

z/OS 3.2 IBM Education Assistant

Solution Name: Upgrading to z/OS 3.2 - Highlights

Solution Element(s): z/OS 3.2

September 2025



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Abstract:

z/OS 3.2 is the latest release of our flagship operating system. Come to this session to learn the highlights on how to upgrade to z/OS 3.2, from either z/OS 3.1 or V2.5.

The general availability date for z/OS 3.2 is planned for September 30, 2025.

What you need to know for upgrading to z/OS 3.2

(Highlights of the planning and technical actions)

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Agenda



- Content of z/OS3.2
 - Added, Changed, and Withdrawn Elements and Features
- z/OS Ordering and Deliverables
 - Products Related to z/OS
- z/OS Policies
 - z/OS End of Service dates
 - z/OS Coexistence-Upgrade-Fallback
- Planning for z/OS3.2:
 - Ensuring System Requirements are Satisfied
 - Coexistence System Requirements
 - Using z/OSMF Workflow for z/OS Release Upgrade
 - z/OSMF Driving System Requirement
 - Some Upgrade Actions You Can Do NOW
 - Programmatic Verification of Upgrade Actions
- Highlights of z/OS3.2 UpgradeActions



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What you need to know for upgrading to z/OS 3.2

(Highlights of the planning and technical actions)

Scope



This presentation is focused on [upgrading z/OS, not the HW upgrade.](#)

If upgrading to a new server level, see:

- [For z15:](#) z/OS z15 Workflow (or Upgrade action in z/OS V2.5 Upgrade Workflow) for “Upgrade to an IBM z15 server”.
- [For z16:](#)(A01 and A02): z/OS z16 Workflow
 - Found in PTF with [FIXCAT IBM.Device.Server.z1-931.RequiredService](#)
 - Located at /usr/lpp/bcp/upgrade/z16_zOS_Upgrade_Workflow.xml
- [For z17:](#) z/OS z17 Workflow
 - Found in PTF with [FIXCAT IBM.Device.Server.z1-9175.RequiredService](#)
 - Located at /usr/lpp/bcp/upgrade/z17_zOS_Upgrade_Workflow.xml

Note: All HW upgrade actions are found in the HW Upgrade Workflow now, as they have been removed from the z/OS Software Upgrade Workflows.

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What you need to know for upgrading to z/OS 3.2 (Highlights of the planning and technical actions)

z/OS 3.2 Elements (changing* in z/OS 3.1 and V3.2)



NEW!

- | | | |
|--|---|--|
| → BCP | → IBM z/OS Management Facility | → TSO/E |
| → Program Binder | → IBM z/OS Workload Interaction Correlator (zWIC) | → XML Toolkit (V1.11 level) |
| → Capacity Provisioning Manager | → Infoprint Server | → z/OS Advanced Data Gatherer |
| → BCP Support for Unicode | → Integrated Security Services: | → z/OS Data Gatherer |
| → Common Information Model (CIM) | → Network Authentication Service | → z/OS Container Extensions |
| → Communications Server | → ISPF | → z/OS File System (zFS) |
| → Cryptographic Services: | → JES2 | → z/OS OpenSSH |
| → ICSF (FMID HCR77F0) | → Language Environment | → z/OS Security Level 3: |
| → PKI Services | → Network File System | → Communications Server |
| → System SSL | → RMF | → IBM Tivoli Directory Server Security Level 3 |
| → DFSMSdfp (including DFMSStvs) | → RUCSA | → Network Authentication Service Level 3 |
| → DFSMSdss | → SDSF | → System SSL Level 3 |
| → DFMSHsm | → Security Server – RACF | → z/OS UNIX |
| → DFMSrmm | | → zEDC |
| → DFSORT | | |
| → HCD | | |
| → HCM | | |
| → IBM Tivoli Directory Server | | |
| → IBM Z Deep Neural Network (zDNN) | | |

KEY:

- * “Changing” means the FMID is changing. Remember, PTFs might have added new functions on FMIDs that are not changing.
- Black (not in bold) are base elements
- Green (also in bold) are optional priced features
- Brown (also in *italics*) are optional unpriced features with export controls
- This element changed in z/OS 3.1
- This element changed in z/OS 3.2
- All other elements not listed have not changed since z/OS V2.5.
- New in 3.1: XML Toolkit

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z/OS Elements and Features

z/OS consists of base elements and optional features:

- The **base elements** (or simply *elements*) deliver essential operating system functions. When you order z/OS, you receive all of the base elements.
- The **optional features** (or simply *features*) are orderable with z/OS and provide additional operating system functions. Optional features are unpriced or priced:
 - Unpriced features* are shipped to you **only if** you order them. If you plan to use any unpriced features, IBM recommends that you order them when you order your base elements. You must not wait until the next release becomes available. Once a release's base elements are no longer orderable, usually neither are its unpriced features.
 - Priced features* are **always** shipped to you. When IBM packages your order, we *enable* the priced features that you ordered. These features are ready to use after you install z/OS (and customize them as needed). We *disable* the priced features that you did not order. Although they are installed on your system, you cannot use them. Later on, if you decide to use them, you notify IBM and you enable them dynamically (which is known as *dynamic enablement*). You dynamically enable by updating parmlib member IFAPRDxx and you notify IBM by contacting your IBM representative.

Elements and features may be exclusive or nonexclusive:

- An element or feature is called **exclusive** to z/OS if it exists only within z/OS (not also as a separately orderable, or stand-alone, product) and if future functional enhancements will occur only within z/OS.
- An element or feature is called **nonexclusive** if it exists both (1) within z/OS and (2) as a stand-alone product.

Listed in the slide above are the changing FMIDs (elements) within z/OS 3.2 since z/OS V2.5.

What you need to know for upgrading to z/OS 3.2 (Highlights of the planning and technical actions)

Important ordering changes for z/OS 3.2 (and 3.1)



- [z/OS Security Level 3:](#) **Do not forget to order if you need it!**
- [Communications Server Security Level 3](#)
 - [IBM Tivoli Directory Server Security Level 3](#)
 - [Network Authentication Service Level 3](#)
 - [SSL Level 3](#)
- Note that the Communications Server Security Level 3 optional unpriced export-controlled feature is now part of the z/OS Security Level 3 feature.
- [IBM JES3, and BDT priced features](#)
- These priced features (as well as the BDT base element) have been removed as of z/OS 3.1.
 - JES2 is installed into the z/OSMF portable software instance base z/OS SMP/E zone, and is not allowed to be removed.
- [DFSMStvs priced feature](#)
- This priced feature is now part of the base as of 3.1, and is entitled to use with the base.
 - XML Toolkit has been added as a base element
 - This had been the program product , 5655-J51, V1.11.
- *Reminders from prior z/OS releases, continuing in z/OS 3.1:*
- Enabling z/OS Advanced Data Gatherer feature also implicitly enables the z/OS Workload Interaction Correlator feature.
 - Ordering the RMF feature automatically provides entitlement to the z/OS Advanced Data Gatherer feature to be enabled.

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Bypassable Requisites on Shopz for z/OS 3.2 (and 3.1)



MVS: z/OS Operating System

Select	Product	Description	Version	Language	Notes
<input checked="" type="checkbox"/>	▲●● [5655-ZOS]	z/OS 3 Base	[Entitlement Description] [FMIDs]	3.01.00	English (US) ⓘ
The above product has a bypassable requisite for one of the following products:					
<input type="radio"/>	▲●● [5655-PYT]	Open Ent SDK for Python	[Entitlement Description] [FMIDs]	3.13.00	English (US)
The above product has a bypassable requisite for one of the following products:					
<input type="radio"/>	▲●● [5698-PA1]	Z Open Automation Utilities	[Entitlement Description] [FMIDs]	1.03.00	English (US)
The above product has a bypassable requisite for one of the following products:					
<input type="radio"/>	▲●● [5655-JB1]	Semeru Runtime Java z/OS 21	[Entitlement Description] [FMIDs]	21.00.00	English (US)
The above product has a bypassable requisite for one of the following products:					
<input type="radio"/>	▲●● [5655-164]	z/OS AI Services	[Entitlement Description] [FMIDs]	1.02.00	English (US)
The above product has a bypassable requisite for one of the following products:					
<input type="radio"/>	▲●● [5655-OEF]	Open Enterprise Foundation	[Entitlement Description] [FMIDs]	1.01.00	English (US)

- A quick reminder about bypassable prerequisites, when building your order in ShopZ you'll have the option to include program products that are tightly related to z/OS content, which are zero cost products.
 - ZOAU and OEF are zero cost S&S!
- Remember: Semeru 21 is the current z/OS dependent Java version at this time.
- More information on Bypassable Requisites: [At Marna's Blog Here!](#)

Decide if you want to:

- Include with z/OS, in your deployable package
- Order separately and deploy with or without z/OS (can be installed into z/OS global zone)
- Do nothing, and order it later if you need it.

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What you need to know for upgrading to z/OS 3.2
(Highlights of the planning and technical actions)

Functions Withdrawn from z/OS 3.1



JES3	Priced feature – many JES2 functions already added. Contact jes3q@us.ibm.com if you need more information. As of z/OS V2.4, JES2 SMP/E zones are merged into the base zones, for z/OSMF portable software instances (ServerPac).	z/OS 3.1
IBM Bulk Data Transfer (BDT) Features	Functional replacements for BDT F2F are IBM MQ Advanced for z/OS (5655-AV9), which include IBM MQ Managed File Transfer and MQ Advanced Message Security, and IBM Sterling Connect:Direct for z/OS (5655-X11).	z/OS 3.1
IBM z/OS Global Mirror(XRC)	New functions to support asynchronous replication technology are intended to be developed only for DS8000 Global Mirror, and it is intended that no new z/OS Global Mirror functions will be provided with DS8900F and z/OS.	z/OS 3.1
Distributed File Manager	Base element – DFSMS. If you use DFM to enable remote client, it is recommended to use z/OS NFS instead.	z/OS 3.1
ISFPARMS assembler macros	Priced feature – SDSF. Use ISFPRMxx parmlib member instead. This has been a long time recommendation.	z/OS 3.1
Knowledge Center for z/OS (KC4Z)	Base function. Use online IBM Documentation instead.	z/OS 3.1

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Withdrawn in z/OS 3.1 (last delivered in z/OS V2.5)

This section lists items that were withdrawn in z/OS 3.1. You should take this into account if you are upgrading from z/OS V2.5 or 3.1 to z/OS 3.2. The removal of these functions may have upgrade actions which you can perform now, in preparation for z/OS 3.2.



- IBM announced that JES2 is the strategic Job Entry Subsystem (JES) for the z/OS Operating System and that JES3 would continue to be supported and maintained. To date, IBM has made significant investment in JES2 by delivering unique functions such as email support in JCL, spool migration and merge, and dynamic checkpoint expansion and tuning to make management easier. In z/OS V2.4, IBM delivered JES2 Spool Encryption and a new user exit alternative based on defining policies that allow exit programs to be implemented in a parameterized rule-based approach. To help JES3 to JES2 migration efforts, JES2 has added functionality, including dependent job control, deadline scheduling, 8-character job classes, and interpreting JES3 JECL control statements. For z/OS V2.4, additional function was provided to aid in migrations, including Disk Reader capability and enhanced JES3 JECL support in JES2 (ROUTE XEQ). Today, as a result of our strategic investment and ongoing commitment to JES2, as well as continuing to enhance JES3 to JES2 migration aids, IBM has announced that z/OS V2.5 is the last release of z/OS that will include JES3 as a feature. If you are one of the clients who remains on JES3, IBM encourages you to start planning your migration. For questions, contact jes3q@us.ibm.com.
- z/OS 2.5 is the last release that BDT is included in z/OS. This applies to both priced features, BDT SNA NJE and BDT File-to-File (F2F). BDT SNA NJE offers JES3 clients the capability to send information over SNA networks to other end points. Note that BDT SNA NJE does not apply to JES2 clients because this function has always been included as part of JES2. The BDT F2F feature offers both JES3 and JES2 clients the capability of managed file copying from one system to another system. Functional replacements for BDT F2F are IBM MQ Advanced for z/OS (5655-AV9), which includes IBM MQ Managed File Transfer and MQ Advanced Message Security, and IBM Sterling™ Connect:Direct® for z/OS (5655-X11). Support is planned to be provided for BDT, BDT SNA NJE, and BDT F2F until the end of support for z/OS V2.5.

What you need to know for upgrading to z/OS 3.2

(Highlights of the planning and technical actions)

- z/OS support for z/OS Global Mirror: For decades, IBM has offered two asynchronous replication strategies, IBM z/ OS Global Mirror, also known as extended remote copy, or XRC, and DS8000 Global Mirror. IBM plans to support and maintain z/OS Global Mirror on z/OS with its current function only, and z/OS V2.5 will be the last release to provide such support. This withdrawal aligns with what was previously announced in Hardware Announcement 920-001, dated January 7, 2020, which indicated the DS8900F family would be the last platform to support z/OS Global Mirror. New functions to support asynchronous replication technology are intended to be developed only for DS8000 Global Mirror, and it is intended that no new z/OS Global Mirror functions will be provided with DS8900F and z/OS.
- Deprecation of DFSMS Distributed FileManager: z/OS V2.5 is the last release to support the DFSMS Distributed FileManager (DFM), a seldom used function in z/OS. To determine if DFM is being used, it is recommended to look for JCL that starts DFM; for example, START DFM,SUB=MSTR. If you use DFM to enable remote clients in your network to access data on z/OS systems, it is recommended to use the z/OS Network File System (NFS) instead.
- System Display and Search Facility (SDSF) ISFPARMS removal: For many z/OS releases, a recommended update action has been to specify z/OS SDSF customization with the ISFPRMxx parmlib member. There are several major advantages to using the ISFPRMxx parmlib member format over the original format, which involves an assembler module and SDSF macros. Beginning with z/OS 3.1, IBM plans that only the ISFPRMxx parmlib member format will be supported. For this reason, if the parmlib member ISFPRMxx is not currently being used, IBM recommends clients convert to using ISFPRMxx to avoid being impacted in the future.
- To replace Knowledge Center for z/OS (KC4Z), use the online IBM Documentation for z/OS, <https://www.ibm.com/docs/en/zos>.



Functions Withdrawn from z/OS 3.2



DFSMSoam Support for IBM 3995 optional libraries and drives for unstructured (object) data	Base function: The other layers of the OAM storage tier such as IBM Db2®, z/OS zFS, NFS, tape, and cloud will continue to be supported. IBM had previously discontinued support for the 3995 optical libraries and drives effective December 31, 2012.	z/OS 3.2
C/C++ Performance Analyzer host	Priced function: The C/C++ Performance Analyzer host component was part of the optionally priced feature of XL C/C++. The recommended replacements are: <ul style="list-style-type: none">• IBM Application Performance Analyzer for z/OS• IBM Application Delivery Foundation for z/OS	z/OS 3.2

Withdrawn in z/OS 3.2 (last delivered in z/OS 3.1)

This section lists items that were withdrawn in z/OS 3.2. You should take this into account if you are upgrading from z/OS V2.5 or 3.1 to z/OS 3.2. The removal of these functions may have upgrade actions which you can perform now, in preparation for z/OS 3.2.

- z/OS 3.1 is the last release that DFSMSdfp Object Access Method (OAM) supports the IBM 3995 optical libraries and drives for unstructured (object) data. The other layers of the OAM storage tier such as IBM Db2®, z/OS zFS, NFS, tape, and cloud will continue to be supported. IBM had previously discontinued support for the 3995 optical libraries and drives effective December 31, 2012, in Services Withdrawal announcement 911-106, dated June 14, 2011.
- In z/OS 3.2, the C/C++ Performance Analyzer host component (FIMIDs H24P111 and J24P112) is removed from z/OS. The C/C++ Performance Analyzer host component was part of the optionally priced feature of XL C/C++. The C/C++ Performance Analyzer host component has been available within z/OS to support IBM C/C++ Productivity Tools for OS/390 (5655-B85), which was withdrawn from service on 30 May 2020. The recommended replacements for IBM C/C++ Productivity Tools for OS/390 are: IBM Application Performance Analyzer for z/OS, or IBM Application Delivery Foundation for z/OS. If using C/C++ Performance Analyzer host component for the IBM C/C++ Productivity Tools for OS/390, migrate to using one of these products.

**What you need to know for upgrading to z/OS 3.2
(Highlights of the planning and technical actions)**

What you need to know for upgrading to z/OS 3.2
(Highlights of the planning and technical actions)

Functions Planned to be Withdrawn

in the release after z/OS 3.2...



DFSMSdfpCheckpoint/Restart	<p></p> <p>Base function - Any remaining z/OS software that still depends on checkpoint restart capability may need to be redesigned to remove the dependency on checkpoint/restart. (CHKPT macro is intended to be syntax checked and ignored. Restart capability will need to be redesigned to remove the dependency on checkpoint/restart.)</p> <p>z/OS Generic Tracking is planned with APAR OA64519 on z/OS V2.4 and higher.</p>	Planned for the release after z/OS 3.2
Common Information Module	<p></p> <p>Base element – All z/OS software that depends on a CIM server running on z/OS will be updated to remove the dependency.</p>	Planned for the release after z/OS 3.2
MICR/OCR	<p>Base element - Other modern document processing capabilities are available for magnetic ink character recognition. Any remaining z/OS software that depends on MICR/OCR will need to be upgraded to remove the dependency.</p>	Planned for the release after z/OS 3.2
TSO/E Information Center	<p>Base function - Modern alternatives exist for much of the function, some of which is available from z/OSMF, Zowe, and IBM online documentation.</p>	Planned for the release after z/OS 3.2

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Functions Planned to be Withdrawn

in the release after z/OS 3.2...



Online Test Executive Program (OLTEP)	<p>Base function - used to run diagnostics against I/O devices. Current devices include diagnostic programs built into their firmware making OLTEP unnecessary.</p>	Planned for the release after z/OS 3.2
Quick start and warm start IPLs	<p>Base function - Only cold start IPLs will be supported, which are IPLs with CLPA specified, resulting in the pageable link pack area (PLPA) being reloaded/rebuilt and virtual input/output (VIO) data set pages being cleared.</p>	Planned for the release after z/OS 3.2
LNLKSTxx and IEAAPFxx parmlib members	<p></p> <p>Base function - Preferred specification for the linklist and the authorized program facility has been the PROGxx parmlib member.</p>	Planned for the release after z/OS 3.2
Virtual equals real (V=R) jobs	<p></p> <p>Base function - V=R jobs are programs that require real and virtual memory addresses to be equivalent. Systems that already specify or default to REAL=0 are not affected. The Generic Tracker Facility and SMF 30 records can be used to identify jobs that use ADDRSPC=REAL.</p>	Planned for the release after z/OS 3.2
Default location for DASD and Tape Unit Control Blocks (UCBs)	<p>Base function - IBM intends to change the default location for DASD and Tape UCBs to be in 31-bit storage (LOCANY=YES).</p>	Planned for the release after z/OS 3.2

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What you need to know for upgrading to z/OS 3.2
(Highlights of the planning and technical actions)

Functions Planned to be Withdrawn
in the release after z/OS 3.2...



z/OS Discovery and Auto-Configuration (zDAC)	Base function - removal of zDAC affects some functions available through HCD and HCM, including removal of discover and propose functions for new and changed control units and I/O devices and configuration verification functions that leverage sensed data obtained using the discover function. 	Planned for the release after z/OS 3.2
Dynamic Channel-Path Management (DCM)	Base function - z/OS processing will no longer detect, manage, or show current status of dynamic channel paths. Managed channel definitions should be removed and optionally replaced with static CHPIDs based on capacity needs. 	Planned for the release after z/OS 3.2
Ability to disable HYPERPAV mode	Base function - Removal of the ability to disable HYPERPAV will have no effect on DASD devices that are not HyperPAV capable. 	Planned for the release after z/OS 3.2
Deprecated CMS, SSL APIs, SSLv2 and SSLv3 protocols	Base function - The Internet Engineering Task Force (IETF) deprecated SSL V2.0 in 2011 and SSL V3.0 in 2015. All z/OS System SSL and AT-TLS applications will need to change to use the newer protocols, and all z/OS System SSL applications that make use of the deprecated APIs will need to be changed to use the corresponding newer APIs.	Planned for the release after z/OS 3.2

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Planned for removal in the release following z/OS 3.2

This section lists items that IBM has announced it intends to remove in the releases after z/OS 3.2. You are encouraged to consider these removals when making your plans for system upgrades. These statements represent IBM's current intentions. IBM development plans are subject to change or withdrawal without further notice.

- DFSMSdfp Checkpoint/Restart: z/OS 3.2 is planned to be the last release to support DFSMSdfp Checkpoint/Restart. The intent is not to require changes to applications with regards to usage of the CHKPT macro. Usage of the CHKPT macro is intended to be syntax checked and ignored. Any remaining z/OS software that still depends on checkpoint/restart capability may need to be redesigned to remove the dependency on checkpoint/restart. Updates to allow identification of usage of checkpoint/restart are planned to be available with the Generic Tracker Facility. z/OS continues to provide job restart processing, which works on a step basis as well as capabilities like Transactional VSAM which may provide the basis for solutions that could replace checkpoint/restart.
- Common Information Model (CIM) server: z/OS 3.2 is planned to be the last z/OS release to include the CIM server. All z/OS software that depends on a CIM server running on z/OS will need to be upgraded to remove the dependency.
- MICR/OCR: z/OS 3.2 is planned to be the last release to support MICR/OCR function, which provides the support for magnetic ink character recognition and optional character recognition, likely used in the financial industry. Other modern document processing capabilities are available. Any remaining z/OS software that depends on MICR/OCR will need to be upgraded to remove the dependency.
- TSO/E Information Center Facility: z/OS 3.2 is planned to be the last release to support TSO/E Information Center Facility. Modern alternatives exist for much of the function, some of which is available from z/OSMF, Zowe, and IBM online documentation.
- Online Test Executive Program (OLTEP): z/OS 3.2 is planned to be the last release to include the OLTEP which was used to run diagnostics against I/O devices. Current devices include diagnostic programs built into their firmware making OLTEP unnecessary.
- Quick start and warm start IPLs: z/OS 3.2 is planned to be the last release to support quick start and warm start IPL types. Only cold start IPLs will be supported, which are IPLs with CLPA specified, resulting in the pageable link pack area (PLPA) being reloaded/rebuilt and virtual input/output (VIO) data set pages being cleared. A quick start is an IPL that specified CVIO to clear VIO data set pages but not reload PLPA. A



What you need to know for upgrading to z/OS 3.2

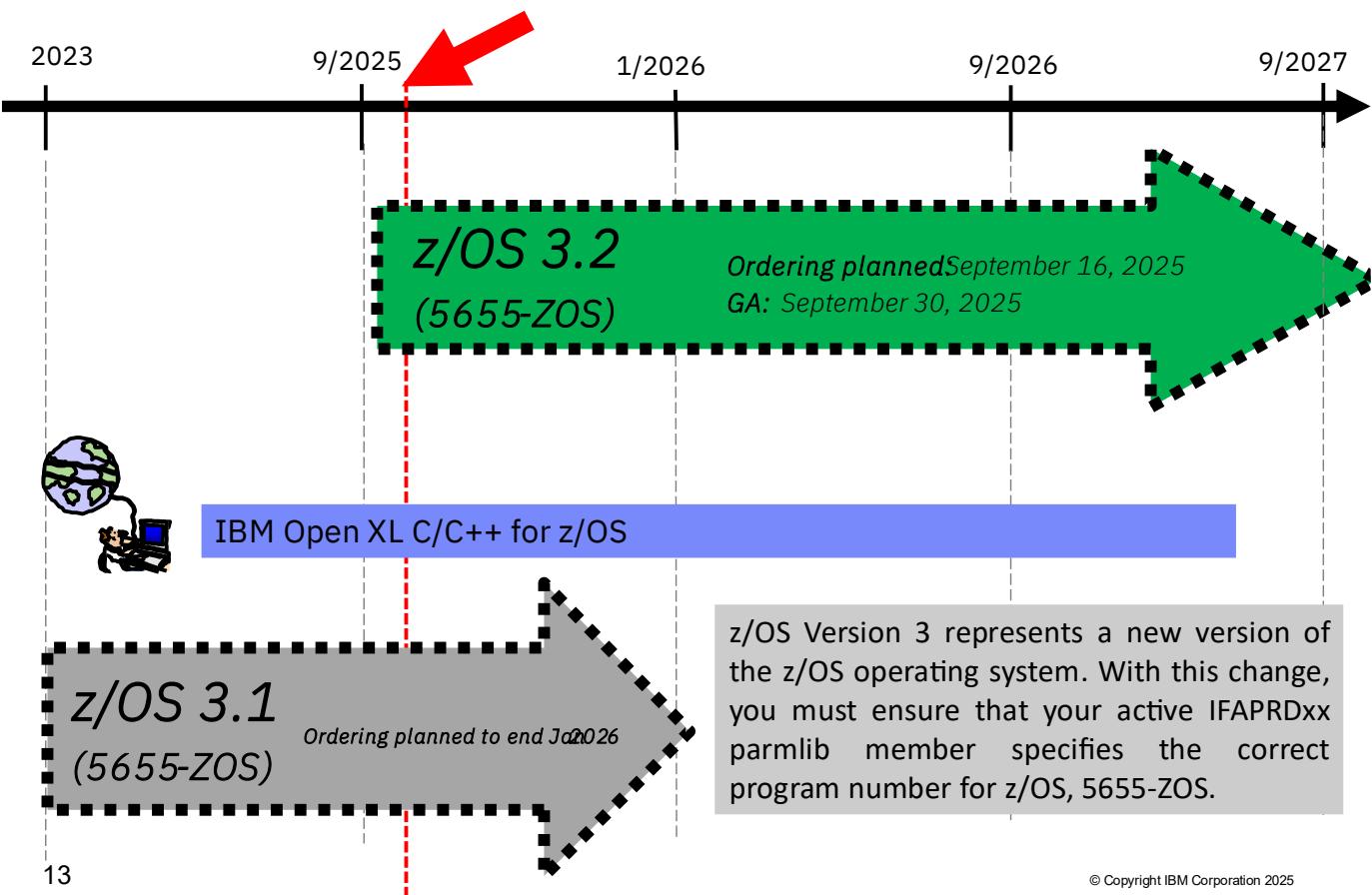
(Highlights of the planning and technical actions)

warm start is an IPL that does not reload PLPA and preserves journaled VIO data sets. The IEASYSxx PARMLIB keywords CLPA will be implicit for all IPLs. Additionally, because warm starts are no longer supported, virtual input/output (VIO) journaling will no longer be supported. The IEASYSxx PARMLIB keyword VIODSN will be ignored.

- **LNLSTxx and IEAAPFxx parmlib members:** z/OS 3.2 is planned to be the last release to support the LNLSTxx and IEAAPFxx parmlib members. For many years now, the preferred specification for the linklist and the authorized program facility has been the PROGxx parmlib member. The PROGxx parmlib member offers several advantages, such as comprehensive control in a single location (with dynamic exit specification and other controls) and ability to perform dynamic updates.
- **Virtual equals real (V=R) jobs:** z/OS 3.2 is planned to be the last release to support V=R jobs. V=R jobs are programs that require real and virtual memory addresses to be equivalent. ADDRSPC=REAL keyword on the EXEC or JOB JCL statements will no longer be supported. IEASYSxx PARMLIB keyword REAL will be ignored and default to zero. IEASYSxx PARMLIB keyword VRREGN will be ignored. Systems that already specify or default to REAL=0 are not affected. The Generic Tracker Facility and SMF 30 records can be used to identify jobs that use ADDRSPC=REAL.
- **Change the default location for DASD and Tape Unit Control Blocks (UCBs):** z/OS 3.2 is planned to be the last release in which the default location for DASD and Tape UCBs is in 24-bit storage (LOCANY=NO). In a future release, IBM intends to change the default location for DASD and Tape UCBs to be in 31-bit storage (LOCANY=YES).
- **z/OS Discovery and Auto-Configuration (zDAC):** z/OS 3.2 is planned to be the last z/OS release in which IBM intends to support z/OS Discovery and Auto-Configuration (zDAC). The removal of zDAC affects some functions available through HCD and HCM, including removal of discover and propose functions for new and changed control units and I/O devices and configuration verification functions that leverage sensed data obtained using the discover function. IBM will be providing a migration health check to assist in the determination of usage of the zDAC functions.
- **Dynamic Channel-Path Management (DCM):** z/OS 3.2 is planned to be the last z/OS release in which IBM intends to support DCM. z/OS processing will no longer detect, manage, or show current status of dynamic channel paths. Managed channel definitions should be removed and optionally replaced with static CHPIDs based on capacity needs. IBM will be providing a migration health check to assist in the determination of the usage of DCM.
- **Ability to disable HYPERPAV mode:** z/OS 3.2 is planned to be the last z/OS release in which IBM intends to support the ability to select traditional PAV operation mode (use of HYPERPAV=NO). Removal of the ability to disable HYPERPAV will have no effect on DASD devices that are not HyperPAV capable. IBM will be providing a migration health check to assist in the determination of usage of HYPERPAV=NO.
- **Deprecated CMS, SSL APIs, SSLv2 and SSLv3 protocols:** z/OS 3.2 is planned to be the last release to support the deprecated CMS, SSL APIs, SSLv2 and SSLv3 protocols. The Internet Engineering Task Force (IETF) deprecated SSL V2.0 in 2011 and SSL V3.0 in 2015. All z/OS System SSL and AT-TLS applications will need to change to use the newer protocols, and all z/OS System SSL applications that make use of the deprecated APIs will need to be changed to use the corresponding newer APIs. These APIs are documented in the z/OS Cryptographic Services within the Deprecated Secure Socket layer (SSL) APIs and the Certificate Management Services (CMS) API reference chapters.



z/OS Ordering and Deliverables Schedule



z/OS Ordering and Deliverable Key Dates

Key dates for recent z/OS releases and functions:

- September 2023: z/OS 3.1 general availability.
- September 16, 2025: z/OS 3.2 ordering begins
- September 30, 2025: z/OS 3.2 general availability.
- January 2026: Ordering complete for z/OS 3.1.

Web deliverables

Sometimes enhancements are provided as Web deliverables, **and not integrated in your Portable Software Instance or CBPDO deliverable**. For example, the IBM Open XL C/C++ for z/OS compiler is available this way. It is available from <https://early-access.ibm.com/software/support/trial/cst/programwebsite.wss?siteId=2041&h=null&p=null> and packaged as two files that you download:

- A **readme** file, which contains a sample job to uncompress the second file, transform it into a format that SMP/E can process, and invoke SMP/E to RECEIVE the file. This file must be downloaded as text.
- A **pax.z** file, which contains an archive (compressed copy) of the FMIDs to be installed. This file needs to be downloaded to a workstation and then uploaded to a host as a binary file.

For Web downloads, you perform the SMP/E installation work yourself.

What you need to know for upgrading to z/OS 3.2 (Highlights of the planning and technical actions)

Some orderable no-charge** products (with z/OS 3.2, 5655-ZOS)



- ❖ [IBM Semeru Runtime Certified Edition for z/OS, 21.0 5655-JB1,5655-I48\)**](#)
 - *This is the dependency for z/OS 3.2 GA! Except future dependency moves.*
- [IBM Semeru Runtime Certified Edition for z/OS, 17.0 5655-UA1,5655-I48\)**](#)
- ❖ [IBM AI System Services for IBM z/OS 1.1 \(5655-164,5655-165\)**](#) ↵ *for z/OS foundational AI capabilities!*
- ❖ [IBM Open Enterprise Foundation for z/OS \(5655-OEF\), no-charge S&S!](#)
- ❖ [IBM Z Open Automation Utilities \(ZOAU\) \(5698-PA1\), no-charge S&S!](#)
- ❖ [IBM Open Enterprise SDK for Python \(3.13\) \(5655-PYT\), no-charge S&S!](#)



**Subscription & Support (S&S) may be priced
❖ Shopz bypassable ordering requisite

Announced Java 8 dates:

- ✓ End of Marketing: IBM 64-bit SDK for z/OS V8 (5655-DGH) and 31-bit (5655-DGG): Jan 29, 2024
- ❑ End of Service: IBM 64-bit SDK for z/OS V8 (5655-DGH) and 31-bit (5655-DGG): Sept 30, 2026

Announced Semeru 11 dates:

- ✓ End of Marketing: IBM Semeru Runtime for z/OS 11.0 (5655-DGJ): April 1, 2024
- ✓ End of Service: IBM Semeru Runtime for z/OS 11.0 (5655-DGJ): Nov 30, 2024

Announced Semeru 17 dates:

- ❑ End of Service: IBM Semeru Runtime for z/OS 11.0 (5655-DGJ): Sept 30, 2026

Announced Semeru 21 dates:

- ✓ GA: IBM Semeru Runtime for z/OS 21.0 (5655-JB1): November 22, 2024

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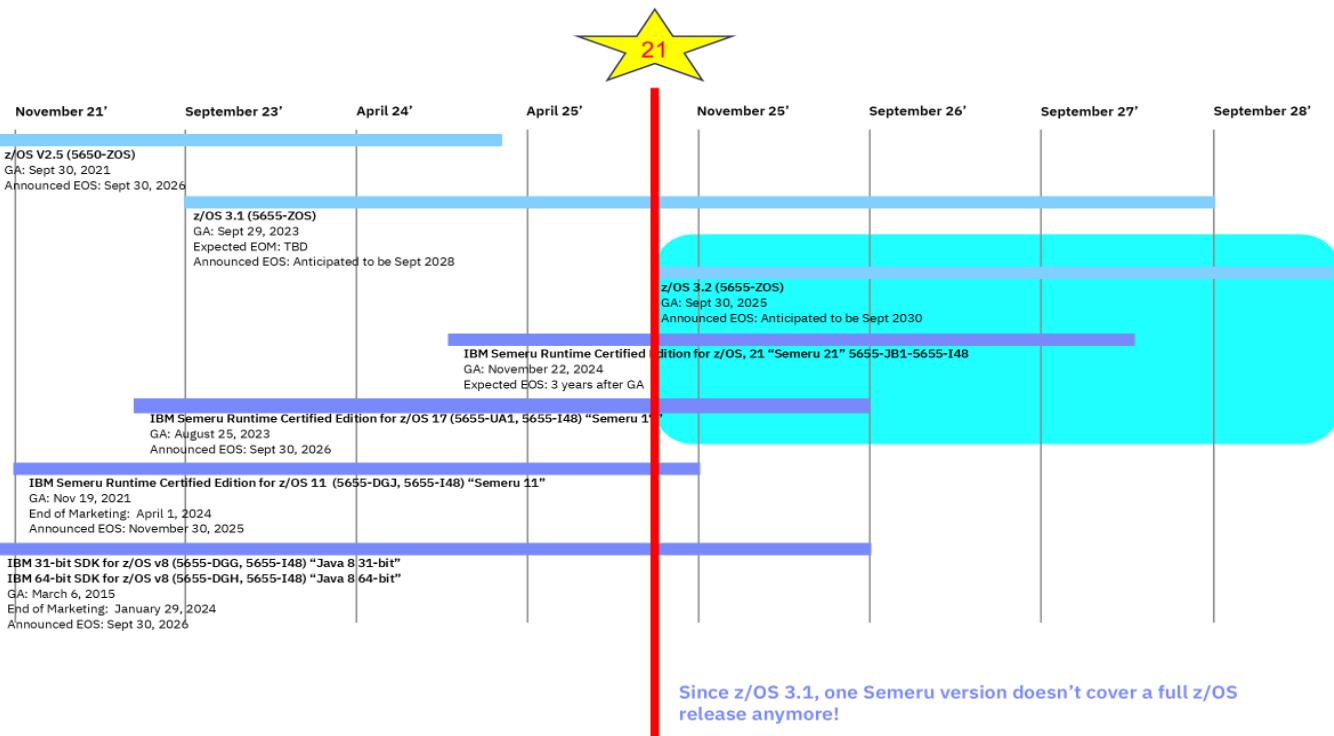
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What you need to know for upgrading to z/OS 3.2 (Highlights of the planning and technical actions)

z/OS 3.2 Java Dependencies



Update the JAVA_HOME environment variable to Java 21 (Required)



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IBM Semeru Runtime for z/OS 21.0 (5655-JB1-5655-UA2). "Semeru 21"

IBM Semeru Runtime Certified Edition for z/OS 21 delivers a high performance Java runtime and development kit that supports the Java 21 Standard Edition long-term support specification. In addition, Semeru Runtime Certified Edition for z/OS 21 includes the following features and enhancements:

- Community OpenJDK implementation with the latest Eclipse OpenJ9 virtual machine
- Exploitation of new capabilities available with z/OS V2.5 or later and the latest IBM Z hardware
- IBM z/OS unique value-add security components, such as IBM Java Cryptography Extension Common Cryptographic Architecture (IBMJCECCA), IBM Z Security provider (IBMZSecurity), IBM Java Cryptography Extension Hybrid (IBMJCEHYBRID), Open Java Cryptography Extensions Plus (OpenJCEPlus), SunPublic Key Cryptography Standards #11 (SunPKCS11), and Java Authentication and Authorization Service (JAAS)
- JZOS Batch Launcher and Toolkit to run Java applications as batch jobs or started tasks, with direct access to traditional z/OS data and key z/OS system services

IBM AI System Services for IBM z/OS (September 29, 2023) 5655-164 and 5655-165 (S&S)

AI System Services for IBM z/OS 1.1 delivers foundational AI capabilities and represents one of the key components of the AI Framework for IBM z/OS that is intended to support AI infusion into z/OS. This solution provides IT data ingestion and filtering capabilities to allow the collection of data for training and inference purposes. Furthermore, it delivers AI model server capabilities that support the AI model lifecycle, including AI model training, deployment, inference, monitoring, and retraining. The combination and integration of AI System Services for IBM z/OS with the rest of the AI Framework for IBM z/OS components that are delivered within z/OS 3.1 enable you to put prebuilt AI models into operation. Based on those capabilities, system programmers can leverage prebuilt and operationalized AI models for use cases that are geared towards helping to simplify the management of z/OS and its offerings by augmenting them with AI to help:

- Reduce skill requirements
- Optimize IT processes
- Improve performance

What you need to know for upgrading to z/OS 3.2 (Highlights of the planning and technical actions)

AI System Services for IBM z/OS enables the setup and use of AI-infused capabilities into z/OS base components, starting with the initial use case: AI-powered WLM batch initiator management.

AI System Services for IBM z/OS represents an important set of capabilities that are part of the AI Framework for IBM z/OS. The AI Framework for IBM z/OS, including AI System Services for IBM z/OS, is a new AI platform introduced with z/OS 3.1 that is designed to seamlessly integrate a set of components to enable the operationalization and usage of AI-infused capabilities into z/OS base components. It is intended to offer a seamless and simplified installation, setup, and management experience of the AI-infused capabilities without requiring additional data science or AI skills. It is designed to pave the way for AI use case providers that can harness the foundational AI capabilities to address AI model operationalization requirements, simplify the process to put future AI use cases to work, and accelerate time to market.

Important companion products for z/OS

IBM announced the addition of Open Enterprise SDK for Python along with IBM Z Open Automation Utilities (ZOAU) and IBM Open Enterprise Foundation for z/OS to z/OS 3.1 as bypassable requisites, as of July 1st, 2024. Many IBM Z clients have adopted these emerging technologies to accelerate their mainframe modernization strategies. Open Enterprise SDK for Python and Open Enterprise Foundation for z/OS are fundamental to accelerating IBM Z application modernization with open-source technologies. Z Open Automation Utilities adds powerful ways to interact with Multiple Virtual Storage (MVS) facilities and data sets directly from z/OS UNIX System Services and offers Python integration points. Existing z/OS installations can consider ordering these offerings as separate deployable packages through the normal IBM Shopz process. As of July 1, 2024 these offerings are available at a no-charge license and with no-charge Software Subscription and Support (S&S).

End of Service and Marketing Dates for Older Java levels:

- **IBM 64-bit SDK for z/OS V7 Release 1 (5655-W44):** was out of service as of April 30, 2022.
- **IBM 31-bit SDK for z/OS V7 Release 1 (5655-W43):** was out of service as of April 30, 2022.
- **IBM 64-bit SDK for z/OS V8 (5655-DGH) and 31-bit (5655-DGG):** announced to be end of marketing on January 29, 2024, and end of service on September 30, 2026.
- **IBM Semeru Runtime for z/OS 11.0 (5655-DGJ) :** is end of marketing on April 1, 2024, 2024, and is planned for out of service on November 30, 2025
- **IBM Semeru Runtime for z/OS 17.0 (5655-UA1) :** is planned for out of service on September 30, 2026

It is important to understand for z/OS 3.2, the z/OS functions that depend on Java will be changing their dependency level during the lifecycle of z/OS 3.2. This statement does not apply to any customer applications that require Java, and apply only to the z/OS functions which require Java. Read this blog entry for a more indepth discussion: <https://www.marnasmusings.com/2023/08/having-your-java-and-drinking-it-too.html>.

What you need to know for upgrading to z/OS 3.2 (Highlights of the planning and technical actions)

z/OS Service Policy



- Priced service extensions available for older releases:
 - V2.3 and V2.4: Contact your IBM rep.
- With the V2 release cycle, IBM plans to provide 5 years of z/OS support, with 3 years of optional extended service (5+3).

	<i>GA Date</i>	<i>End of Service Date</i>
z/OS V2.4	29 Sept 2019	Occurred in Sept 2024
z/OS V2.5	30 Sept 2021	Announced to be Sept 2026 (5 years)
z/OS 3.1	29 Sept 2023	Planned to be Sept 2028 (5 years)
z/OS 3.2	30 Sept 2025	Planned to be Sept 3030 (5 years)

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Service Policy

With the two-year z/OS release frequency, the z/OS support policy is five years of z/OS support, with three years of optional extended service (5+3).

Prior to withdrawing service for any version or release of z/OS, IBM intends to provide at least 12 months notice. The service policy for z/OS also applies to any enhancements (including but not limited to web deliverables).

See the table below for expiration dates for service support.

Version and release	General availability (GA)	End of service (EOS)
OS/390 V2R8	24 September 1999	Occurred 30 September 2002
OS/390 V2R9	31 March 2000	Occurred 31 March 2003
OS/390 V2R10	29 September 2000	Occurred 30 September 2004
z/OS V1R1	30 March 2001	Occurred 31 March 2004
z/OS V1R2	26 October 2001	Occurred 31 October 2004
z/OS V1R3	29 March 2002	Occurred 31 March 2005
z/OS V1R4	27 September 2002	Occurred on 31 March 2007
z/OS V1R5	26 March 2004	Occurred on 31 March 2007
z/OS V1R6	24 September 2004	Occurred on 30 September 2007
z/OS V1R7	30 September 2005	Occurred on 30 September 2008
z/OS V1R8	29 September 2006	Occurred 30 September 2009
z/OS V1R9	28 September 2007	Occurred 30 September 2010
z/OS V1R10	26 September 2008	Occurred 30 September 2011
z/OS V1R11	25 September 2009	Occurred 30 September 2012
z/OS V1R12	24 September 2010	Occurred 30 September 2014
z/OS V1R13	30 September 2011	Occurred 30 September 2016
z/OS V2R1	30 September 2013	Occurred 28 September 2018
z/OS V2R2	30 September 2015	Occurred 30 September 2020
z/OS V2R3	29 September 2017	Occurred 30 September 2022
z/OS V2R4	29 September 2019	Occurred 30 September 2024

What you need to know for upgrading to z/OS 3.2
(Highlights of the planning and technical actions)

z/OS V2.5	30 September 2021	Announced for September 2026
z/OS 3.1	29 September 2023	Planned for September 2028
z/OS 3.2	30 September 2025	Planned for September 2030

If you wish to purchase corrective extended service on an unsupported z/OS release, contact your IBM representative.

z/OS 3.2 Coexistence Policy



- With two year release frequency, three consecutive releases for coexistence remains.
- z/OS V2.5, z/OS 3.1, and z/OS 3.2 are supported for coexistence, upgrade, and fallback.
 - If you are running z/OS V2.4 and would like coexistence support, plan for an upgrade to z/OS 3.1.
- Use SMP/E FIXCAT to determine which PTFs you need for coexistence:
IBM.Coexistence.z/OS.3.2

z/OS Coexistence

Coexistence occurs when two or more systems at different software levels share resources. The resources could be shared at the same time by different systems in a multisystem configuration, or they could be shared over a period of time by the same system in a single-system configuration. Examples of coexistence are two different JES releases sharing a spool, two different service levels of DFSMSdfp sharing catalogs, multiple levels of SMP/E processing SYSMODs packaged to exploit the latest enhancements, or an older level of the system using the updated system control files of a newer level (even if new function has been exploited in the newer level).

The sharing of resources is inherent in multisystem configurations that involve Parallel Sysplex implementations. But other types of configurations can have resource sharing too. Examples of configurations where resource sharing can occur are:

- A single processor that is time-sliced to run different levels of the system, such as during different times of the day
- A single processor running multiple images by means of logical partitions (LPARs)
- Multiple images running on several different processors
- Parallel Sysplex or non-Parallel Sysplex configurations

Note: The term coexistence does not refer to z/OS residing on a single system along with VSE/ESA, VM/ESA, or z/VM in an LPAR or as a VM guest.

z/OS systems can coexist with specific prior releases. This is important because it gives you flexibility to migrate systems in a multisystem configuration using rolling IPLs rather than requiring a systems-wide IPL. The way in which you make it possible for earlier-level systems to coexist with z/OS is to install coexistence service (PTFs) on the earlier-level systems.

What you need to know for upgrading to z/OS 3.2

(Highlights of the planning and technical actions)

You should complete the upgrade of all earlier-level coexisting systems as soon as you can. Keep in mind that the objective of coexistence PTFs is to allow existing functions to continue to be used on the earlier-level systems when run in a mixed environment that contains later-level systems. Coexistence PTFs are not aimed at allowing new functions provided in later releases to work on earlier-level systems.

Rolling z/OS across a multisystem configuration

A *rolling IPL* is the IPL of one system at a time in a multisystem configuration. You might stage the IPLs over a few hours or a few weeks. The use of rolling IPLs allows you to migrate each z/OS system to a later release, one at a time, while allowing for continuous application availability. For example, data sharing applications offer continuous availability in a Parallel Sysplex configuration by treating each z/OS system as a resource for processing the workload. The use of rolling IPLs allows z/OS systems running these applications to be IPLed one at a time, to migrate to a new release of z/OS, while the applications continue to be processed by the other z/OS systems that support the workload. By using LPAR technology, you can use rolling IPLs to upgrade your systems without losing either availability or capacity.

You can use rolling IPLs when both of the following are true:

- The release to which you're migrating falls is supported for coexistence, fallback, and upgrade with the releases running on the other systems.
- The appropriate coexistence PTFs have been installed on the other systems in the multisystem configuration.

Even when you're using applications that do not support data sharing, rolling IPLs often make it easier to schedule z/OS software upgrades. It can be very difficult to schedule a time when all applications running on all the systems in a multisystem configuration can be taken down to allow for a complex-wide or Parallel Sysplex-wide IPL. The use of rolling IPLs not only enables continuous availability from an end-user application point of view, but it also eliminates the work associated with migrating all z/OS systems in a multisystem configuration at the same time.

Understanding fallback

Fallback (backout) is a return to the prior level of a system. Fallback can be appropriate if you upgrade to z/OS 3.2 and, during testing, encounter severe problems that can be resolved by backing out the new release. By applying fallback PTFs to the "old" system before you migrate, the old system can tolerate changes that were made by the new system during testing.

Fallback is relevant in all types of configurations, that is, single-system or multisystem, with or without resource sharing. As an example of fallback, consider a single system that shares data or data structures, such as user catalogs, as you shift the system image from production (on the "old" release) to test (on the new release) and back again (to the old release). The later-level test release might make changes that are incompatible with the earlier-level production release. Fallback PTFs on the earlier-level release can allow it to tolerate changes made by the later-level release.

As a general reminder, always plan to have a backout path when installing new software by identifying and installing any service required to support backout.

Fallback is at a system level, rather than an element or feature level.

Fallback and coexistence are alike in that the PTFs that ensure coexistence are the same ones that ensure fallback.

Note: Keep in mind that new functions can require that all systems be at z/OS 3.2 level before the new functions can be used. Therefore, be careful not to exploit new functions until you are fairly confident that you will not need to back out your z/OS 3.2 systems, as fallback maintenance is not available in these cases. You should consult the appropriate element or feature documentation to determine the requirements for using a particular new function.

Which releases are supported for coexistence, fallback, and upgrade?

- IBM plans to continue to support an n-2 (three consecutive release) coexistence, fallback, and upgrade policy.
- Do note that with the two-year release cycle that z/OS support is intended for five years with three optional extended service years (5+3). You should plan on completing your upgrade plans during the period of time while your older z/OS release is still in service.

What you need to know for upgrading to z/OS 3.2

(Highlights of the planning and technical actions)

- Starting with z/OS V1R6, IBM has aligned the coexistence, fallback, and upgrade policy with the service policy. IBM intends to continue with the practice of providing coexistence, fallback, and policy support for those releases which are still in support.

z/OS 3.2 is coexistence, fallback, and upgrade supported with the following two z/OS releases: V2.4 and V2.5. This means that:

- Coexistence of a 3.2 system with a V2.5 or 3.1 system is supported.
- Fallback *from* 3.2 to V2.5 or 3.1 is supported.
- Upgrade *to* 3.2 *from* V2.5 or 3.1 is supported

The z/OS coexistence, fallback, and upgrade policy applies to the elements and features of z/OS, not to customer-developed applications, vendor-developed applications, or IBM products that run on z/OS. IBM performs integration testing and will provide service as necessary to support the z/OS coexistence, fallback, and upgrade policy.

See the table below for a summary of current and planned coexistence, fallback, and upgrade support. These statements represent IBM's current intentions. IBM reserves the right to change or alter the coexistence, fallback, and upgrade policy in the future or to exclude certain releases beyond those stated. IBM development plans are subject to change or withdrawal without further notice. Any reliance on this statement of direction is at the relying party's sole risk and does not create any liability or obligation for IBM.

Releases that are coexistence, fallback, and upgrade supported as of z/OS R10

z/OS release	Releases that are coexistence, fallback, and upgrade supported with the release in column	Explanation
R10	R10, R9, R8	General availability of R10 was September 26, 2008. R8 is the oldest release that is service supported at that time and therefore the oldest release that is coexistence, fallback, and upgrade supported with R10.
R11	R11, R10, R9	General availability of R11 was September 25, 2009. R9 is the oldest release that is service supported at that time and therefore the oldest release that is coexistence, fallback, and upgrade supported with R11.
R12	R12, R11, R10	General availability of R12 was September 24, 2010. R10 is the oldest release that is service supported at that time and therefore the oldest release that is coexistence, fallback, and upgrade supported with R12.
R13	R13, R12, R11	General availability for R13 was September 30, 2011. R11 is the oldest release that is service supported at that time and therefore the oldest release that is coexistence, fallback, and upgrade supported with R13.
V2R1	V2R1, R13, R12	General availability for V2R1 was September 30, 2013. R12 is the oldest release that is service supported at that time and therefore the oldest release that is coexistence, fallback, and upgrade supported with V2R1.
V2R2	V2R2, V2R1, R13	General availability for V2R2 was September 30, 2015. R13 is the oldest release that is service supported at that time and therefore the oldest release that is coexistence, fallback, and upgrade supported with V2R2.
V2R3	V2R3, V2R2, V2R1	General availability for V2R3 was September 29, 2017. V2R1 is the oldest release that is service supported at that time and therefore the oldest release that is coexistence, fallback, and upgrade supported with V2R3.
V2R4	V2R4, V2R3, V2R2	General availability for V2R4 was September 2019. V2R2 is the oldest release that is service supported at that time and therefore the oldest release that is coexistence, fallback, and upgrade supported with V2R4.
V2.5	V2.5, V2R4, V2R3	General availability for V2.5 was September 2021. V2R3 is the oldest release that is service supported at that time and therefore the oldest release that is coexistence, fallback, and upgrade supported with V2R5.

What you need to know for upgrading to z/OS 3.2
(Highlights of the planning and technical actions)

3.1	3.1, V2.5, V2.4	General availability for 3.1 was September 2023. V2.4 is the oldest release that is service supported at that time and therefore the oldest release that is coexistence, fallback, and upgrade supported with 3.1.
3.2	3.2, 3.1, V2.5	General availability for 3.2 is September 2025. V2.5 is the oldest release that is service supported at that time and therefore the oldest release that is coexistence, fallback, and upgrade supported with 3.2.

**What you need to know for upgrading to z/OS 3.2
(Highlights of the planning and technical actions)**

What you need to know for upgrading to z/OS 3.2
(Highlights of the planning and technical actions)

Positioning for z/OS 3.2

- Perform Workflow and Read Documentation
 - *z/OS 3.2 Upgrade Workflow* and *z/OS 3.2 Planning for Installation*
- Approximate DASD Storage Requirements for z/OS
 - All z/OS features, including Japanese (as of August 2025)
 - Your sizes will vary significantly, based on what was ordered with z/OS



3390 cyl	z/OS V2.5	z/OS 3.1	z/OS 3.2
Target libraries (PDS and PDSE)	11,239	10,246	11,290
DLIB	19,231	19,022	21,248
Root file system	4,479	5,555 	6,335 Exceeded the zFS 4GB limit, EA is required, but SMS-management is NOT required.
Font file system	2,795	2,795	2,795
Liberty file system	2,400	2,400	2,400
zCX (z/OS Container Extensions) file system	5,250	5,250	5,250

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Positioning for z/OS 3.2



- Ensuring System Requirements Are Satisfied
 - Driving System Requirements for z/OSMF Portable Software Instance
 - Minimally z/OS V2.5, with z/OSMF configured and active, and Software Management available for use.
 - ✓ Necessary PTFs are found with [IBM.DrivingSystem-RequiredService FIXCAT](#).
 - For package signature verification, a keyring with the RACF-delivered [STG Code Signing Certificate AuthorityG2](#) connected.
 - Package signing verification is completely optional and compatible...for now...
 - Heads up – signing verification requirements are changing! Verify signatures now to avoid any surprises!
 - No Shopz ordering indication is necessary.
 - All product packages will arrive signed. You choose to verify, or not.
 - IBM service (PTF) packages are also being signed.
 - Target System Requirements
 - Product requirements for running on z/OS 3.2
 - Hardware and Software
 - Coexistence System Requirements
 - Allows z/OS 3.2 to coexist with other z/OS systems
 - FYI – there are no z/OS 3.2 PSP buckets. Good riddahce
 - Upgrade Actions You Can [Do Now](#)
 - Using Programmatic Assistance Health Checks and Workflow



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What you need to know for upgrading to z/OS 3.2

(Highlights of the planning and technical actions)

Positioning for z/OS 3.2



Changed Driving System Enhancement for z/OSMF Portable Software Instance

- ✓ Found with IBM.DrivingSystem-RequiredService FIXCAT.

The Deployment action in z/OSMF Software Management task has been updated to

- Allow connecting existing user catalogs to a new master catalog
 - Often requested, for OMVS and SMP/E data sets!
 - ✓ *Customer requirement delivered!*
- Eliminate required read authorization to Portable Software Instance originating data set names (CB.** data sets for IBM).
 - This was a common pitfall! You can remove your CB.** security profiles now!
 - ✓ *Customer requirement delivered!*
- Allow a data class specification to support ZFS target data sets that are bigger than 4GB.
- Support SMS to non-SMS data set conversion for target data sets during installation of a Portable Software Instance.



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z/OS Documentation:

To gain an overview of z/OS and plan for the installation, review:

- z/OS 3.2 Upgrade Workflow , supplied via PTF with FIXCAT **IBM.Coexistence.z/OS.3.2**
- z/OS 3.2 Planning for Installation
- zSeries Platform Test Report for z/OS and Linux Virtual Servers (formerly, the z/OS Parallel Sysplex Test Report)
- z/OS 3.2 Introduction and Release Guide - great for finding new functions in a release to exploit.

To install z/OS using CBPDO, review the *z/OS Program Directory*.

Hardware FIXCAT identifiers

Hardware PTFS are provided which contain the latest software dependencies for the hardware, and recommended PTFs for specific processor models. The FIXCAT names are:

- z17 ME1 server.
 - The FIXCAT names are IBM.Device.Server.z17-9175.RequiredService, IBM.Device.Server.z17-9175.Exploitation, and IBM.Device.Server.z17-9175.RecommendedService.
- z16 A01 server.
 - The FIXCAT names are IBM.Device.Server.z16-3931.RequiredService, IBM.Device.Server.z16-3931.Exploitation, and IBM.Device.Server.z16-3931.RecommendedService.
- z16 A02 server.
 - The FIXCAT names are IBM.Device.Server.z16A02-3932.RequiredService, IBM.Device.Server.z16A02-3932.Exploitation, and IBM.Device.Server.z16A02-3932.RecommendedService.
- z15 T01 server.
 - The FIXCAT names are IBM.Device.Server.z15-8561.RequiredService, IBM.Device.Server.z15-8561.Exploitation, and IBM.Device.Server.z15-8561.RecommendedService.
- z15 T02 server.

What you need to know for upgrading to z/OS 3.2 (Highlights of the planning and technical actions)

- The FIXCAT names are IBM.Device.Server. z15T02-8562.RequiredService, IBM.Device.Server.z15T02-8562.Exploitation, and IBM..Device.Server. z15T02-8562.RecommendedService.

Specific functions for each server also have corresponding FIXCATs.

DASD Storage Requirements

Keep in mind the DASD required for your z/OS system includes all z/OS elements (per the z/OS Policy). That is, it includes ALL elements, ALL features that support dynamic enablement, regardless of your order, and ALL unpriced features that you ordered. This storage is in addition to the storage required by other products you might have installed. All sizes include at least 15% freespace to accommodate the installation of maintenance.

The estimated total storage required for z/OS 3.2 data sets is provided below. If you add other products to your z/OS 3.2 z/OSMF Portable Software Instance (ServerPac), you will need additional space for those other products.

For z/OS 3.2 (as of August 2025):

- The total storage required for all the target data sets is approximately 11,290 cylinders on a 3390 device. **This total size exceeds the space on a 3390-9.**
- The total storage required for all the distribution data sets is approximately 21,248 cylinders on a 3390 device.
- The total executable root file system storage is approximately at 6,335 cylinders on a 3390 for zFS. Use IBM Health Checker for z/OS check ZOSMIGREC_ROOT_FS_SIZE to determine whether a volume has enough space for the z/OS version root file system, available back to z/OS R9 in APARs OA28684 and OA28631.
 - Note that this root file system has exceeded the 4GB limit in which Extended Addressability (EA) is required. EA does not require SMS-management.



- z/OS V2.1 introduced the z/OS Font Collection base element. This element installs into a separate file system (the “font file system”). You may choose to merge the font file system and root file system if you desire. z/OSMF Software Management supports this merge capability. The total font file system storage is estimated at 2,795 cylinders on a 3390 device.
- z/OS V2.3 introduces the IBM z/OS Liberty Embedded base element. This element installs into a separate file system (the “Liberty file system”). IBM recommends that you keep the Liberty file system separate from other file systems in case of space fluctuations. The total Liberty file system storage is estimated at 2,400 cylinders on a 3390 device.
- z/OS V2.4 introduces the IBM Container Extensions (zCx) base element. This element installs into a separate file system (the “zCX file system”). IBM recommends that you keep the zCX file system separate from other file systems in case of space fluctuations. The total xCX file system storage is estimated at 5,250 cylinders on a 3390 device.
- For configuration and execution, additional file system space is needed:
 - You will need 50 cylinders for the /etc file system.
 - For the CIM element, the space required for the /var VARWBEM file system is 165 cylinders primary, 16 cylinders secondary.
 - For Predictive Failure analysis, a separate file system is created and mounted at mountpoint the /var/pfa. The total space required for zFS is 300 cylinders primary; 50 cylinders secondary.
 - For z/OSMF additional file system space is needed for the repositories. Refer to your z/OSMF Portable Software Instance PostDeploy Workflow (sample jobs provided).

What you need to know for upgrading to z/OS 3.2 (Highlights of the planning and technical actions)

z/OS Driving System Requirements

The *driving system* is the system image (hardware and software) that you use to install the target system. The *target system* is the system software libraries and other data sets that you are installing. You log on to the driving system and run jobs there to create or update the target system. Once the target system is built, it can be IPLed on the same hardware (same LPAR or same processor) or different hardware than that used for the driving system.

If your driving system will share resources with your target system after the target system has been IPLed, *be sure to install applicable coexistence service* on the driving system before you IPL the target system. If you don't install the coexistence service, you will probably experience problems due to incompatible data structures (such as incompatible data sets, VTOCs, catalog records, GRS tokens, or APPC bind mappings).

Customized Offerings Driver (5751-COD)

The Customized Offerings Driver V3.1 (5751-COD) is an entitled driving system you can use if:

- you don't have an existing system to use as a driving system, or
- your existing system does not meet driving system requirements and you don't want to upgrade it to meet those requirements.

This driver is currently a subset of a z/OS V2.5 system and is available on a DVD or electronically. This COD activates z/OSMF so that you can use it as a driving system for a z/OSMF Portable Software Instance, if you don't have a driving system which has z/OSMF.

The Customized Offerings Driver requires three DASD volumes configured as 3390-9, or larger; a non-Systems Network Architecture (SNA) terminal used for a z/OS MVS™ system console; and a locally attached SNA terminal for a Time Sharing Option Extended (TSO/E) session. Also, if you select tape media, a tape drive that can read 3590 or 3592 tape is required. The Customized Offerings Driver can also be ordered on DVDs, which removes the requirement for a tape drive.

The Customized Offerings Driver is intended to run in single-system image and monoplex modes only. Its use in multisystem configurations is not supported. The Customized Offerings Driver is intended to be used only to install new levels of z/OS using ServerPac or CBPDO, and to install service on the new software until a copy (clone) of the new system can be made. The use of the Customized Offerings Driver for other purposes is not supported.

As of z/OS V2R2, the Customized Offerings Driver Installation Guide is no longer shipped in hardcopy format. Instead, this publication is shipped in PDF format on a separate DVD.

The Customized Offerings Driver includes a zFS file system and the necessary function to use Communications Server (IP Services), Security Server, and the system-managed storage (SMS) facility of DFSMSdfp, but these items are not customized. However, existing environments can be connected to, and used from, the Customized Offerings Driver system for the purposes of installation.

Identifying Driving System Software Requirements for ServerPac for z/OS 3.2

Driving system requirements for installing z/OS 3.2 by way of z/OSMF Portable Software Instance are:

- *An operating system:* Use either of the following:
 - A supported z/OS release (V2.5 or later), with the following PTFs installed, which have been identified with the FIXCAT of IBM.DrivingSystem-RequiredService. z/OSMF should be activated, with the z/OSMF Software Management plug-in available.
 - The Customized Offerings Driver V3 (5751-COD).
- *A terminal:* A locally-attached or network-attached terminal that can be used to establish a TSO/E session on the IPLed system is required.
- *Proper authority:* Use the RACFDRV installation job as a sample of the security system definitions required so that you can perform the installation tasks.
- *Proper security:*
 - To deploy a ServerPac Portable Software Instance with z/OSMF Software Management, observe the following requirements:
 - In order for you to install into the zFS, the user ID you use must have read access to the SUPERUSER.FILESYS.PFSCTL resource in the RACF FACILITY class.
 - In order for you to install the z/OS UNIX files, the following is required:

What you need to know for upgrading to z/OS 3.2

(Highlights of the planning and technical actions)

- The user ID you use must be a superuser (UID=0) or have read access to the BPX.SUPERUSER resource in the RACF facility class.
- The user ID you use must have read access to facility class resources BPX.FILEATTR.APF, BPX.FILEATTR.PROGCTL, and BPX.FILEATTR.SHARELIB (or BPX.FILEATTR.* if you choose to use a generic name for these resources). The commands to define these facility class resources are in SYS1.SAMPLIB member BPXISEC1.
- Group IDs uucpg and TTY, and user ID uucp, must be defined in your security database. These IDs must contain OMVS segments with a GID value for each group and a UID value for the user ID. (For ease of use and manageability, define the names in uppercase.)
 - The group ID and user ID values assigned to these IDs cannot be used by any other IDs. They must be unique.
- You must duplicate the required user ID and group names in each security database, including the same user ID and group ID values in the OMVS segment. This makes it easier to transport the HFS data sets from test systems to production systems. For example, the group name TTY on System 1 must have the same group ID value on System 2 and System 3. If it is not possible to synchronize your databases you will need to continue running the FOMISCHO job against each system after z/OS UNIX is installed.

If names such as uucp, uucpg, and TTY are not allowed on your system, or if they conflict with existing names, you can create and activate a user ID alias table. For information about defining these group and user IDs to RACF and about creating a user ID alias table (USERIDALIASTABLE), see *z/OS UNIX System Services Planning*. Other sources of information are SYS1.SAMPLIB member BPXISEC1. (**Note:** You can use the RACFDRV installation job as a sample of the security system definitions required to perform the installation tasks.)
- **OMVS address space active:** an activated OMVS address space with z/OS UNIX kernel services operating in full function mode is required.
- **SMS active:** The Storage Management Subsystem (SMS) must be active to allocate zFS and PDSE data sets, whether they are SMS-managed or non-SMS-managed. Also, the use of zFS data sets is supported only when SMS is active in at least a null configuration, even when the data sets are not SMS-managed. Do either of the following:
 - To allocate non-SMS-managed zFS and PDSE data sets, you must activate SMS on the driving system in at least a null configuration. You must also activate SMS on the target system.
 - To allocate SMS-managed zFS and PDSE data sets, you must activate SMS on the driving system in at least a minimal configuration. Then you must define a storage group, create SMS-managed volumes, and write, translate, and activate a storage class ACS routine that allows the allocation of PDSE and zFS data sets. You must also activate SMS on the target system.
- Because zFS data sets that will exceed the 4 GB size limit, you must define an SMS Data Class with extended format and extended addressability.

If you intend to receive your order using Secure FTP (FTPS)

To use Secure FTP (FTPS) to download the ServerPac portable software instance files from the IBM Download Server by using the z/OSMF Software Management **Add > From Download Server** action, you require the following:

- z/OS SMP/E V3R7 in z/OS V2.5 or higher
- Either of the following features is installed, which enables strong cryptographic ciphers to be used for SSL/TLS connections in non-FIPS mode:
 - System SSL Security Level 3 Feature
 - CP Assist for Cryptographic Functions (CPACF) DES/TDES Enablement Feature 3863 with PTF UA95810.
- ICSF is configured and active, or either of the following SDK levels is installed:
 - IBM 31-bit SDK for z/OS Java Technology Edition V8.0 (5655-DGG) or later
 - IBM 64-bit SDK for z/OS Java Technology Edition V8.0 (5655-DGH) or later

This function enables SMP/E to calculate SHA-1 hash values to verify the integrity of data that is being transmitted. If ICSF is not configured and active, SMP/E uses its Java application class instead for calculating the SHA-1 hash values. IBM recommends the ICSF method because it is likely to perform better than the SMP/E method. For information about how to configure and activate ICSF, see *z/OS Cryptographic Services ICSF System Programmer's Guide*

- A download file system. The *Download to host - View Server XML* link on the Shopz order download page contains order size information.

What you need to know for upgrading to z/OS 3.2 (Highlights of the planning and technical actions)

- Ensure that the DigiCert Global Root CA certificate (and the Root 2 - GeoTrust Global CA Certificate) is connected to your security manager key ring or stored in your default Java keystore file and is trusted on your system. Also, ensure that the user ID that runs SMP/E is authorized to use the key ring or default Java keystore file.
- Ensure that the FTP.DATA data set statements that are used to receive your order are set for your environment. For example, an FTPKEEPALIVE statement with a value of 0 (the default) can cause an FTP control connection to expire in some environments. Also, the security manager key ring file that is specified by the key ring statement in the FTP.DATA file might require certificates to be added.
- Firewall configuration. If your enterprise requires specific commands to allow the download of your ServerPac portable software instance files through a local firewall, you must identify these commands when you specify the Client XML information on the z/OSMF Software Management *Add Portable Software Instance from a Download Server* page.

If you intend to download your order using HTTP Secure (HTTPS):

If you intend to download your order through HTTP Secure (HTTPS) by downloading the ServerPac portable software instance files from the IBM Download Server by using the z/OSMF Software Management **Add > From Download Server** action, you need the following:

- z/OS SMP/E V3R7 in z/OS V2.5 or higher
- SMP/E uses the services of either of the following SDK levels:
 - IBM 31-bit SDK for z/OS Java Technology Edition V8.0 (5655-DGG) or later
 - IBM 64-bit SDK for z/OS Java Technology Edition V8.0 (5655-DGH) or later
- A download file system. The *Download to host - View Server XML* link on the Shopz order download page contains order size information.
- Ensure that the DigiCert Global Root CA certificate and the Root 2 - GeoTrust Global CA Certificate is connected to your security manager key ring or stored in your default Java keystore file. It must be trusted on your system. Also, ensure that the user ID that runs SMP/E is authorized to use the key ring or default Java keystore file.
- HTTP or SOCKS Proxy Server configuration. Your enterprise might require specific commands to allow the download of your ServerPac portable software instance files through an HTTP or SOCKS Proxy Server. If so, you must identify these commands when you enter the Client XML information on the z/OSMF Software Management *Add Portable Software Instance from a Download Server* page.

If you intend to receive your order by way of DVD, you need the following:

- Order is available on z/OS host system. To make the order available on your z/OS host system, upload the order to the z/OS host from the DVD(s). Refer to *readme.pdf* on the first DVD to find the various methods for making your order available on your z/OS host system.
- Space requirements on z/OS. Ensure you have the required space on your z/OS host system. To get the actual size of the order, refer to *dialog.txt* on the first DVD.
- Space requirements on a workstation. If you chose to copy your order from the DVD(s) to a workstation before uploading the contents to your z/OS host system, ensure you have the required space available on your workstation.

If you intend to verify the digital signature of the ServerPac portable software instance package by using the z/OSMF Software Management **Add > From Download Server** action, you need the following:

- z/OSMF with APAR PH49385
- z/OS SMP/E V3R7, plus the PTFs that are identified with the SMP/E fix category IBM.DrivingSystem-RequiredService
- STG Code Signing Certificate Authority - G2 certificate added to your security manager database
- STG Code Signing Certificate Authority - G2 certificate connected to that security manager key ring that you will use when validating package signing certificates and the package signatures

Driving system requirements for Validated Boot for z/OS

To signing in-scope IPL artifacts for Validated Boot for z/OS, you must satisfy the following requirements on the driving system:

- z/OS V2.5 or later, plus the PTFs that are identified with the following SMP/E FIXCAT: IBM.Function.ValidatedBoot

What you need to know for upgrading to z/OS 3.2 (Highlights of the planning and technical actions)

- Signing certificate is set up on the driving system.

Use the SMP/E REPORT FIXCAT command to verify that all required PTFs are installed on your driving system.

To perform the validation of signatures, your target system must meet a separate set of requirements, including an IBM z16 with the appropriate microcode level, HMC security, and z/OS V2.5 or later with the PTFs that are identified with the SMP/E FIXCAT: IBM.Function.ValidatedBoot.

- For information about how to get started with Validated Boot for z/OS, see Validated Boot for z/OS (www.ibm.com/support/z-content-solutions/validated-boot-for-zos/) content solution.
- For information about setting up Validated Boot for z/OS, see the white paper, z/OS Validated Boot (ibm.biz/zosValidatedBoot).
- For the collected z/OS publication updates for Validated Boot for z/OS, see Validated Boot for z/OS

Proper level for service

In order for you to install service on the target system that you're building, your driving system must minimally meet the driving system requirements for CBPDO Wave 1 and must have the current (latest) levels of the program management binder, SMP/E, and HLASM. Another way to install service is from a copy of your target system.

Target System HW Requirements for z/OS 3.2



• Hardware Requirements

- Processor Requirements for z/OS 3.2:
 - IBM System z server: **z17 ME1, z16 A01 or A02, z15 T01 or T02**
- Minimum Memory Requirements (not changed):
 - **8 GB** of memory on a “native” LPAR.
 - < 8GB : WTOR in which your reply indicates you know that running less than the minimum might impact availability.
 - **2 GB** of memory as a “guest” or with zPDT:
 - < 2GB : WTOR in which your reply indicates you know that running less than the minimum might impact availability.
 - IBM Health Check warns you that the minimum hasn’t been met today.
 - WTOR is **IAR057D LESS THAN 8 GB OF REAL STORAGE IMPACTS SYSTEM AVAILABILITY – ADD STORAGE OR REPLY C TO CONTINUE.**
- z/VM level: If you will be running z/OS 3.2 as a guest of z/VM, the z/VM release must be z/VM 7.2, or later

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Target System Hardware Requirements

The minimal hardware requirements for z/OS, as well as additional hardware needed by specific z/OS elements and features, are documented in *z/OS Planning for Installation*.

Identifying Processor Requirements

z/OS 3.2 supports these System z server models:

- IBM z17 ME1
- IBM z16 A01 and A02
- IBM z15 T01 and T02

The following IBM System z servers, and earlier servers, are not supported with z/OS 3.2 and later releases:

- IBM z14 and z14 ZR1
- IBM z13 and z13s
- IBM zEnterprise zBC12 and zEC12

Important: If you IPL z/OS on a server that it does not support, you might receive wait state 07B. The number of IEA434I messages is limited to 32 during IPL/NIP to avoid exhausting initial ESQA. An IEA444I message will be reported one time during IPL/NIP to indicate that additional IEA434I messages have been suppressed: IEA444I NUMBER OF IEA434I MESSAGES EXCEEDS NIP MAXIMUM .

z/OS 3.2 needs these machine facilities to IPL:

- The miscellaneous-instruction-extensions facility 3.
- The vector enhancements facility 2.
- The vector BCD enhancements facility 1.

What you need to know for upgrading to z/OS 3.2 (Highlights of the planning and technical actions)

Identifying Minimum Storage Requirements as of z/OS 3.2

IBM z/OS 3.2 requires a minimum of 8 GB of memory. When running as a z/VM guest or on a IBM System z Personal Development Tool, a minimum of 2 GB will be required. If the minimum is not met, a warning WTO will be issued at IPL. Continuing with less than the minimum memory could impact availability. An IBM health check warns you when an LPAR has been configured with less than 8 GB.

Identifying Coupling Facility Requirements

There are coupling facility level (CFLEVEL) considerations.

When you change coupling facility control code (CFCC) levels, your coupling facility structure sizes might change. If, as part of your upgrade to a z17 server, you change CFCC levels, you might have larger structure sizes than you did previously. If your CFCC levels are identical, structure sizes are not expected to change when you migrate from a previous server to a newer generation server.

In addition, ensure that the CF LPAR has at least 512MB of storage.

If you are moving your coupling facilities and the coupling facility structures will be on higher CFCC levels than they were previously, run the Coupling Facility Structure Sizer (CFSIZER) tool to find out if you have to increase coupling facility structure sizes. Prepare to make the necessary changes to the CFCC level as indicated by the tool. It is recommended that you use the CFSIZER tool, available from the z/OSMF CFRM Policy Editor.

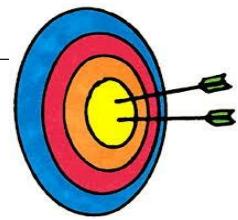
Note: After you make a coupling facility available on the new hardware, you can run the Sizer utility, an authorized z/OS program, to evaluate structure size changes. The Sizer utility is distinct from CFSizer, and should be run after the new hardware (CFLEVEL) is installed, but before any CF LPAR on the new hardware is populated with structures.

- IBM z17 ME1 servers ship with CFCC level 26.
- IBM z16 A01 and A02 servers ship with CFCC level 25.
- IBM z15 T01 and T02 servers ship with CFCC level 24.

Identifying z/VM Requirements

If you will be running IBM z/OS 3.2 as a guest under IBM z/VM, the z/VM release must be z/VM 7.2, or later.

Software Requirements for z/OS 3.2

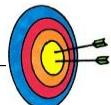


- **Software Requirements:**
 - **Coexistence Software** (on other z/OS systems)
 - **Target Software** (correct levels of IBM non-z/OS and non-IBM products on the z/OS system)
 - *Generally*, you may use the product levels on z/OS 3.2 from your prior system, as long as those product levels are still service supported.
 - Note, however, that if you are using any of the functions in z/OS 3.2 *Planning for Installation*, Appendix B, verify that those functional requirements are satisfied, and are continued to be satisfied over the release lifetime.
 - At GA, z/OS 3.2 has an *overall* dependency on "**IBM Semeru 21 Runtime Certified Edition**"
 - **ALL** z/OS 3.2 functions require IBM Semeru 21. There are no exceptions, as in prior releases.
 - Other Java levels are supported for your applications, for as long as they remain supported.
 - It is expected that the z/OS functions will move their requirement to IBM Semeru Java 21 over the z/OS 3.2 timeframe **Be prepared!**

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Selected z/OS 3.2 SW Functional Requirements



Function	Minimum functional dependency
z/OS 3.2 functions at GA: z/OSMF, SDSF, RACF, Communications Server, SCRT, HCD, ...	IBM Semeru 21 for z/OS (5655-JB1)
IBM Security zSecure™ products: <ul style="list-style-type: none">• IBM Security zSecure Adapters for QRadar® SIEM (5655-AD8)• IBM Security zSecure Admin (5655-N16)• IBM Security zSecure Audit (5655-N17)• IBM Security zSecure Command Verifier (5655-N19)• IBM Security zSecure Visual (5655-N20)• IBM Security zSecure Alert (5655-N21)	3.2 level at a minimum. Earlier levels of this product are not supported for use with z/OS 3.2.

- ➔ Use FIXCAT `IBM.TargetSystem-RequiredService.z/OS.3.2` for program product PTF dependencies.
- ➔ Use FIXCAT `IBM.TargetSystem-RequiredService.Semeru.*` for z/OS 3.2 PTF dependencies when the Java level dependency changes during z/OS 3.2.
- ➔ Website <http://www-306.ibm.com/software/support/lifecycle/> can be helpful.

➔ Remember! Semeru levels are planned to change over the z/OS 3.2 lifecycle, so be aware!

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What you need to know for upgrading to z/OS 3.2

(Highlights of the planning and technical actions)

Choosing IBM Products That You Want to Run with z/OS

You must determine the minimum product release levels and release levels for functional requirements. IBM middleware and application products require a specific level (version, release, or PTF) so that the products will run on z/OS 3.2. You cannot use the FIXCAT support to determine these release levels. Instead, you can refer to *z/OS 3.2 Planning for Installation*, Appendix B, for the functions of z/OS that require specific z/OS optional features, IBM middleware products, or IBM application products.

If you are upgrading from z/OS V2.5 or z/OS 3.1, you may *generally* use the product levels on z/OS 3.2 that you used on your prior z/OS release, as long as the product levels are still service-supported.

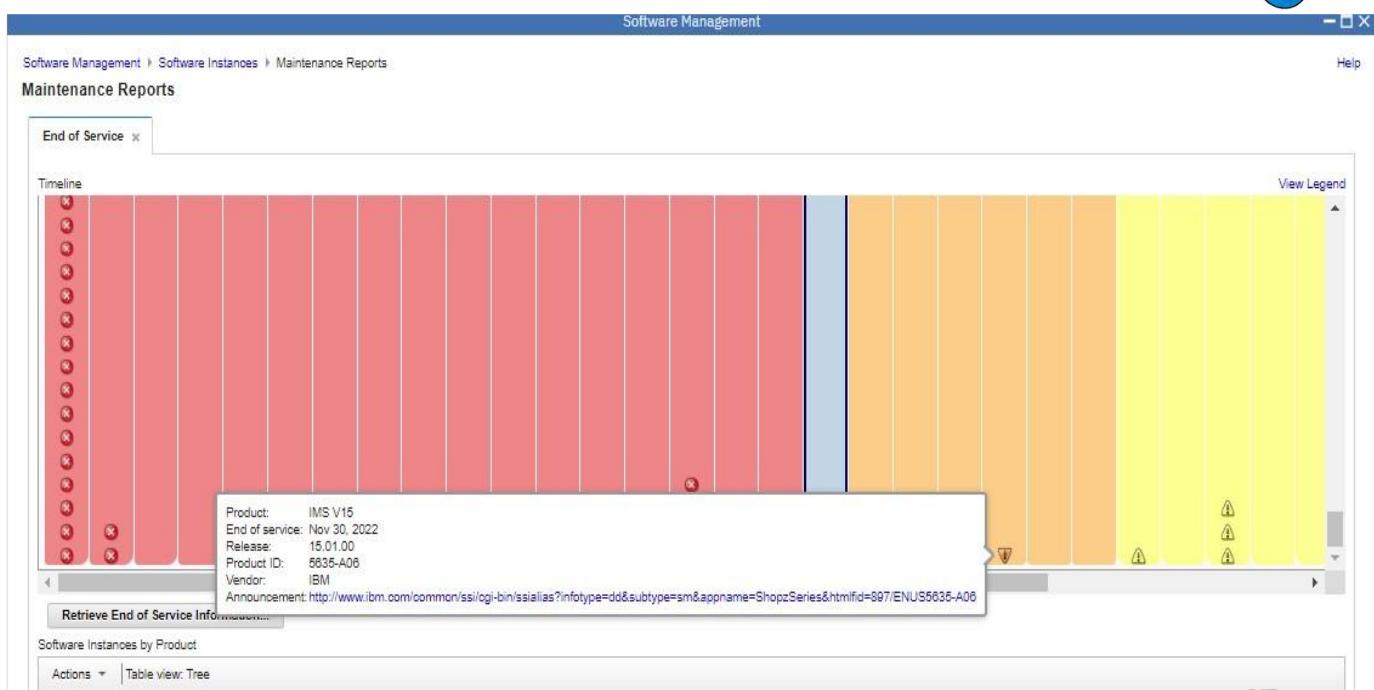
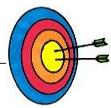
Note, however, that if you are using any of the functions in *z/OS Planning for Installation*, Appendix B, and those functions have dependencies on IBM middleware or application products, you must use the product levels shown (or later).

Many of these products can be ordered as part of your z/OS portable software instance order. Note that there may be differences between what is minimally service supported, what is minimally supported with z/OS 3.2, and what is currently orderable.

If you're upgrading to z/OS 3.2, you can find out which products have new levels by using Shopz and loading your current inventory to see what higher levels of products are orderable.

What you need to know for upgrading to z/OS 3.2 (Highlights of the planning and technical actions)

→ Best way to check End of Service products!



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Tip! Finding End of Service Dates for IBM Products

A handy website for finding end of service dates for IBM products is <http://www.ibm.com/software/support/lifecycle/>.

An especially useful way of identifying if any of the products you are approaching or have met end of service is to use z/OSMF Software Management, and look at the End of Service report!

Target System PTF Verification for z/OS 3.2



1. RECEIVE the latest HOLDDATA. (If you pull HOLDDATA from the ftp website, make sure you use FULL!)
 - HOLDDATA is produced to associate a particular PTF with a minimum or functional level for z/OS 3.2.

```
++HOLD(HABR330) FIXCAT FMID(HABR330) REASON(AH56856)
RESOLVER(UI93752)

CATEGORY(IBM.TargetSystem-RequiredService.z/OS.3.2)

DATE(25108).
```

2. Run the REPORT MISSINGFIX command* to see what is needed, but not yet installed.

```
SET BDY(GLOBAL). /* Your program product global zone */

REPORT MISSINGFIX ZONES(pp_tgt)

FIXCAT(IBM.TargetSystem-RequiredService.z/OS.3.2).
```

* if you have your target system defined as a z/OSMF Software Management software instance (easy to do!), you can use the z/OSMF's Maintenance Reports → Missing FIXCAT SYSMODs in a couple of clicks!

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Programmatic Help with Target System PTF Verification for z/OS 3.2

The IBM PTFs needed to support z/OS 3.2 are identified with a FIXCAT called **IBM.TargetSystem-RequiredService.z/OS.3.2**, in Enhanced HOLDDATA. You must use the SMP/E REPORT MISSINGFIX command to help identify those PTFs on your current system which would be needed for your upgrade to z/OS 3.2.

It is a good idea to periodically re-run the REPORT MISSINGFIX command to determine if any new PTFs have been identified that you are missing.

Coexistence System PTF Verification for z/OS 3.2



1. RECEIVE the latest HOLDDATA. (If you pull HOLDDATA from the ftp website, make sure you use FULL!)

- HOLDDATA is produced to associate a particular PTF as coexistence between z/OS V2.5 or 3.1, with z/OS 3.2.

```
++HOLD (HJE77D0) FIXCAT FMID(HJE77D0) REASON(DA65446)
RESOLVER(UJ96970)

CATEGORY(IBM.Coexistence.z/OS.3.2) DATE(25113).
```

2. Run the REPORT MISSINGFIX command* to see what is needed, but not yet installed.

```
SET BDY(GLOBAL). /* Your z/OS V2.5 global */
REPORT MISSINGFIX ZONES(ZOS25T)
FIXCAT(IBM.Coexistence.z/OS.3.2,
      IBM.Function.HealthChecker).
```

For the upgrade health checks ☺!



* if you have your coexisting system defined as a z/OSMF Software Management software instance (easy to do!), you can use the z/OSMF's Maintenance Reports → Missing FIXCAT SYSMODs, in just a couple of clicks.

Using FIXCAT for coexistence PTFs for z/OS 3.2

For coexistence verification for z/OS 3.2, the fix category of interest is **IBM.Coexistence.z/OS.3.2**. You can use the FIXCAT of ++HOLD statement to identify APARs, their fix categories, and the PTF that resolves the APAR. Another fix category that is helpful when doing the coexistence verification is **IBM.Function.HealthChecker**, for verifying that you've got the latest migration IBM Health Checks for z/OS installed on your coexisting system.

When FIXCAT HOLDDATA statements are received into a global zone, SMP/E assigns the fix category values as sourceids to the PTFs that resolve the APARs. These sourceids then simplify selecting and installing required fixes. During APPLY and ACCEPT command processing you can specify the assigned sourceids on the SOURCEID and EXSRCID operands to select the SYSMODs associated with a particular fix category. In addition, for the APPLY and ACCEPT commands you can specify which Fix Categories are of interest using the FIXCAT operand. This tells SMP/E to process only FIXCAT HOLDDATA for the categories you specify, and all others are ignored.

Finally, SMP/E uses the FIXCAT HOLDDATA to identify what required fixes are missing. The REPORT MISSINGFIX command analyzes the FIXCAT HOLDDATA and determine which fixes (APARs) identified by the HOLDDATA are not yet installed. Only the fixes associated with the fix categories of interest to you, specified by you, are analyzed and identified. For example, you can identify only the missing fixes associated with a particular hardware device or coexistence for a specific new software release.

Note that you can use wildcards in the FIXCAT name in the REPORT MISSINGFIX command. For example, if you wanted to verify coexistence for z/OS V2.5 as well as z/OS 3.1 on your z/OS V3.2 system, your command could be:

```
REPORT MISSINGFIX ZONES(ZOS24T) FIXCAT(IBM.Coexistence.z/OS.*,
                                 IBM.Function.HealthChecker).
```

Do notice though, that z/OS 3.1 coexistence fixes have also been “backmarked” for z/OS 3.2 coexistence, so it is not necessary to specify interim z/OS releases for coexistence verification in the REPORT MISSINGFIX command.



Some Upgrade Tasks You Can Do NOW

1. Transition off of removed functions and elements:

- In 3.1: JES3, BDT, ISFPARMS assembler macros, ...
- After 3.2: CIM, LNKLSTxx/IEAAPFxx, ...



2. Prepare your driving systems – heads up on verify signatures!

3. Prepare Target Systems:

- Target systems -
 - HW: z15 or higher, with 8GB “native”.
 - SW: Semeru 21 is the general requirement for z/OS 3.2 functions. Prepare for Semeru dependency changes over 3.2.
 - DASD storage for z/OS 3.2 – root file system exceeds 4GB
 - IBM product level research: FIXCAT [IBM.TargetSystem-RequiredService.z/OS.3.2](#)
 - Find z/OS 3.2 PTFs needed for Semeru FIXCAT [IBM.TargetSystem-RequiredService.Semeru.*](#)
 - ISV research for z/OS 3.2
- Coexisting systems - FIXCAT [IBM.Coexistence.z/OS.3.2](#)



4. Use IBM Health Checker for z/OS

- Activate the Upgrade Health Checks (they are shipped INACTIVE).

5. You need z/OSMF to use the z/OS 3.2 Upgrade Workflow.

- No migration book!

6. Perform z/OS 3.2 upgrade actions you can do NOW.

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Prepare for your upgrade to z/OS 3.2!

In this presentation you've seen many things you can do right now, on your current z/OS release to help make your z/OS 3.2 upgrade smooth. Listed above are a recap of the things that were shown in this presentation, but make sure you review the upgrade actions in the z/OS Upgrade Workflow so that you know a more complete upgrade picture.

Finding the latest z/OS 3.2 Upgrade Workflow



- The z/OS 3.2 Upgrade Workflow is part of z/OS!!
 - Not supplied via GitHub anymore.
 - IBM Service will also support this workflow
 - We still welcome any feedback or comments to zosmig@us.ibm.com.
- The files needed to create your workflow can be found in the directory
/usr/lpp/bcp/upgrade
 - [zOS_3.2_from_3.1_Upgrade_Workflow.xml](#)
 - [zOS_3.2_from_V2.5_Upgrade_Workflow.xml](#)
 - [z17_zOS_Upgrade_Workflow.xml](#)
 - [z16_zOS_Upgrade_Workflow.xml](#)
- When creating your workflow, choose the appropriate file for the system you are upgrading from.
- The initial workflows are shipped back to z/OS V2.5 and 3.1 with a PTF, and found with the FIXCAT **IBM.Coexistence.z/OS.3.2**
- Updates to the z/OS 3.2 Upgrade Workflow, will also have the same FIXCAT.
 - Use “Create new based on existing” to pick up updates.

Very Important Links:

Exported version of the z/OS 3.2 Upgrade Workflow will be available on IBM Documentation for z/OS 3.2, under “System Level” category.

Content Solution webpage for learning in an easy way about ServerPac packaged as a z/OSMF Portable Software
Continuing the advancement in z/OS upgrade assistance! <https://www.ibm.com/support/z-content-solutions/serverpac-install-zosmf/>

We have two z/OS Management Facility (z/OSMF) z/OS Upgrade Workflow versions, one for the n-1, and one for the n-2 path. Using the z/OSMF workflow, you can go through a z/OS 3.2 upgrade as an interactive, step-by-step process. Depending on your z/OS 3.2 upgrade path, you select the file you will need.

In z/OS 3.2, the z/OS Upgrade Workflow has the capability to invoke IBM health checks directly from the step, and also provides the optional capability to give feedback on your upgrade experience. The z/OS 3.2 Upgrade Workflow is supported by the IBM Service organization, and provided in PTF(s). We also do welcome suggestions or comments to email zosmig@us.ibm.com.

The z/OS 3.2 Upgrade Workflow has the ability to discover used z/OS priced features (continuing what was introduced in V2.3), and some other features, on your system. This is very helpful, because if you are not using a certain feature, then why have to manually skip those steps yourself? The z/OSMF Workflow can identify many features that you might not be using, and automatically skip them in the Workflow for you, giving you less steps to perform. In z/OS 3.2, is the ability to reduce the number of applicable steps by seeing if PTFs that included HOLD ACTIONS were already performed. In addition, coexistence PTF verification can be done from the Workflow, via an included SMP/E REPORT MISSINGFIX step.



What you need to know for upgrading to z/OS 3.2 (Highlights of the planning and technical actions)

If you would like to see a short demo on using the z/OS V2.1 migration workflow, visit [the IBM Media Center](#) for an older, but yet still valuable, video on what the migration workflow looks like, and how to use it.

Upgrade Workflow Usage Tips

1. If you have performed part of any Workflow, and there has been an updated version of that Workflow that has been issued, you can update your partially completed Workflow by using the action “Create new based on existing”. This can “merge” the two Workflows together such that unchanged steps that you have completed, stay completed.
2. The URL links to the documentation in the workflow cannot go to an anchor in the web page. The URLs will just bring you to the web page, not content that may be further down in the page. You may have to scroll down on the web page to find the information that you need.
3. For each upgrade action and for the entire upgrade, you can optionally provide your feedback to IBM. Just follow the instructions you see in z/OSMF. You do not need to provide feedback to complete each step of the workflow.
4. When searching for something in the Workflow, use the Search capability in the upper right corner. This strong capability can look “inside” all the steps to find the string you are looking for.

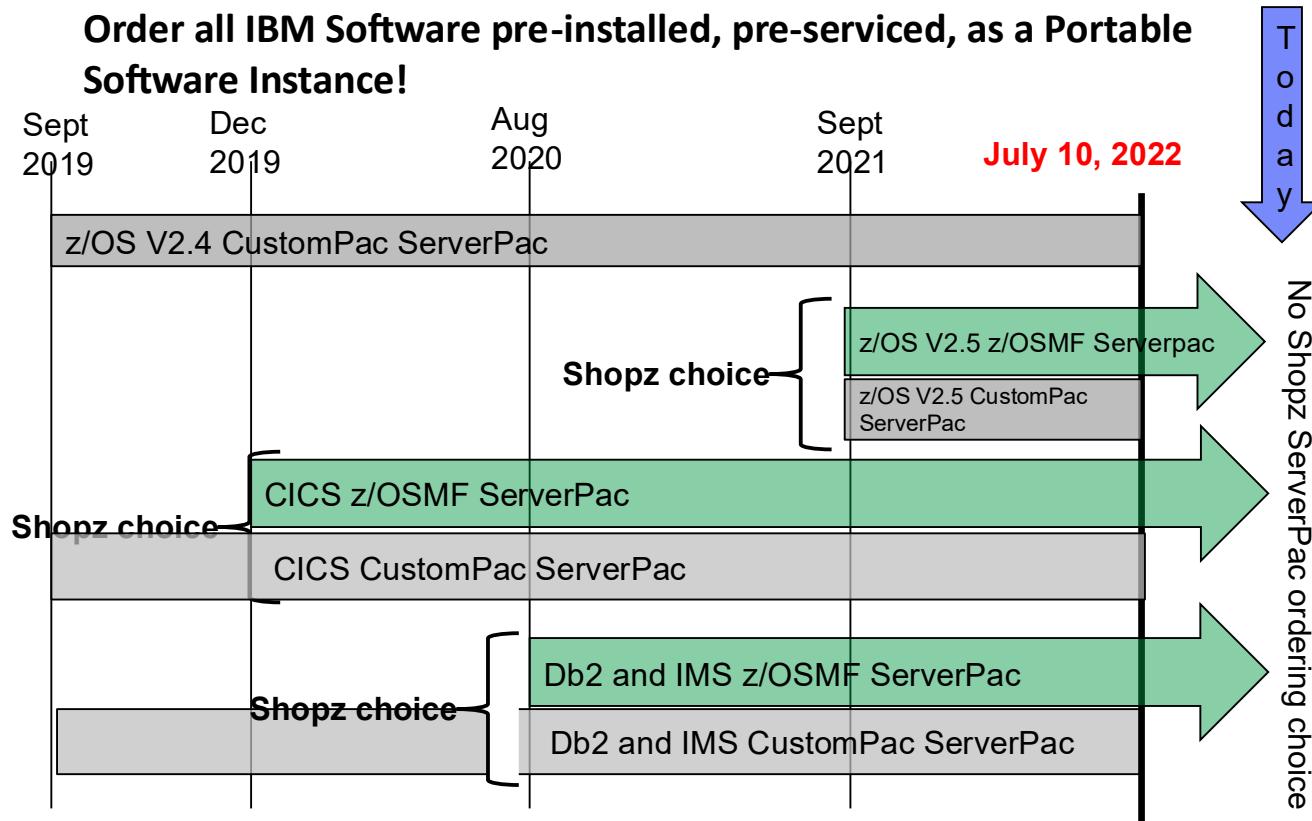
z/OS Upgrade Workflow

Starting in z/OS V2.4, IBM no longer provide the z/OS Migration publication, GA32-0889, in its current format. Since z/OS V2.2, the preferred method for learning about upgrade actions has been the z/OS Upgrade Workflow.

Discovering, performing, and verifying many upgrade actions through the z/OSMF Workflow function instead of a more traditional book format allows for a tailored and specific upgrade path associated with a particular system.

Starting with the z/OS V2.4 release and later, IBM provides upgrade tasks in a z/OSMF Workflow, as well as a single exported file. By providing the z/OS upgrade materials in both formats, users still can enjoy the advantages of a z/OSMF Workflow as well as being able to search, browse, and print in a more traditional format. Notice that the exported format of the z/OS upgrade materials that can be easily read or printed for those without any z/OSMF capabilities will not be tailored for any environment.

ServerPac Portable Software Instance Timeline





Elements with Upgrade Actions for z/OS 3.2

These elements have 3.1 → 3.2 upgrade actions:

- BCP
- Communications Server
 - Cryptographic Services – System SSL
 - Integrated Security Services - NAS
- DFSMS
- HCD
 - Infoprint Server
- JES2
 - Language Environment
- MICR/OCR
- Network File System (NFS)
- RMF
- SDSF
- Security Server (RACF)
- XL C/C++
- z/OS Container Extensions (zCX)
- z/OS Management Facility



➤ means that some of that element's upgrade actions are discussed in this presentation.

ALWAYS use the z/OS 3.2 Upgrade Workflow to know all the upgrade actions!

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BCP Upgrade Actions for z/OS 3.2



• Upgrade Actions Before First-IPL:

Ensure that the sysplex uses SSD-capable sysplex couple data sets
(Required-IF, as of 3.1)



- A basic or parallel sysplex requires a couple data set formatted to support System Status Detection (SSD) protocol.
- Failure to use the required level of sysplex CDS could result in:
 - z/OS 3.1 cannot initialize a sysplex containing a downlevel sysplex CDS.
 - z/OS 3.1 cannot join a running sysplex that contains a downlevel sysplex CDS.
- Use the XCF_SYSSTATDEF_PARTITIONING health check or enter D XCF,COUPLE,TYPE=SYSPLEX and check that "SYSTEM STATUS DETECTION PROTOCOL IS SUPPORTED" for both primary and alternate sysplex CDS's.
 - If the sysplex CDS is not formatted with the SSD protocol, format two replacement SSD-capable sysplex CDS's, with the input to the utility ITEM NAME(SSTATDET) NUMBER(1).
 - Introduce the primary and alternate CDS to the sysplex using the usual SETXCF commands (new alternate, switch, new alternate).



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BCP Upgrade Actions for z/OS 3.2

• Upgrade Actions Before First-IPL:

Accommodate the changed default value of the OPT parameter

CPENABLE

(Required-IF, as of 3.2)

- Starting in z/OS 3.2, the default value of the OPT parameter CPENABLE is changed from (0,0) to SYSTEM.
- The new default value, CPENABLE=SYSTEM, automatically applies low and high threshold values recommended by IBM.
- This value removes the need to update the parameter when there is a hardware migration.
- In contrast, the previous default CPENABLE=(0,0) causes all logical processors to be enabled for I/O interrupts.



DFSMS Upgrade Actions for z/OS 3.2

Upgrade Actions Before Installing:

DFSMSdfp: Accommodate change to SAF checking during VSAM OPEN of data sets (Req-IF, as of 3.2)

- Pre-3.2, VSAM OPEN routines automatically bypassed SAF authorization checking if the program that issued the OPEN request was running in supervisor state or protection key zero.
- In z/OS 3.2, programs no longer bypass the SAF authorization check for VSAM OPEN requests by default if they are running in supervisor state or key zero.
- Use the FACILTIY class STGADMIN.IGG.AUTO.BYPASS.LOG, collect SMF 80 for that FACILITY class resource, run workloads, and then use SMF 80 records to determine which jobs are opening VSAM data sets and bypassing SAF authorization checks.

DFSMSdfp: Define and permit copy services related facility class profiles (Req-IF, as of 3.2)

- Starting in z/OS 3.2, DFSMS system data mover (SDM) will fail TSO/E commands and ANTRQST functions if the requested service does not have a matching FACILITY class resource profile, or the user lacks READ access to the matching profile.
- Determine whether any programs on your system use SDM TSO commands and ANTRQST calls.
 - If these services are being used, determine whether profiles are defined for the related FACILITY class resources. If needed, define matching profiles and permit users before trying to use the associated commands on z/OS 3.2.

What you need to know for upgrading to z/OS 3.2

(Highlights of the planning and technical actions)

zCX Upgrade Actions for z/OS 3.2



Upgrade Actions you can do NOW:

Prepare existing zCX workflow instances (**Required-IF, as of V2.5 OA64231**)



- zCX Workflows was impacted by the z/OSMF Workflow upgrade action (“Check workflow definition files for undeclared referenced entities”).
- Correction was provided in OA64231 for the affected workflows, with workflow version 1.1.4.
 - If your zCX Workflow instances are at least 1.1.4, you are not affected.
- If you have any zCX Workflow instances that are 1.1.3 or earlier, you are impacted. Prior to IPLing 3.1, you must:
 - Complete, export, or delete any zCX workflow instances on your system
 - Install the PTF for OA64231.
- After 3.1 has been IPled, you can no longer access the zCX workflows that are levels prior to 1.1.3.

zCX: Ensure that all zCX appliance levels are at least 1.26.0 (**Required-IF, as of 3.2**)

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z/OS OpenSSH Upgrade Actions for z/OS 3.2



Upgrade Actions Pre-First IPL:

• Accommodate the OpenSSH ported level (**Required-IF, as of V2.5**)



- Pre-3.1 was open source version OpenSSH **level 7.6p1**.
- 3.1 and 3.2 contains open source version OpenSSH **level 8.4p1**.
- Several differences in the ported levels, which may cause upgrade actions.
- Less-secure algorithms are either deprecated or removed as defaults:
 - Diffie-hellman-group14-sha1 is removed from the default KexAlgorithms list.
 - If ssh-keygen is used to create new OpenSSH certificates with an RSA key, the rsa-sha2-512 algorithm is used by default.
 - The ssh-rsa (sha1) key algorithm is still supported as a default key algorithm, but is deprecated. It will be removed as a default in a future release.
- Changes to these might require a potential upgrade action:
 - ssh_config file
 - sshd_config file
 - ssh_config file in /samples/
 - sftp command
 - ssh-keygen command
- Read of all changes in your handout, or the *z/OS 3.2 Upgrade Workflow*.

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JES2 Upgrade Actions for z/OS 3.2



Upgrade Actions Before installation:

Review applications that create, modify, or delete JES2 system data sets(Required-IF, as of 3.2)

- in z/OS 3.2, JES2 obtains shared SYSDSN ENQs for the following JES2 system data sets:
 - CKPT1
 - CKPT2
 - NEWCKPT1
 - NEWCKPT2
 - SPOOL data sets
- JES2 obtains shared SYSDSN ENQs on these data sets when they are allocated. This change is intended to protect against the accidental modification or deletion of system data sets that are necessary for JES2 function.
- It is possible that your installation might have applications that intentionally modify or delete JES2 system data sets. If so, these applications are affected by this change. Ensure that a viable method is in place to accommodate the new system data set ENQ protection.
 - This protection can be temporarily toggled off.

SDSF Upgrade Actions for z/OS 3.2



Upgrade Actions Before Installing:

Use dynamic statements for SDSF configuration, not assembler macros (Req-IF, as of 3.1)

- As of 3.1, assembler macros for defining ISFPARMS are not allowed.
 - Usage of the parmlib member ISFPRMxx is required.
 - ISFPRMxx was introduced in 1995 and is easier to use, less error prone, and more dynamic than assembling ISFPARMS.
 - In addition, when ISFPRMxx is used, the SDSF server creates a log that lists all ISFPRMxx statements processed and the values that were used.
- **If you are already using ISFPRMxx, no action is necessary.**
- To convert from assembler format to ISFPRMxx, use conversion tool ISFACP.

Update the Java CLASSPATH and LIBPATH references in your scripts(Req-IF, as of 3.2)

- As of 3.2, the SDSF Java API is enhanced to use the FasterXML Jackson JSON parser. To support this change, the jar files that the Jackson JSON parser uses must reside on the same class path that your scripts use to invoke the SDSF Java API.
- To accommodate this change, you might need to update the Java CLASSPATH and LIBPATH variables for any of your scripts that invoke the SDSF Java API. (Symlinks previously provided to SDSF jar files and DLLs are removed.)
 - Use CLASSPATH variable of `/usr/lpp/sdsf/java/classes/isfjcall.jar`
 - Use LIBPATH variable of `/usr/lpp/sdsf/java/lib_64`

HCD Upgrade Actions for z/OS 3.2



Upgrade Actions Before Installing:

Remove configurations for unsupported processor types (Req-IF, as of 3.2)

- Out of service processor types are not supported by HCD:
 - 2964 and 2965: z13 and z13s
 - 2827 and 2828: zEC12 and zBC12
 - 2817 and 2818: z196 and z114
 - 2097 and 2098: z10 EC and z10 BC
 - 2094 and 2096: z9 EC and z9 BC
 - 2084 and 2086: z990 and z890
- Remove these server configurations from your IODF, before upgrading to 3.2.
- HCD cannot validate the I/O configuration for unsupported processor types.
- If you are still using a processor that is out of service, the system that maintains that IODF cannot be upgraded to 3.2.



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RACF Upgrade Actions for z/OS 3.1



Upgrade Actions Before First IPL:

Security Server: Change RVARY passwords to use KDFAES encryption (Req-IF, as of V2.4 with OA65905)

- With the SETROPTS command, the security administrator can set the password the operator must supply in order for RACF to complete an RVARY command that changes RACF status or changes the RACF databases.
 - As of APAR OA65905, RVARY passwords are protected using the KDFAES algorithm. Previously, RVARY passwords were protected with Data Encryption Standard (DES), an earlier and less secure method of data encryption.
- Install the PTF for APAR OA65905 on **all** systems which share the RACF database. Take a database backup prior to the KDFAES conversion.
- Follow the HOLD ACTION in the PTF for APAR OA65905, which requires you to change your RVARY passwords using the new KDFAES keyword.
- Important: If the upgrade action is not performed, and an installation-defined RVARY password is in effect, the password will not correctly evaluate on 3.2.
 - Therefore, critical RACF database maintenance functions that use the RVARY command will not work, unless the RVARY command is entered from a console with master authority.
 - The condition can be avoided by changing the RVARY passwords on 3.2, but you must do so prior to encountering a situation that requires RVARY for its resolution, such as switching to the backup database.

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What you need to know for upgrading to z/OS 3.2 (Highlights of the planning and technical actions)



Communications Server Upgrade Actions for z/OS 3.2

IP Services: Prepare for more secure TLS defaults in System SSL and AT-TLS (Req-IF, as of 3.2)

- Default **TLS protocol** change: The defaults for TLS V1.0, TLS V1.1, and TLS V1.2 are changed. Only TLS V1.2 is enabled by default.
- Default **cipher suites** change: SHA1 ciphers are removed from the default list.
- Default **signature algorithms changes for X.509 certificates and handshake messages**: SHA1, SHA224 and DSA are removed from the default signature algorithms that are used by X509 certificates and TLS handshake messages.
- Default **signature algorithms change for certificate revocation**: SHA1, SHA224 and DSA are removed from the default signature algorithms that is used for OCSP, HTTP and LDAP CRL revocation checking.
- Default **client elliptic curves list order change**: secp224r1 is moved later in the order of the client's list of supported elliptic curves/supported groups.

IP Services: Prepare for more secure TLS defaults for the FTP client (Req-IF, as of 3.2)

- TLSv1 is no longer enabled unconditionally. A configuration statement is added to FTP to control whether TLSv1 is enabled. **By default, TLSv1 is disabled**.
- If the CIPHERSUITE statement is configured, FTP uses 4-character cipher specifications when it calls System SSL. Otherwise, FTP does not pass a default value, which allows System SSL to use its new 4-character default ciphers in z/OS 3.2.

IP Services: Prepare for more secure TLS defaults for the Policy Agent client (Req-IF, as of 3.2)

- Parameters are added to control whether TLSv1, TLSv1.1, and TLSv1.2 are enabled. **By default, TLSv1 and TLSv1.1 are disabled** and TLSv1.2 is enabled.
- Various defaults in System SSL are updated. These changes can impact ciphers, client elliptic curves, and hash and signature algorithms for the policy agent client if default values are used.

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"Big Migs" occurring on 3.1



Upgrade actions at 3.1 you should not overlook:

1. IBM JES3 removal
2. Use dynamic statements for SDSF configuration, not assembler macros.
3. Sysplex couple data sets are System Status Detection (SSD) capable
4. OpenSSH new ported level, 8.4p1
5. z/OSMF Workflow definition files for undeclared referenced entities, before 3.1 IPL.
6. zCX Workflow instances should be completed, before 3.1 IPL.

Plus...

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"Big Migs" occurring on 3.2



Upgrade actions at 3.2 you should not overlook:

1. Update your z/OS functional dependency to Semeru 21 (verify JAVA_HOME)
2. zCX: Ensure that all zCX appliance levels are at least 1.26.0
3. IP Services: Prepare for more secure TLS defaults in System SSL and AT-TLS, Prepare for more secure TLS defaults for the FTP client, and Prepare for more secure TLS defaults for the Policy Agent client.



What you need to know for upgrading to z/OS 3.2: Summary



- **Changing content of z/OS 3.2**
 - Removed in z/OS 3.1: JES3, ISFPARMS, ...
 - Get ready for the removals after z/OS 3.2: MICR/OCR, CIM, DFSMS Checkpoint/Restart...
- **Timeline of z/OS ordering and deliverables:** associated products to consider
- **z/OS Policies**
 - Three consecutive releases (V2.5 → 3.2) for coexistence, upgrade, fallback.
- **Ensuring System Requirements are Satisfied**
 - Driving, Target SW, Target HW, and Coexisting System Requirements
 - z/OS 3.2 requires **z15** or later
 - Memory requirements: **8 GB** "native", or 2 GB zPDT or under zVM of memory
 - Target system requirements: general Semeru 21 functional requirement.
 - Use FIXCATs IBM.TargetSystem-RequiredService.z/OS.3.2, IBM.Coexistence.z/OS.3.2, IBM.Function.HealthChecker, IBM.TargetSystem-RequiredService.Semeru.* ...
- **Use IBM Health Checker for Upgrade Actions:** Install and activate checks
- **Use z/OSMF Workflow for z/OS 3.2 Upgrade:** Best to use interactive format!
- **z/OSMF is the ServerPac driving system as of July 10, 2022!**
 - This includes all IBM products, including middleware. Why not use z/OSMF for middleware installation???

What you need to know for upgrading to z/OS 3.2: Summary



• **BCP:**

- IEAOPTxx CPENABLE default change from (0,0) to SYSTEM.

• **DFSMS**

- Accommodate change to SAF checking during VSAM OPEN of data sets.
- Define and permit copy service related facility class profiles, use a matching FACILITY class resource profile.

• **JES2:**

- Prepare for shared SYSDSN ENQs for several JES2 system data sets. Default usage of new job level resource limits and actions, truncation of blanks which affects some printing products. Investigate exit 2 and 52 changes.

• **SDSF:**

- Use Java CLASSPATH and LIBPATH variables for any of your SDSF JAVA scripts.

• **HCD:** Out of service processor types are removed.

• **RACF:**

- Change RVARY passwords to use the new KDFAES keyword.