

IBM z/OS V2.4 3Q 2020 new functions and enhancements

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Overview

IBM^(R) z/OS^(R) is designed to keep applications and data available, systems secure, server utilization high, and development agile. z/OS continuous delivery (CD) offers clients the opportunity to use z/OS functions, capabilities, and technologies by applying service rather than upgrading the entire operating system. Applying the service is designed to be nondisruptive to maintain system behavior until the capabilities are ready to be exploited by clients.

This quarter's CD update extends the capabilities of z/OS V2.4 with enhancements and functions that benefit clients across areas of resiliency, cloud native experience, and systems operations and management. Key features delivered in this third-quarter release in support of z/OS V2.4 include:

- Enhanced System Recovery Boost. These capabilities enable clients to leverage a class of boost that can be applied to a range of z/OS sysplex recovery processes, including sysplex partitioning, Coupling Facility (CF) structure recovery, CF data sharing member recovery, and IBM HyperSwap^(R).
- Exploitation of IBM Integrated Accelerator for Z Sort. This hardware accelerated approach to sorting using a new CPU coprocessor on the IBM z15TM is intended to reduce CPU usage and improve elapsed time for eligible sort workloads.
- Enhanced z/OS Container Extensions. These capabilities enable efficiency with support for large pages and ease of use with the capability to securely access business data that is located elsewhere, including in the hosting z/OS.
- Improved installation. Continuing the journey for improving software installation, configuration, and deployment for clients now includes IBM IMS and IMS program products, and IBM Db2^(R) and Db2 program products as a ServerPac Portable Software Instance.
- Improved System Modification Program Extended (SMP/E) processing. This is an IBM z/OS Management Facility (z/OSMF) task in z/OSMF Software Management called Software Update. The graphical user interface in Software Update provides a simplified and guided process to install any SMP/E PTF, regardless of software vendor.
- Enhanced z/OSMF. Includes the z/OSMF Ansible^(R) collection. z/OSMF has been enhanced to support job operations and z/OS operator commands that are based on z/OSMF REST APIs. It is available on the [Ansible Galaxy](#) web page.
- Enhanced Pervasive Encryption. These capabilities enable users to encrypt data without application changes and to simplify the task of compliance with support for additional z/OS data set types.
- Additional storage tier for archiving unstructured data. Enhancements to DFSMS Object Access Method (OAM) enable primary copies of OAM objects to be

managed and stored directly on cloud storage, via public, private, or hybrid cloud infrastructures supporting the S3 API.

Key requirements

z/OS V2.4 operates on the following IBM Z^(R) servers:

- IBM z15 Models T01 and T02
- IBM z14^(R) Models M01-M05
- IBM z14 Model ZR1
- IBM z13^(R)
- IBM z13s^(R)
- IBM zEnterprise^(R) EC12 (zEC12)
- IBM zEnterprise BC12 (zBC12)

If you run z/OS V2.4 on IBM z/VM^(R), the z/VM release must be z/VM V6.4, or later.

For a complete description of z/OS V2.4 hardware requirements, see *z/OS V2.4 Planning for Installation* (GA32-0890), when available, in [IBM Knowledge Center](#).

Planned availability date

September 30, 2020

Description

System Recovery Boost sysplex recovery enhancements

The initial z/OS support for System Recovery Boost for z15 servers provided additional capacity to accelerate image-level recovery (image shutdown and re-IPL/middleware startup) and enabled accelerated processing of workload backlogs that occurred as a result of those image-level events following the re-IPL. System Recovery Boost provided additional image-level processing capacity and parallelism for the images during the IPL and shutdown boost periods by making use of two underlying z15 technologies:

- Speed Boost that enables sub-capacity general-purpose processors to run at full-capacity speed
- zIIP boost that makes general-purpose work eligible to run on zIIP processors.

With new enhancements to System Recovery Boost, IBM extends the solution to provide value in scenarios beyond just image-level shutdowns and startups. System Recovery Boost now offers a new class of short-term recovery process boosts addressing a specific set of z/OS Parallel Sysplex^(R) recovery events, utilizing the same underlying boost technologies. These Parallel Sysplex recovery events can cause workload disruption while the sysplex is recovering from a component failure or a reconfiguration event, until such time as the recovery processing completes and steady-state sysplex operation is restored. Boosted processor capacity is automatically provided to mitigate these short-term recovery impacts and restore normal sysplex operation as quickly as possible, and the boosted processor capacity can also continue for a short time following restoration of steady-state operation. This provides workload catch-up following the recovery activity.

The solution automatically provides boosted processor capacity and parallelism for the following specific recovery events:

- Sysplex partitioning. Boosts all surviving systems in the sysplex as they recover and take on additional workload following the planned or unplanned removal of a system from the sysplex.
- CF structure recovery . Boosts all systems participating in CF structure recovery processing, including CF structure rebuild, duplexing failover, and re-duplexing.
- CF data sharing member recovery. Boosts all systems participating in recovery following disconnection of a CF locking data sharing member, such as a Db2 IRLM instance or an SMSVSAM instance, from a coupling facility lock structure with lock resources held.
- HyperSwap. Boosts all systems participating in a HyperSwap process.

These short-duration recovery process boost periods are a separate class of boosts from the existing image-level IPL and shutdown boost periods. Each participating image can receive boosts as follows:

- One IPL boost for image-level startup (60 minutes)
- One shutdown boost for image-level shutdown (30 minutes)
- Several recovery process boosts, each of less than 5 minutes duration, with a total usage of no more than 30 minutes of recovery process boost time in a 24-hour period.

During recovery process boost periods, either Speed Boost, zIIP boost, or both can be applied under the control of the z/OS **BOOST=** system parameter.

The use of System Recovery Boost upgrade temporary capacity record activations for recovery process boosts is not supported. The System Recovery Boost upgrade temporary capacity is for use only in conjunction with image-level IPL and shutdown boosts.

Use of the recovery process boosts requires:

- z15 T01 or z15 T02 with new logical partition (LPAR) firmware support for recovery process boosts, provided by LPAR machine change level (MCL) P46602.005, or later, for z15 Driver 41C.
- z/OS PTFs for z/OS V2.3 or z/OS V2.4. The z/OS PTFs will be included in a z/OS FIXCAT, specifically for System Recovery Boost support, named **IBM.Function.SystemRecoveryBoost** , and includes PTFs for enablement for APAR OA59813 and its related prerequisite APARs.

IBM Integrated Accelerator for Z Sort

The z15 provides a hardware accelerated approach to sorting using a new CPU coprocessor that can be exploited by software using the new **SORTL** instruction. By providing one sort accelerator per core, frequently used functions can be accelerated to help speed up sorting, shorten batch windows, and improve select database functions, such as reorganization. The Integrated Accelerator for Z Sort, which is standard on the z15, is designed to cut the CPU costs and improve the elapsed time for eligible sort workloads, which typically occur during client batch windows. DFSORT and Db2 for z/OS Utilities Suite exploit the SORTL instruction. DFSORT support is available on z/OS V2.3 with PTF UI90067 and V2.4 with PTF UI90068. Check the latest Db2 for z/OS Utilities Suite PTFs for exploitation of the Integrated Accelerator for Z Sort.

The IBM Z Batch Network Analyzer (zBNA) V2.2 provides support for the Integrated Accelerator for Z Sort. zBNA has a new application, DFSORT Z Sort, which uniquely identifies DFSORT-eligible candidates and estimates the z15 benefits, using data from the current environment and does not require a z15. The new information integrates with the traditional batch information already available in zBNA. This no-charge tool is available for download from the [IBM Techdocs Library](#) web page.

For additional information, see Hardware Announcement [120-050](#), dated August 4, 2020.

z/OS Container Extensions enhancements (zCX)

zCX provides the capability to run Linux^(R) on Z containers on z/OS.

- Updates are made with the PTF for APAR OA59111 to support single instruction multiple data (SIMD) processes. Some applications are compiled with SIMD instructions and require SIMD enablement. The z14 and z15 physically support SIMD, so this option is enabled unilaterally with this improvement.
- Updates are planned with the PTF for APAR OA59865 for the following:
 - zCX to support 1 MB and 2 GB large pages. This can improve the efficiency of zCX workloads.
 - The maximum number of containers supported is raised to 1,000. The practical limit might be lower depending on available resources.
 - The amount of guest memory can be configured up to 1 TB. Given zCX use of fixed storage and z/OS memory layout, the practical limit is lower.
- Updates are planned with the PTF for APAR OA59835 for the following:
 - Support to monitor and log zCX resource usage of the root disk, guest memory, swap disk, and data disks in the servers job log.
 - An enhanced operator command option to display the version and service information about any zCX server and all the relevant components used to provision and run it. This reduces the effort and improve the accuracy of service communications.
 - The zCX instance root disk can be enlarged when using the software upgrade workflow of the zCX appliance.

z/OSMF ServerPac availability for IMS and Db2

IBM continues to make progress in improving software installation, configuration, and deployment for the IBM client community using an installation strategy developed in collaboration with leading industry software vendors. These include additional products in a z/OSMF Software Management Portable Software Instance format. In addition to the delivery option in Shopz of IBM CICS^(R) and CICS program products as a ServerPac Portable Software Instance on December 6, 2019, this delivery option has been extended to IMS and IMS program products, as well as to Db2 and Db2 program products. These additional products became available as a ServerPac Portable Software Instance delivery option on August 20, 2020. IBM continues to recommend that clients become familiar with z/OSMF Software Management and the Portable Software Instance deployment process as more IBM and industry vendors embrace this easier installation method.

To learn how to install a z/OSMF ServerPac, see the [ServerPac Installation using z/OSMF content solution](#) web page.

z/OS software update enhancement

Because performing updates to z/OS software can be a complicated and time-consuming task, a z/OSMF task has been made available in z/OSMF Software Management called Software Update. This enhanced task is planned to be available on or before October 31, 2020, with the PTFs for APAR PH28412 on V2.3 and V2.4. The graphical user interface in Software Update provides a simplified and guided process to install any SMP/E-packaged PTF, regardless of software vendor. SMP/E HOLDDATA contained in updates can be difficult to manage, but Software Update enables you to review and track this information in an orderly fashion. All installation output is saved so you can review it at any time.

The Software Update task can be used to install updates associated with three different use cases:

- Corrective. Install individual software updates to fix a problem. Clients can identify the updates to be installed by name.
- Recommended. Install all software updates that are recommended by a software vendor. The IBM recommendations are those designated as IBM Recommended Service Upgrade (RSU) fixes.
- Functional. Install software updates to support new hardware, software, or functions. Software Update identifies the fix categories associated with

available updates, and clients can then select fix categories to install all updates associated with those categories.

Clients can continue to use their existing methods to install SMP/E-packaged software updates, such as with batch jobs, but they might find a simpler experience requiring lesser SMP/E skills by using z/OSMF Software Update instead.

To learn more about z/OSMF Software Update, including helpful instructions about how to get started, see the [Software Update with z/OSMF](#) web page.

z/OSMF

- z/OSMF is enhanced by the PTF for APAR PH24527 to provide a simple UI that enables administrators to enable or disable most z/OSMF services. This provides more flexibility and also better usability for administrators to tailor a minimum z/OSMF runtime. In addition to using the UI, users can tailor z/OSMF runtime by uploading a simple JavaScript Object Notation (JSON) file to the z/OSMF configuration directory. This is designed to simplify settings deployment across multiple z/OSMF instances.
- z/OSMF Workflows is enhanced to support auto-deletion after a workflow is completed with the PTF for APAR PH24190. This helps to reduce the clutter in the z/OSMF file system from workflows that you don't want to save.
- z/OSMF Diagnostic Assistant is enhanced with the PTF for PH25691 to support the display of z/OSMF data file system utilization on the z/OSMF desktop taskbar. It supports automatic cleanup of z/OSMF diagnostic data based on a predefined policy. This is designed to help maintain the health of the z/OSMF data file system.
- z/OSMF Ansible Collection is enhanced to support job operations and MVS operator commands based on z/OSMF REST APIs. They are available on the [Ansible Galaxy](#) web page.

Pervasive encryption

z/OS V2.4 continues to drive pervasive encryption efforts within an enterprise with support for additional z/OS data set types, including sequential basic format and large format System Managed Storage (SMS)-managed data sets, providing users with the capability to encrypt data without application changes and to simplify the task of compliance. Support for sequential basic format and large format SMS-managed data sets enables applications using standard Basic Sequential Access Method (BSAM) and Queued Sequential Access Method (QSAM) APIs to encrypt data with no, or minimal changes. Restrictions will apply and investigation might be needed to identify eligible data sets. Applications using Execute Channel Program (EXCP) must change to encrypt data with the use of a new access method encryption macro. As with other supported data set types, this support is designed to enable the installation to specify data sets to be encrypted through a policy such as SAF or SMS, or manually. The data remains encrypted during administrative functions such as backup and restore, migration and recall, and replication. Support for sequential basic format and large format SMS-managed data sets is available on z/OS V2.3, or later, with the PTF for APAR OA56622.

OAM cloud tier support

With the PTF for APAR OA55700 for z/OS V2.3, or later, OAM's cloud tier support is now available. With this support, DFSMS OAM has added a cloud tier to its existing storage hierarchy. OAM objects can be managed and stored as objects to public, private, or hybrid cloud infrastructures supporting the S3 API. Through SMS policies, OAM objects can be stored directly to the cloud or can transition to the cloud, based on access requirements. Also provided is the capability to recall an object stored in the cloud to the disk level of the storage hierarchy. OAM-managed backup copies will continue to be supported as they are today to removable media, typically virtual or physical tape. This support was previously announced through a statement of direction in Software Announcement [218-472](#), dated November 13, 2018.

Improved auditability and serviceability

Support has been added to the password syscall to include the caller's Port of Entry IP address when calling the System Authorization Facility (SAF) to authenticate the user. The security product includes this IP address in SMF Type 80 records. This improves logging and auditing capability of users by system security administrators. Also, this additional information in SMF could be helpful in determining network setup issues. This support is available on z/OS V2.3, or later, with the PTF for APAR OA59444.

Enhanced support for NFS

The z/OS NFS Server has been enhanced with a Windows™-specific attribute, known as */win*, to help identify connections from a Windows 10 NFS client. This enables the z/OS NFS Server to tailor responses for a better experience when accessing z/OS UNIX[®] directories. This support is designed to help clients migrate to the z/OS NFS Server because the Server Message Block (SMB) server is no longer available in z/OS V2.4. To help clients in this migration, the enhanced prefix attribute is supported on z/OS V2.2, or later, with the PTF for OA57493.

Cryptographic hash utilities

Cryptographic hash utilities are provided in z/OS UNIX, including **md5**, **rmd160**, **sha1**, **sha224**, **sha256**, **sha384**, and **sha512**. These utilities use the Integrated Cryptographic Service Facility (ICSF) One-Way Hash Generate callable service to generate a cryptographic hash for input files respectively. The utilities can check cryptographic hashes read from input files. These utilities are provided on z/OS V2.3, or later, with the PTF for OA59201.

IBM DFSMSrmm plug-in for z/OSMF updated

The modern graphical user interface for DFSMSrmm that was shipped for z/OS V2.4 as a plug-in for z/OSMF with the PTF for OA59499 has been improved with several features. The PTF for APAR OA59727 makes it possible to use the z/OSMF plug-in to view data sets defined to DFSMSrmm and related data set information, and to export this data to a CSV format file. These enhancements augment the existing TSO and ISPF dialog support with an easy-to-use graphical interface providing simplified control and management of removable media manager (RMM).

ICSF enhancements

With PTFs for APAR OA59593, planned to be available on or before October 31, 2020, ICSF provides support for the following:

- The capability to use Advanced Encryption Standard (AES) keys in Derive Unique Key Per Transaction (DUKPT) services. Key derivation, especially the DUKPT derivation process, is critical for financial transactions, and with the expansion to include AES derivation keys, enterprises have additional capability to migrate their applications to a more secure AES-based cryptography.
- Enhancements to AES-based ISO-4 PIN[®] block processing. Building on prior efforts, OA59593 completes the support for ISO-4 PIN blocks that enable financial institutions to exploit stronger AES cryptography.
- Format Preserving Encryption (FPE) algorithms. The addition of callable services introduce FPE algorithms FF1, FF2, and FF2.1, which are:
 - Format Preserving Encryption Encipher (CSNBFFXE)
 - Format Preserving Encryption Decipher (CSNBFFXD)
 - Format Preserving Encryption Translate (CSNBFFXT)

FPE algorithms enable data to be encrypted in such a way that it retains the original form of data; for example, a 16-byte account number when encrypted with an FPE algorithm results in ciphertext that is 16 numeric digits.

- A new curve for Elliptic Curve Cryptography, *secp256k1*, often referred to as a Koblitz Curve.

- Updated warn mode processing that includes services that use AES and RSA keys. The warn mode option enables clients to identify changes to their applications required to exploit a coprocessor configured in PCI HSM compliance mode.

IBM System Display and Search Facility (SDSF) System Recovery Boost support

SDSF is enhanced with the PTF for APAR PH26552 to display information about System Recovery Boost.

IBM Resource Measurement Facility (RMF) enhancements

RMF enhancements include the following:

- Capability to display information about System Recovery Boost with the PTFs for APARs OA59852 and OA59321. The Boost Class in the Post Processor CPU Report [REPORTS(CPU)] indicates Recovery, for the new sysplex recovery process boosts, in addition to the already supported IPL, Shutdown, or None values for Boost Class.
- With the PTF for APAR OA58726 RMF, CF monopolization avoidance is supported.
- With the PTF for APAR OA58727 RMF, reports about storage class memory (SCM) busy percentage on a z15. RMF adds input/output processor (IOP) utilization SCM busy percentage for all IOPs in the I/O Queuing Activity (IOQ) report.

IBM Job Entry Subsystem 2 (JES2) enhancements

JES2 is updated with the PTF for OA58190, which provides single-system image support for policy-based exits. When updating the policy-based exits, this support can ensure that each multi-access spool (MAS) member is operating with the same configuration.

See the [Installation Guide](#) for usage and installation information.

Shared Memory Communications Version 2 (SMCv2) multiple IP subnet support

Currently, SMC for SMC-R and SMC-D is limited to communications for hosts attached to a common IP subnet. SMCv2 defines SMC over multiple IP subnets. The SMCv2 multiple IP subnet support extends SMC capability to additional application workloads that were previously ineligible for SMC. z/OS V2.4 delivers SMCv2 multiple IP subnet capability for SMC-D (SMC-Dv2) with the PTFs for APARs PH22695 and OA59152. SMC-Dv2 is enabled with new IBM Z capability provided by the IBM Z Internal Shared Memory (ISM) function. The new ISMv2 capability is available on the z15. For the z15 model T01, see the MCL number P46601.067 driver D41C. The ISMv2 support is in the base of the z15 model T02. For more about IBM's intent to provide SMCv2 multiple subnet capability for SMC-R, see the [Statement of direction](#) section.

Section 508 of the US Rehabilitation Act

z/OS V2.4 is capable as of September 30, 2019, when used in accordance with associated IBM documentation, of satisfying the applicable standards, including the Worldwide Consortium Web Content Accessibility Guidelines, European Standard EN 301 349, and US Section 508, provided that any assistive technology used with the product properly interoperates with it. An Accessibility Conformance Statement can be requested on the [Product accessibility information](#) website.

Statement of direction

SDSF utilization of system authorization facility (SAF) resources for security

For more than a decade, IBM has been strongly recommending that SDSF security definitions use SAF resources, such as RACF[®] and other security programs, rather than the SDSF-specific ISFPARMS/ISFPRMxx method. Using SAF has the benefit of placing security controls in the hands of the security administrator, reducing the manual task of reassembly of ISFPARMS during each upgrade, and elimination of maintenance of security definitions outside the external security manager. In the release after z/OS V2.4 IBM plans to require the use of SAF-based security for the SDSF feature. In the case in which a client is using ISFPARMS/ISFPRMxx-based security, there will be a required migration to SAF-based security. The SDSF feature plans migration documentation and tooling to assist in the conversion. In preparation for this removal for those affected, IBM recommends clients start their conversion to SAF-based security on their current z/OS release.

SVC 111 removal

In all supported releases of z/OS, IBM has stopped using SVC 111 (module IGC111), replacing previous use of SVC 111 (x'6F') with other functions. In the release after z/OS V2.4, IBM plans to remove module IGC111 from z/OS so that an expected error will occur if the SVC is invoked. If a client is using SVC 111, they will have to change to another method of giving control to an exit routine in an authorized state. IBM offers to work with any clients using SVC 111 to understand why they are using it and to help identify alternative approaches to what is currently being done.

Customized Offerings Driver

The IBM Customized Offerings Driver (5751-COD) is a prebuilt, stand-alone driving system that can be used to install z/OS ServerPac, z/OS SystemPac (in dump-by-dataset format, where available), and z/OS Custom-Built Product Delivery Offering (CBPDO) packages when clients do not have a driving system or one that meets the minimum requirements for IBM z/OS installation.

IBM intends to update the Customized Offerings Driver to include a subset of a z/OS V2.3 system, including selected functions in z/OSMF and IBM 64-bit SDK for z/OS, Java™ Technology Edition, V8.0 that can run on any IBM Z processor that is supported by z/OS V2.3, or later. This addition of some z/OSMF functions and IBM Java SDK enhances the installation capability of the Customized Offerings Driver.

Shared Memory Communications v2 (SMCv2) - RDMA over Converged Ethernet v2 (RoCEv2) and Linux[®] support

Today, SMC for both SMC-R and SMC-D is limited to communications for hosts attached to a common IP subnet. SMCv2 defines SMC over multiple IP subnets. The SMCv2 multiple IP subnet support extends SMC capability to additional application workloads that were previously ineligible for SMC. z/OS V2.4 delivers SMCv2 multiple IP subnet capability for SMC-D (SMC-Dv2). See details in the [Description](#) section. IBM plans to make SMCv2 multiple IP subnet capability available for SMC-R exploiting "routable RoCE" (RoCEv2) in a future z/OS deliverable. IBM is working with Linux distribution partners to provide SMCv2 support for Linux on IBM Z and IBM LinuxONE.

Removal of Sysplex Distributor support for Cisco Multi-Node Load Balancer (MNLB)

z/OS V2.4 is planned to be the last release to support Sysplex Distributor optimized connection load balancing with the Cisco MNLB router function. This removal does not affect any other Sysplex Distributor functions, only configurations that have SERVICEMGR specified on the VIPADEFINE statement in the TCP/IP profile. In the future, the SERVICEMGR keyword will be ignored and all load balancing processing will be performed by the Sysplex Distributor.

Cryptographic support for Common Cryptographic Architecture (CCA) redirection removal

z/OS V2.4 (ICSF FMID HCR77D0) and the Web deliverable Cryptographic Support for z/OS V2.2 -z/OS V2.4 (ICSF FMID HCR77D1) are planned to be the last releases

that support CCA redirection to a regional cryptographic service. In the future, ICSF intends to restrict use of regional cryptographic services to the PKCS #11 interfaces only. Because these callable services for redirection of CCA requests to a network attached regional cryptographic server were not, to IBM's knowledge, ever exploited, IBM does not anticipate any client impact in their removal.

RACF support for TSO help command

z/OS V2.4 is planned to be the last release to support the RACF TSO help command. IBM recommends using the [z/OS Internet Library](#), specifically the [z/OS Version 2 Release 4 Security Server RACF Command Language Reference](#) for RACF command syntax support.

Statements by IBM regarding its plans, directions, and intent are subject to change or withdrawal without notice at the sole discretion of IBM. Information regarding potential future products is intended to outline general product direction and should not be relied on in making a purchasing decision. The information mentioned regarding potential future products is not a commitment, promise, or legal obligation to deliver any material, code, or functionality. Information about potential future products may not be incorporated into any contract. The development, release, and timing of any future features or functionality described for IBM products remain at the sole discretion of IBM.

Hardware and software support services

SmoothStart/installation services

IBM SmoothStart Services and Installation Services are not provided.

Reference information

For information about z/OS V2.4, see:

- Software Announcement [220-226](#), dated June 16, 2020
- Software Announcement [220-102](#), dated March 17, 2020
- Software Announcement [219-210](#), dated December 10, 2019
- Software Announcement [219-344](#), dated July 23, 2019
- Software Announcement [219-013](#), dated February 26, 2019

For information about the z15, see:

- Hardware Announcement [120-050](#), dated August 4, 2020
- Hardware Announcement [120-006](#), dated April 14, 2020
- Hardware Announcement [120-013](#), dated January 14, 2020
- Hardware Announcement [119-085](#), dated November 26, 2019
- Hardware Announcement [119-027](#), dated September 12, 2019

For information about the z14 Model ZR1, see:

- Hardware Announcement [118-075](#), dated October 2, 2018
- Hardware Announcement [118-018](#), dated April 10, 2018

For information about the z14, see:

- Hardware Announcement [118-075](#), dated October 2, 2018
- Hardware Announcement [117-093](#), dated November 28, 2017
- Hardware Announcement [117-044](#), dated July 17, 2017

For information about the z13^(R), see:

- Hardware Announcement [119-039](#), dated May 7, 2019
- Hardware Announcement [119-014](#), dated February 12, 2019
- Hardware Announcement [116-058](#), dated June 7, 2016
- Hardware Announcement [115-055](#), dated March 3, 2015
- Hardware Announcement [115-001](#), dated January 14, 2015

For information about the z13s^(R), see:

- Hardware Announcement [116-058](#), dated June 7, 2016
- Hardware Announcement [116-002](#), dated February 16, 2016

For information about the IBM zEnterprise EC12, see Hardware Announcement [112-155](#), dated August 28, 2012.

For information about the IBM zEnterprise BC12, see Hardware Announcement [113-121](#), dated July 23, 2013.

Business Partner information

If you are a Direct Reseller - System Reseller acquiring products from IBM, you may link directly to Business Partner information for this announcement. A PartnerWorld ID and password are required (use IBMid).

[BP Attachment for Announcement Letter 220-378](#)

Availability of national languages

Translation information, if available, can be found at the [Translation Reports](#) website.

Program number

Program number	VRM	Program name
5650-ZOS	2.4	z/OS

Technical information

Specified operating environment

Hardware requirements

z/OS V2.4 runs on these Z servers:

- z15 Models T01 and T02
- z14 Models M01-M05
- z14 Model ZR1
- z13
- z13s
- zEnterprise EC12 (zEC12)
- zEnterprise BC12 (zBC12)

Software requirements

The z/OS base is a system that can be IPLed. There are no software prerequisites in order to IPL. Specific functions might require additional products not included in the z/OS base or in the optional features of z/OS. See the [z/OS V2.4 Planning for Installation](#) (GA32-0890) web page for a listing of specific software requirements.

Compatibility

For compatibility information about z/OS V2.4, see Software Announcement [219-344](#), dated July 23, 2019.

Planning information

Direct client support

Direct client support is provided by IBM Operational Support Services - SoftwareXcel Enterprise Edition or SoftwareXcel Basic Edition. These fee services can enhance your productivity by providing voice and electronic access into the IBM support organization. IBM Operational Support Services - SoftwareXcel Enterprise Edition or SoftwareXcel Basic Edition will help answer questions pertaining to usage, how-to, and suspected software defects for eligible products.

Installation and technical support is provided by IBM Global Services. For more information on services, call 888-426-4343.

To obtain information on customer eligibility and registration procedures, contact the appropriate support center.

Security, auditability, and control

Data security and auditability in the z/OS environment are enhanced by the functions available in the optional Security Server for z/OS feature.

The client is responsible for evaluation, selection, and implementation of security features, administrative procedures, and appropriate controls in application systems and communication facilities.

Ordering information

New licensees

Not applicable.

For ordering information on the base program, z/OS V2.4, see Software Announcement [219-344](#), dated July 23, 2019.

Publications

A program directory is supplied automatically with the basic machine-readable material.

To access the unlicensed z/OS product documentation, start at the [z/OS Internet Library](#). It contains direct links to the following repositories and content:

- [IBM Knowledge Center](#) sections for z/OS V2.4 and other supported releases
- z/OS V2.4 Library, hosted on [Resource Link](#), to download individual or grouped PDFs. An IBMid and password are required
- Adobe™ Indexed PDF Collections (SC27-8430) to easily conduct offline searches on the z/OS product documentation
- Downloadable collections of IBM Knowledge Center plug-ins for clients who host their own instances of IBM Knowledge Center for z/OS (KC4z)
- Content Solutions, which provide comprehensive and interactive content such as workflows, videos, and content collections

- [IBM Z Publications Library Archive](#), to obtain as-is content for out-of-service products and releases

PDF collections are provided in the "zip" format that any modern zip utility can process.

Licensed documentation

Subsequent updates (technical newsletters or revisions between releases) to the publications shipped with the product will be distributed to the user of record for as long as a license for this software remains in effect. A separate publication order or subscription is not needed.

Subsequent updates (technical newsletters or revisions between releases) to the publications shipped with the product will be distributed to the user of record for as long as a license for this software remains in effect. A separate publication order or subscription is not needed.

Terms and conditions

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Statement of good security practices

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Corrections

(Corrected on October 13, 2020)

Revised Reference information section.

(Corrected on October 7, 2020)

Revised Description section under "z/OS software update enhancement" and "ICSF enhancements" headings.