCPSADMP	INCOMPATIBLE: • [7.1] Utility removed.
IOCP	Upwardly compatible: • [7.3 VM66423] Parameters DYN and NODYN no longer have an effect.
IOEXPLOR	Upwardly compatible: • [7.2] <i>rdev</i>, <i>rdev1-rdev2</i> updated to support 4- and 5-digit hexadecimal numbers.
MIGR51D	Upwardly compatible: • [7.3] New usage notes. New messages: IUG8990I, IUG8991W, IUG8992E. Updated messages: IUG8431E, IUG8463E, IUG8477E, IUG8478R, IUG8480E, IUG8481I, IUG8499E. • [7.4] New usage note. New message: IUG8479R.
MONWRITE	Upwardly compatible: • [7.2] The <i>bndy</i> operand description is updated. Added usage note about <i>bndy</i> interval. • [7.3 VM66726] The <i>filemode</i> and CLOSE operands can be used together. The monitor file name and file type can be specified by using equals sign (=), which indicates the default value. A new example has been added. • [7.4 VM66829] New SUBINT option.
MOVE2SFS	Upwardly compatible: • [7.4] The VMHCD parameter has been removed.
SALIPL	Upwardly compatible: • [7.2] <i>rdev</i> updated to support 4- and 5-digit hexadecimal numbers. • [7.5] New operand EXTRACT. New messages HCP8502E, HCP8504E.
SCSIDISC	Upwardly compatible: • [7.3 VM66654] New options: ERRORS, DIAG, NOLOG, NOTERM. Two new usage notes. Updated messages: – HCP974E: Two new message variations. – HCP975I: Updated user response in one message variation.

Table 9. Changes to CP Utilities (continued)

Utility	Changes
SDINST	INCOMPATIBLE: • [7.3 VM66677] The user running the SDINST utility must have at least 512 MB of storage, not 256 MB. Upwardly compatible: • [7.1] Renamed image files for the new release: SADU71, SSPK71, SSPJ71, SSPP71. • [7.2] Renamed image files for the new release: SADU72, SSPK72, SSPJ72, SSPP72. • [7.2 VM66201] Updated message: HCP8648E. • [7.3] Renamed image files for the new release: SADU73, SSPK73, SSPJ73, SSPP73. New and updated usage notes. • [7.4] Renamed image files for the new release: SADU74, SSPK74, SSPJ74, SSPP74.
TRACERD	Upwardly compatible: • [7.1] SELECT operand: The processor address range for the CPU keyword is updated to: X'0000' to X'003F'. • [7.1 VM66265] The processor address range for the CPU keyword is updated to: X'0000' to X'004F'. • [7.4 VM66829] New and changed responses.

Dynamic I/O Return Codes

Table 10 on page 137 lists dynamic I/O return codes that have changed. For additional information, see [z/VM: I/O Configuration](#).

Table 10. Changes to Dynamic I/O Return Codes

Return Code	Changes
0130	Upwardly compatible: • [7.3 VM66823, 7.4 VM66824] Issued if you tried to define a coupling-over channel path, but the specified adapter identifier or port number was invalid, unrecognized, or not available for use.
0131	Upwardly compatible: • [7.3 VM66823, 7.4 VM66824] Issued if you tried to define the second path of a pair of coupling-over channel paths, but the peer-path information on the command did not refer back to the first path.
0132	Upwardly compatible: • [7.3 VM66823, 7.4 VM66824] Issued if you tried to add a coupling-over channel path, but the specified peer-path was not appropriate.
0134	Upwardly compatible: • [7.3 VM66823, 7.4 VM66824] Issued if you tried to define a coupling-over channel path, but the addition of the specified channel would exceed the maximum number allowed or would exceed the channel subsystem's resource limit.

Table 10. Changes to Dynamic I/O Return Codes (continued)

Return Code	Changes
0135	Upwardly compatible: • [7.3 VM66823, 7.4 VM66824] Issued if you tried to define a coupling-over channel path, but the specified system name was invalid.
0321	Upwardly compatible: • [7.3 VM66823, 7.4 VM66824] Issued if you tried to define an internal-queued direct-communication (IQD) channel path, and a NETID was specified that is already associated to a different IQD channel path.

DIAGNOSE Codes

Changes to DIAGNOSE codes are identified in the following topic:

- [“DIAGNOSE Codes for Customer Use” on page 138](#)

DIAGNOSE Codes for Customer Use

Table 11 on page 138 lists DIAGNOSE codes for customer use that have changed. For additional information, see *z/VM: CP Programming Services*.

Table 11. Changes to DIAGNOSE Codes

Code	Changes
X'00' Storage Extended Identification Code	Upwardly compatible: • [7.5] Licensed program bit map field of the extended-identification code bit map contains a changed value for the new product level. • [7.5] Release information field of the extended-identification code bit map contains the new release level.
X'14' Input Spool File Manipulation	Upwardly compatible: • [7.3] The SFBORIGM field is added to the Spool File Control Block (SFBLOK) to hold the slot number of the originating system.
X'84' Directory Update-in-Place	Incompatible: • [7.4] Deleted CRYPTO/NOCRYPTO options from the CPU operation.
X'D8' Read Spool File Blocks on System Queues	Upwardly compatible: • [7.2 VM66479] – DIAGNOSE code X'D8' is now able to return a bitmap indicating which CP-owned volumes contain at least one page of a designated spool file. – The input parameter list includes a new field: DD8PBMSZ, which is the size of a guest buffer area, in doublewords, to hold the bitmap. – The system data queue is added as an option to the DD8PTYPE field. • [7.3] The SFBORIGM field is added to the Spool File Control Block (SFBLOK) to hold the slot number of the originating system.

Table 11. Changes to DIAGNOSE Codes (continued)

Code	Changes
X'26C' Access Certain System Information	Upwardly compatible: • [7.1] Updated privilege class to add support for class B users. • [7.1 VM66219] Virtual Switch Priority Queuing support. Updated subcodes: X'00000010', X'00000020', and X'00000024'. • [7.2 VM66485] IPv6 Layer 2 Query Support. Updated subcode X'00000024' to return IPv6 addresses for Layer 2 guests. • [7.2 VM66557] Updated subcodes X'00000020' and X'00000024' to include NIC distribution information. • [7.3 VM66823, 7.4 VM66824] Updated subcodes X'00000010' and X'00000020' to include EQDIO information. • [7.3 VM66878, 7.4 VM66877] Updated subcode X'00000024' to include EQDIO vNIC information.
X'2FC' Obtain Certain Guest Performance Data	Upwardly compatible: • [7.1] Bit 28 of guest flags field in the response changed to reserved.

STHYI Instruction

Table 12 on page 139 identifies fields in the STHYI instruction function code response buffers that have changed. For additional information, see [z/VM: CP Programming Services](#).

Table 12. Changes to the STHYI Instruction Function Code Response Buffers

Response Buffer	Changes
X'0000' CPU Capacity Partition Section	Upwardly compatible: • [7.1 VM66329] STHYI support for z/OS zCX containers: – INFPVAL1 will contain flag x'02' (INFPZIIPV) to indicate zIIP configuration information is reported. – New INFPSZIIP and INFPDZIIP fields report the number of shared and dedicated logical zIIP cores available to the partition. – New INFPWBZIIP field contains the capacity cap for zIIP CPU type when the partition is capped at its entitlement. – New NFPABZIIP field contains the capacity cap when an absolute capacity cap is in place for the partition for the zIIP CPU type. – New INFPLGZIIP field contains absolute capacity value for zIIP CPU type when LPAR group absolute capacity capping is enabled.

Table 12. Changes to the STHYI Instruction Function Code Response Buffers (continued)

Response Buffer	Changes
X'0000' CPU Capacity Hypervisor Section	Upwardly compatible: • [7.1] Fields INFYDCPS and INFYDIFL: Deprecated on z/VM 7.1.0. • [7.1 VM66329] STHYI support for z/OS zCX containers: – INFYVAL1 will contain flag x'80' (INFYZIIPV) to indicate zIIP configuration information is reported. – INFYTYPE has new values of x'02' (INFYTKVM) and x'03' (INFYTZCX) defined for use by KVM and zCX hypervisors. – New INFYSZIIP field reports the number of zIIP cores shared by non-dedicated zIIP-dispatched virtual CPUs of this hypervisor. – New INFYZIIPT field will report the number of threads in use per zIIP core. z/VM does not support multithreaded zIIP cores so this number will always be reported as 1.
X'0000' CPU Capacity Guest Section	Upwardly compatible: • [7.1] Fields INFGDCPS and INFGDIFL: Deprecated on z/VM 7.1.0. • [7.1 VM66329] STHYI support for z/OS zCX containers: – INFGFLG1 has new flags of x'02' (INFGZIIPH) to indicate that the zIIP dispatch type has a LIMITHARD cap, and x'01' (INFGVZIIPT) to indicate whether virtual zIIP CPUs are thread dispatched. – INFGVAL1 will contain flag x'80' (INFGZIIPV) to indicate zIIP configuration information is reported. – INFGPFLG has new flags of x'04' (INFGPZLH) to indicate that the resource pool has a LIMITHARD cap for zIIPs and x'02' (INFGPZPC) to indicate that the resource pool has a CAPACITY cap for zIIPs. – New INFGSZIIP field reports the number of guest virtual zIIPs. – New INFGZIIPDT field to indicate the virtual zIIP dispatch type. – New INFGZIIPCC field reports the capped capacity for zIIP-dispatched vCPUs. – New INFGPZCC field reports the resource pool capped capacity for virtual zIIPs.

Accounting Records

Table 13 on page 140 lists accounting records that have changed. For additional information, see [z/VM: CP Planning and Administration](#).

Table 13. Changes to Accounting Records

Accounting Record	Changes
Virtual Machine Resource Usage (Type 1)	Upwardly compatible: • [7.2] Column 79 updated for record pertaining to adjunct configuration.
Dedicated Devices (Type 2)	Upwardly compatible: • [7.2] Column 79 updated for record pertaining to adjunct configuration.

Table 13. Changes to Accounting Records (continued)

Accounting Record	Changes
Temporary Disk Space (Type 3)	Upwardly compatible: • [7.2] Column 79 updated for record pertaining to adjunct configuration.
Virtual Disk in Storage Space (Type B)	Upwardly compatible: • [7.2] Column 79 updated for record pertaining to adjunct configuration.
Network Data Transmissions (Type C)	Upwardly compatible: • [7.2] Column 79 updated for record pertaining to adjunct configuration.
Virtual Machine Resource Usage 2 (Type F)	Upwardly compatible: • [7.2] Column 79 updated for record pertaining to adjunct configuration.

CP System Services

Table 14 on page 141 lists CP system services that have changed. For more information, see [z/VM: CP Programming Services](#).

Table 14. Changes to CP System Services

System Service	Changes
*SPL Spool System Service	Upwardly compatible: • [7.2 VM66479] The SPGQUEUE field of the parameter list (SPGBK) can be set to a new value, SPGSDF, to designate that the System Data File (NSS/DCSS, UCR, IMG, NLS, and TRF files) queue is to be processed via the generic *SPL interface. • [7.3] The SFBORIGM field is added to the Spool File Control Block (SFBLOK) to hold the slot number of the originating system.
*VMEVENT VM Event System Service	Upwardly compatible: • [7.3 VM66679] New logon-by and terminal information for Type 0 events. New 32-bit timeout interval information for Type 3 events. • [7.5] A VM Event is generated when memory overcommitment is detected.

VM Dump Tool

Table 15 on page 141 lists VM Dump Tool functions that have changed. For additional information, see [z/VM: VM Dump Tool](#).

Table 15. Changes to VM Dump Tool Command, Subcommands, and Macros

Function	Changes
BLOCK macro	Upwardly compatible: • [7.3] Displacement and display length values can be up to four characters long.
BREG subcommand	• [7.2 VM66532] New BREG subcommand.

Table 15. Changes to VM Dump Tool Command, Subcommands, and Macros (continued)

Function	Changes
CPEXITS macro	Upwardly compatible: • [7.5] Updated operand: DETAILS. Updated example.
DUMPTYPE subcommand	• [7.2 VM66560] New response for the case that the dump contains no CP storage. New messages: HCQ167E, HCQ168W. Updated message: HCQ004E; new error code added.
FRAMES subcommand	Upwardly compatible: • [7.1] Output changed to show a hard abend dump with a correlation table.
RDEVBK subcommand	Upwardly compatible: • [7.2] <i>devnum</i> updated to support 4- and 5-digit hexadecimal numbers.
REGISTER subcommand	Upwardly compatible: • • [7.2] The response includes the breaking-event-address register (BEAR).
VMDTSET subcommand	Upwardly compatible: • [7.4] New operand: DATEUSEC.

CMS changes

Changes to CMS interfaces are identified in the following topics:

- “General CMS Commands” on page 142
- “CMS Utilities” on page 143
- “CMS Routines” on page 144
- “CMS Macros” on page 145
- “HELP Facility” on page 145

For information about changes to CMS monitor records, see [z/VM Data Areas, Control Blocks, and Monitor Records \(https://www.ibm.com/support/pages/zvm/pubs/ctlblk.html\)](https://www.ibm.com/support/pages/zvm/pubs/ctlblk.html).

General CMS Commands

Table 16 on page 142 lists general CMS commands that have changed. For additional information, see [z/VM: CMS Commands and Utilities Reference](#).

Table 16. Changes to General CMS Commands

Command	Changes
CMSDESK	INCOMPATIBLE: • [7.3] The command has been removed.

Table 16. Changes to General CMS Commands (continued)

Command	Changes
DEFAULTS	Upwardly compatible: • [7.2 VM66561] New option that can be used with DEFAULTS: CERTMGR.
HELP	INCOMPATIBLE: • [7.1] GLOSSARY operand removed. • [7.1] HELP components removed: GDDMXD, GLOSSARY, IMAPADM.
QUERY	Upwardly compatible: • [7.5] New operand and associated responses: FSTHIGH.
QUERY CMSLEVEL	Upwardly compatible: • [7.4] Updated format for service level response. • [7.5] Response contains changed value for the new CMS level.
QUERY CMSREL	Upwardly compatible: • [7.5] Response contains changed value for the new release level.
QUERY WORKSTATION	INCOMPATIBLE: • [7.3] The command has been removed.
SAMPNSS	Upwardly compatible: • [7.5] Updated example in support of zCMS as the default.
SET	Upwardly compatible: • [7.5] New operand and associated responses: FSTHIGH.
SET SCPID	Upwardly compatible: • [7.3] New command to change the conversational monitor system (CMS) identification information that a guest reports to z/VM's control program (CP).
SET WORKSTATION	INCOMPATIBLE: • [7.3] The command has been removed.
VMFLOAD	Upwardly compatible: • [7.5] Updated purpose, usage notes in support of zCMS as the default.

CMS Utilities

Table 17 on page 144 lists CMS utilities that have changed. For additional information, see [z/VM: CMS Commands and Utilities Reference](#).

Table 17. Changes to CMS Utilities

Utility	Changes
GETSHOPZ	Upwardly compatible: • [7.3 VM66732] New operand: EXTRACT. New options: ISOLATED, CLEAN, LIST, REPLACE. New response. New usage note. New examples. • [7.3 VM66774] New operands: PROXYMODE DIRECT, PROXYMODE TUNNEL. New examples. • [7.4 VM66834] IBM ServiceLink support added. New options: FASTFTP, FTPPROXY, PROXYUSER, PROXYPASS. Updated option: TOKEN. New usage notes. • [7.4 VM66893, 7.3 VM66900] Support added for transfer of z/VM installation media ZIP files. New response. New usage notes. New example.
VMFPLCD	Upwardly compatible: • [7.3 VM66517] New message DMS1449W. New usage note.

XEDIT Subcommands

Table 18 on page 144 lists XEDIT subcommands that have changed. For additional information, see [z/VM: XEDIT Commands and Macros Reference](#).

Table 18. Changes to XEDIT Subcommands

Subcommand	Changes
WIDTH	INCOMPATIBLE: • [7.5] XEDIT is changed to respect the WIDTH option (if specified), which previously was not honored in all cases. For details, see “[7.5] XEDIT respects the WIDTH option if it is specified” on page 89.

CMS Routines

Changes to CMS routines are identified in the following topic:

- [“General CMS Callable Services” on page 144](#)

General CMS Callable Services

Table 19 on page 144 lists general CMS callable services that have changed. For additional information, see [z/VM: CMS Callable Services Reference](#), unless otherwise indicated.

Table 19. Changes to General CMS Callable Services

Routine	Changes
DMSQEFL	Upwardly compatible: • [7.4] Updated format for service level response. • [7.5] Changed values returned for the <i>cp_level</i> and <i>cms_level</i> parameters.
DMSQSFSL	Upwardly compatible: • [7.5] Changed value returned for the <i>server_level</i> parameter.

CMS Macros

Changes to CMS macros are identified in the following topic:

- [“General CMS Macros and Subcommands” on page 145](#)

General CMS Macros and Subcommands

Table 20 on page 145 lists general CMS macros and subcommands that have changed. For additional information, see [z/VM: CMS Macros and Functions Reference](#).

Table 20. Changes to General CMS Macros and Subcommands

Macro or Subcommand	Changes
DEFNUC macro	Upwardly compatible: • [7.5] Updated purpose, parameter descriptions in support of zCMS as the default.
RDTAPE macro	Upwardly compatible: • [7.3 VM66724] Updated <i>length</i> parameter description. New usage note.
WRTAPE macro	Upwardly compatible: • [7.3 VM66724] New usage note.

HELP Facility

Table 21 on page 145 identifies HELP components (HELPxxxx file types) that have been added or deleted in each release.

Table 22 on page 146 lists HELP files that have been deleted in each release. If a specific file name is not identified, all files with the specified file type have been deleted.

Notes:

1. Files for a new HELP component might conflict with local help files with identical file IDs.
2. Files identified as deleted are removed from the new z/VM release but are not automatically removed from your system if you overlay your current help files with the new set. You need to remove them manually.

Table 21. Added or Deleted HELP Components

HELP Component	File Type	Change
GDDMXD	HELPGDDM	[7.1] Deleted (support removed for TCP/IP GDDMXD/VM interface).
GLOSSARY	HELPGLOS	[7.1] Deleted (z/VM glossary publication and help file discontinued).
IMAPADM	HELPIMAP	[7.1] Deleted (support removed for TCP/IP IMAP server).
CERTMGR	HELPCERT	[7.2 PH40080 (TCP/IP), VM66561 (CMS), VM66581 (VMSES/E)] Added for TCP/IP CERTMGR command.
	HELPDFSM	[7.5] Updated (previously optional, separately orderable feature not in z/VM base) for removable media services (RMS) DFSMSRM commands and for CMS DFSMS COPY command.
DIRECTORY	HELPDIRE	[7.2 VM66511 (CP), VM66512 (CMS), VM66513 (VMSES)] Added for user directory statements.

Table 21. Added or Deleted HELP Components (continued)

HELP Component	File Type	Change
	HELPLDAP	[7.5] Deleted (support removed for TCP/IP Lightweight Directory Access Protocol server).
	HELPNFS	[7.5] Deleted (support removed for TCP/IP Network File System).
SYSCONFIG	HELPSYSC	[7.2 VM66511 (CP), VM66512 (CMS), VM66513 (VMSES)] Added for system configuration statements.

Table 22. Deleted HELP Files

File Name	File Type	Release/Reason
GDDMXD	HELPAABR	[7.1] Support removed for TCP/IP GDDMXD/VM interface.
IMAPADM	HELPAABR	[7.1] Support removed for TCP/IP IMAP server.
VMFSIM	HELPAABR	[7.1]
CONFIGUR	HELPCMS	[7.1] CMA not supported.
LIBRARY	HELPCMS	[7.1] Discontinued.
DVDPRIME	HELPCP	[7.1]
EXPLOFCP	HELPCP	[7.1] Replaced by EXPLORE HELPCP.
HCPSADMP	HELPCP	[7.1] Not supported.
INSTTAPE	HELPCP	[7.1] Tape support removed.
PAVALIAS	HELPCP	[7.1] Replaced by PAVALIAS HELPDEFI.
SPECEX	HELPCPQU	[7.1] Command not supported.
SPECEX	HELPCPSE	[7.1] Command not supported.
<i>fn</i>	HELPGDDM	[7.1] Support removed for TCP/IP GDDMXD/VM interface.
GLOSSARY	HELPGLOS	[7.1] <i>z/VM Glossary</i> publication discontinued.
<i>fn</i>	HELPIMAP	[7.1] Support removed for TCP/IP IMAP server.
GDDMXD	HELPMENU	[7.1] Support removed for TCP/IP GDDMXD/VM interface.
IMAPADM	HELPMENU	[7.1] Support removed for TCP/IP IMAP server.
ALL	HELPMESS	[7.1]
USER	HELPMESS	[7.1]
DMSxxxxx	HELPMMSG	[7.1] Deleted messages: DMS2970E, DMS2971E, DMS2972E, DMS2973E, DMS2974E, DMS2975E, DMS2976E, DMS2977E, DMS2978I, DMS2979E, DMS2980E, DMS2981E, DMS2982E, DMS2983R, DMS2984E, DMS2985E, DMS2986E
HCPxxxxx	HELPMMSG	[7.1] Deleted messages: HCP958E, HCP958W, HCP997W, HCP998W, HCP999W, HCP1057I, HCP1605E, HCP1719I, HCP1851E, HCP8157A, HCP8159A, HCP8166E, HCP8172E, HCP8173E, HCP8174E, HCP8176E, HCP8200W, HCP8201W, HCP8202W, HCP8203W, HCP8204W, HCP8205W, HCP8206W, HCP8207W, HCP8208E, HCP9013W, HCP9017W, HCP9018W, HCP9019W, HCP9061W, HCP9269E

Table 22. Deleted HELP Files (continued)

File Name	File Type	Release/Reason
ITNxxxxx	HELPMMSG	[7.1] Deleted messages: ITN2000E, ITN2000I, ITN2001I, ITN2002I, ITN2003I, ITN2004I, ITN2005I, ITN2006I, ITN2006W, ITN2007I, ITN2007W, ITN2008E, ITN2010E, ITN2011E, ITN2011W, ITN2012E, ITN2013E, ITN2014E, ITN2015E, ITN2016E, ITN2017I, ITN2017W, ITN2018E, ITN2019W, ITN2020E, ITN2021E, ITN2022I, ITN2023E, ITN2024E, ITN2025E, ITN2026E, ITN2027E, ITN2050E
IUGxxxxx	HELPMMSG	[7.1] Deleted messages: IUG8305E, IUG8306R, IUG8308R, IUG8309R, IUG8313E, IUG8360I, IUG8366E, IUG8367E, IUG8368E, IUG8370E, IUG8372R, IUG8373E, IUG8378R, IUG8379E, IUG8381I, IUG8382E, IUG8383R, IUG8386E, IUG8387E, IUG8388I, IUG8389W, IUG8390I, IUG8395E, IUG8397R, IUG8428I, IUG8433I, IUG8434I, IUG8435E, IUG8439E, IUG8441I, IUG8442E, IUG8448E, IUG8464R, IUG8497E
CMSSIGSU	HELPOROU	[7.1] Replaced by CMSSIGSE HELPOROU.
GDDMX	HELPTASK	[7.1] Support removed for TCP/IP GDDMXD/VM interface.
IMAP	HELPTASK	[7.1] Support removed for TCP/IP IMAP server.
MSOCKETS	HELPTASK	[7.1] Replaced by SMAPI HELPTASK.
GDDMXD	HELPTCPI	[7.1] Support removed for TCP/IP GDDMXD/VM interface.
IMAPMAIN	HELPTCPI	[7.1] Support removed for TCP/IP IMAP server.
ITNVTSTR	HELPV MSE	[7.1]
ASSOEX	HELPCP	[7.2] Obsolete command removed.
ASSOMSGS	HELPCP	[7.2] Obsolete command removed.
CONV	HELPCP	[7.2] Obsolete command removed.
CPTRAP	HELPCP	[7.2] Obsolete command removed.
DRAINDIS	HELPCP	[7.2] Obsolete command removed.
DRAINUR	HELPCP	[7.2] Obsolete command removed.
FLASHBND	HELPCP	[7.2] Obsolete command removed.
FLASHST	HELPCP	[7.2] Obsolete command removed.
FLASHRES	HELPCP	[7.2] Obsolete command removed.
FLASHGT	HELPCP	[7.2] Obsolete command removed.
FLASHWIT	HELPCP	[7.2] Obsolete command removed.
FREELOGN	HELPCP	[7.2] Obsolete command removed.
FREEPRIN	HELPCP	[7.2] Obsolete command removed.
GIVRDEV	HELPCP	[7.2] Obsolete command removed.
GIVVDEV	HELPCP	[7.2] Obsolete command removed.
HOLDLOGN	HELPCP	[7.2] Obsolete command removed.
HOLDPRT	HELPCP	[7.2] Obsolete command removed.

Table 22. Deleted HELP Files (continued)

File Name	File Type	Release/Reason
ISLINK	HELPCP	[7.2] Obsolete command removed.
QUERY CPTRAP	HELPCP	[7.2] Obsolete command removed.
STARTDIS	HELPCP	[7.2] Obsolete command removed.
STARTUR	HELPCP	[7.2] Obsolete command removed.
VARYCHPI	HELPCP	[7.2] Obsolete command removed.
VARYCORE	HELPCP	[7.2] Obsolete command removed.
VARYPATH	HELPCP	[7.2] Obsolete command removed.
VARYPCIF	HELPCP	[7.2] Obsolete command removed.
VARYPROC	HELPCP	[7.2] Obsolete command removed.
VARYRDEV	HELPCP	[7.2] Obsolete command removed.
VARYSUBC	HELPCP	[7.2] Obsolete command removed.
HCP1137E	HELPMMSG	[7.2] Remove IPL parameter: PAGING63.
HCP1139I	HELPMMSG	[7.2] Remove IPL parameter: PAGING63.
HCP1395W	HELPMMSG	[7.2] Remove IPL parameter: PAGING63.
HCP6006E	HELPMMSG	[7.2] Obsolete message removed.
HCP6090I	HELPMMSG	[7.2] Obsolete message removed.
HCP6296E	HELPMMSG	[7.2] MSS Multi-Target PPRC Exploitation.
HCP8152E	HELPMMSG	[7.2] Obsolete message removed.
CMSDESK	HELPCMS	[7.3] Obsolete message removed.
WORKSTAT	HELPCMSQ	[7.3] Obsolete message removed.
WORKSTAT	HELPCMSS	[7.3] Obsolete message removed.
DVH3443	HELPMMSG	[7.3] Obsolete message removed.
DVH3444	HELPMMSG	[7.3] Obsolete message removed.
DVH3445	HELPMMSG	[7.3] Obsolete message removed.
HCP495E	HELPMMSG	[7.3] Obsolete message removed.
DMS1346E	HELPMMSG	[7.3] Obsolete message removed.
DMS2082E	HELPMMSG	[7.3] Obsolete message removed.
DMS2084E	HELPMMSG	[7.3] Obsolete message removed.
DMS2085E	HELPMMSG	[7.3] Obsolete message removed.
VMF4203I	HELPMMSG	[7.3] Obsolete message removed.
DMSWKST	HELPROUT	[7.3] Obsolete message removed.
CPEREPXA	HELPCP	[7.4] Obsolete utility removed.
HCP796E	HELPMMSG	[7.4] Obsolete message removed.
HCP1798E	HELPMMSG	[7.4] Obsolete message removed.

Table 22. Deleted HELP Files (continued)

File Name	File Type	Release/Reason
VMF4135E	HELPMMSG	[7.4] Obsolete sample program removed.
APLDVS	HELPVMDT	[7.4] Obsolete sample program removed.
PLDVQ	HELPVMDT	[7.4] Obsolete sample program removed.
PLDVS	HELPVMDT	[7.4] Obsolete sample program removed.
PLDV2CPU	HELPVMDT	[7.4] Obsolete sample program removed.
VMDPLDV	HELPVMDT	[7.4] Obsolete sample program removed.
HCP8050E	HELPMMSG	[7.4] Obsolete message removed.
HCP8051E	HELPMMSG	[7.4] Obsolete message removed.
HCP8052E	HELPMMSG	[7.4] Obsolete message removed.
HCP8053I	HELPMMSG	[7.4] Obsolete message removed.
HCP8054E	HELPMMSG	[7.4] Obsolete message removed.
HCP8074E	HELPMMSG	[7.4] Obsolete message removed.
HCP8075E	HELPMMSG	[7.4] Obsolete message removed.
HCP8076E	HELPMMSG	[7.4] Obsolete message removed.
HCP8077I	HELPMMSG	[7.4] Obsolete message removed.

Table 23. Restored HELP Files

File Name	File Type	Release/Reason
DMS260T	HELPMMSG	[7.5] Restored.

DirMaint Facility changes

For additional information about the items listed in Table 24 on page 149, see [z/VM: Directory Maintenance Facility Commands Reference](#).

Table 24. Changes to DirMaint Facility commands

Command	Changes
DIRECTORY	Upwardly compatible: [7.5] *nnnnn-xxxx value cannot be specified for processor ID on the DIRECTORY command, as the wildcard character (*) is no longer supported for that operand.

GCS changes

Table 25 on page 150 lists GCS commands and macros that have changed. For additional information, see [z/VM: Group Control System](#).

Table 25. Changes to GCS Commands and Macros

Interface	Changes
GCSLEVEL macro	Upwardly compatible: • [7.1] Contains new equate for new release level. • [7.2] Contains new equate for new release level. • [7.3] Contains new equate for new release level. • [7.4] Contains new equate for new release level. • [7.5] Contains new equate for new release level.
QUERY GCSLEVEL command	Upwardly compatible: • [7.4] Updated format for service level response.

REXX/VM changes

Table 26 on page 150 lists REXX/VM instructions, functions, and external functions that have changed. For additional information, see [z/VM: REXX/VM Reference](#).

Table 26. Changes to REXX/VM Instructions, Functions, and External Functions

Interface	Changes
DIAGRC	Upwardly compatible: • [7.1] Maximum amount of data returned for DIAG(00) has been increased to 200 bytes. • [7.2] DIAG(A0) - Obtain ACI Information: ESM Product Information - and DIAGRC(A0) added.

VMSES/E changes

Table 27 on page 150 lists VMSES/E commands that have changed. For more information, see [z/VM: VMSES/E Introduction and Reference](#).

Table 27. Changes to VMSES/E commands

Command	Changes
PUT2PROD	Upwardly compatible: • [7.2] Updated SEGMENTS operand and description. Updated message: VMF1218W.
SERVICE	Upwardly compatible: • [7.2] New operands: ALLAPARS, ALLPTFS. New options: NOLOG and PPF. New usage note about the SERVICE STATUS command. Return code 5 is issued if service that affects core VMSES/E components is identified. New message: VMF1238I. • [7.4] The SERVICE command now automatically generates applicable bitmap files when PTF service is applied and built. New usage note. • [7.4 VM66840] Support added for automatic setting of z/VM linear service environment variables and automatic generation of <i>sysname</i> IBMCONF files. New STATUS option: LEVELS. Updated STATUS option: RSU. New examples. New usage note.

Table 27. Changes to VMSES/E commands (continued)

Command	Changes
SERVMGR	Upwardly compatible: • [7.3] New operand: REMOVE. New messages: VMF4141E, VMF4142E, VMF4143R, VMF4144E, VMF4145E, VMF4146E, VMF4147I, VMF4148I. • [7.3 VM66457] Information added about using a KEYVAULT database with SERVMGR. New usage note. New return code: 90 ("Command processing stops"). New messages: VMF4150R, VMF4151R, VMF4152R, VMF4153I, VMF4154I, VMF4155E, VMF4156E, VMF4157I, VMF4158I, VMF4159W, VMF4160I, VMF4161R, VMF4162W, VMF4163W, VMF4164E. Updated message: VMF2760E.
SERVMGR SRVLVL	Upwardly compatible: • [7.3] New QUERY operand: COMPONENT. New usage note and example. Updated messages: VMF4201I, VMF4209I. • [7.3 VM66457] New usage note.
SERVMGR SYSTEM	Upwardly compatible: • [7.3] New QUERY operand: PRODPENDING. New example. New message: VMF4210W. Updated message: VMF4209I. • [7.3 VM66457] New usage note.
VMFBLD	Upwardly compatible: • [7.3] New object parameter: BYPASS. New part option: BYPASS.
VMFINS MIGRATE	INCOMPATIBLE: • [7.1] Command removed.
VMFSUFIN	Upwardly compatible: • [7.2] Return code 5 is issued if service that affects core VMSES/E components is identified.
VMFVIEW	Upwardly compatible: • [7.2] New operands: \$CSMAGT, \$CSMCMG, and CSM.

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Bibliography

This topic lists the publications in the z/VM library. For abstracts of the z/VM publications, see *Abstracts of the z/VM base product publications* and *Abstracts of the z/VM optional feature publications* in *z/VM: General Information*.

Where to get z/VM information

The current z/VM product documentation is available in *IBM z/VM documentation* (<https://www.ibm.com/docs/en/zvm>).

For lists of additional sources of information about z/VM, see *Where to get information about z/VM* in *z/VM: General Information*.

z/VM base library

Overview

- *z/VM: License Information*, GI13-4377
- *z/VM: General Information*, GC24-6286
- *z/VM: Getting Started*, SC24-6287

Installation, migration, and service

- *z/VM: Installation Guide*, GC24-6292
- *z/VM: Migration Guide*, GC24-6294
- *z/VM: Service Guide*, GC24-6325
- *z/VM: VMSES/E Introduction and Reference*, GC24-6336

Planning and administration

- *z/VM: CMS File Pool Planning, Administration, and Operation*, SC24-6261
- *z/VM: CMS Planning and Administration*, SC24-6264
- *z/VM: Connectivity*, SC24-6267
- *z/VM: CP Planning and Administration*, SC24-6271
- *z/VM: Group Control System*, SC24-6289
- *z/VM: I/O Configuration*, SC24-6291
- *z/VM: Running Guest Operating Systems*, SC24-6321
- *z/VM: Saved Segments Planning and Administration*, SC24-6322
- *z/VM: Secure Configuration Guide*, SC24-6323

Customization and tuning

- *z/VM: CP Exit Customization*, SC24-6269
- *z/VM: Performance*, SC24-6301

Operation and use

- *z/VM: CMS Commands and Utilities Reference*, SC24-6260
- *z/VM: CMS Primer*, SC24-6265

- [z/VM: CMS User's Guide](#), SC24-6266
- [z/VM: CP Commands and Utilities Reference](#), SC24-6268
- [z/VM: Removable Media Services](#), SC24-6278
- [z/VM: System Operation](#), SC24-6326
- [z/VM: Virtual Machine Operation](#), SC24-6334
- [z/VM: XEDIT Commands and Macros Reference](#), SC24-6337
- [z/VM: XEDIT User's Guide](#), SC24-6338

Application programming

- [z/VM: CMS Application Development Guide](#), SC24-6256
- [z/VM: CMS Application Development Guide for Assembler](#), SC24-6257
- [z/VM: CMS Application Multitasking](#), SC24-6258
- [z/VM: CMS Callable Services Reference](#), SC24-6259
- [z/VM: CMS Macros and Functions Reference](#), SC24-6262
- [z/VM: CMS Pipelines User's Guide and Reference](#), SC24-6252
- [z/VM: CP Programming Services](#), SC24-6272
- [z/VM: CPI Communications User's Guide](#), SC24-6273
- [z/VM: ESA/XC Principles of Operation](#), SC24-6285
- [z/VM: Language Environment User's Guide](#), SC24-6293
- [z/VM: OpenExtensions Advanced Application Programming Tools](#), SC24-6295
- [z/VM: OpenExtensions Callable Services Reference](#), SC24-6296
- [z/VM: OpenExtensions Commands Reference](#), SC24-6297
- [z/VM: OpenExtensions POSIX Conformance Document](#), GC24-6298
- [z/VM: OpenExtensions User's Guide](#), SC24-6299
- [z/VM: Program Management Binder for CMS](#), SC24-6304
- [z/VM: Reusable Server Kernel Programmer's Guide and Reference](#), SC24-6313
- [z/VM: REXX/VM Reference](#), SC24-6314
- [z/VM: REXX/VM User's Guide](#), SC24-6315
- [z/VM: Systems Management Application Programming](#), SC24-6327
- [z/VM: z/Architecture Extended Configuration \(z/XC\) Principles of Operation](#), SC27-4940

Diagnosis

- [z/VM: CMS and REXX/VM Messages and Codes](#), GC24-6255
- [z/VM: CP Messages and Codes](#), GC24-6270
- [z/VM: Diagnosis Guide](#), GC24-6280
- [z/VM: Dump Viewing Facility](#), GC24-6284
- [z/VM: Other Components Messages and Codes](#), GC24-6300
- [z/VM: VM Dump Tool](#), GC24-6335

z/VM facilities and features

Directory Maintenance Facility for z/VM

- [z/VM: Directory Maintenance Facility Commands Reference](#), SC24-6281

- *z/VM: Directory Maintenance Facility Messages*, GC24-6282
- *z/VM: Directory Maintenance Facility Tailoring and Administration Guide*, SC24-6283

Open Systems Adapter

- *Open Systems Adapter-Express Customer's Guide and Reference* (https://www.ibm.com/docs/en/SSLTBW_2.3.0/pdf/iaa2z1f0.pdf), SA22-7935
- *Open Systems Adapter Integrated Console Controller User's Guide* (https://www.ibm.com/docs/en/SSLTBW_2.3.0/pdf/SC27-9003-02.pdf), SC27-9003
- *Open Systems Adapter-Express ICC 3215 Support* (<https://www.ibm.com/docs/en/zos/2.3.0?topic=osa-icc-3215-support>), SA23-2247
- *Open Systems Adapter/Support Facility on the Hardware Management Console* (https://www.ibm.com/docs/en/SSLTBW_2.3.0/pdf/SC14-7580-02.pdf), SC14-7580

Performance Toolkit for z/VM

- *z/VM: Performance Toolkit Guide*, SC24-6302
- *z/VM: Performance Toolkit Reference*, SC24-6303

RACF Security Server for z/VM

- *z/VM: RACF Security Server Auditor's Guide*, SC24-6305
- *z/VM: RACF Security Server Command Language Reference*, SC24-6306
- *z/VM: RACF Security Server Diagnosis Guide*, GC24-6307
- *z/VM: RACF Security Server General User's Guide*, SC24-6308
- *z/VM: RACF Security Server Macros and Interfaces*, SC24-6309
- *z/VM: RACF Security Server Messages and Codes*, GC24-6310
- *z/VM: RACF Security Server Security Administrator's Guide*, SC24-6311
- *z/VM: RACF Security Server System Programmer's Guide*, SC24-6312
- *z/VM: Security Server RACROUTE Macro Reference*, SC24-6324

Remote Spooling Communications Subsystem Networking for z/VM

- *z/VM: RSCS Networking Diagnosis*, GC24-6316
- *z/VM: RSCS Networking Exit Customization*, SC24-6317
- *z/VM: RSCS Networking Messages and Codes*, GC24-6318
- *z/VM: RSCS Networking Operation and Use*, SC24-6319
- *z/VM: RSCS Networking Planning and Configuration*, SC24-6320

TCP/IP for z/VM

- *z/VM: TCP/IP Diagnosis Guide*, GC24-6328
- *z/VM: TCP/IP Messages and Codes*, GC24-6330
- *z/VM: TCP/IP Planning and Customization*, SC24-6331
- *z/VM: TCP/IP Programmer's Reference*, SC24-6332
- *z/VM: TCP/IP User's Guide*, SC24-6333

Prerequisite products

Device Support Facilities

- Device Support Facilities (ICKDSF): User's Guide and Reference (https://www.ibm.com/docs/en/SSLTBW_3.2.0/pdf/ickug00_v3r2.pdf), GC35-0033

Related products

XL C++ for z/VM

- *XL C/C++ for z/VM: Runtime Library Reference*, SC09-7624
- *XL C/C++ for z/VM: User's Guide*, SC09-7625

z/OS

IBM Documentation - z/OS (<https://www.ibm.com/docs/en/zos>)

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