

# OI !

- What is new with z/OS 3.1 – Part 1
- What is new with z/OS 3.1 – Part 2
- z/OS Upgrade Hint & Tips For z/OS 3.1
- Specific Focus on z/OSMF
- Parallel Sysplex Update & WSC z/OS Hot Topics

Meral Temel  
z/OS Technical Engagement Leader  
IBM z Washington Systems Center

[Meral.temel@ibm.com](mailto:Meral.temel@ibm.com)



# What is new with z/OS 3.1

[What is new with z/OS 3.1 – Part 1](#)  
[What is new with z/OS 3.1 – Part 2](#)

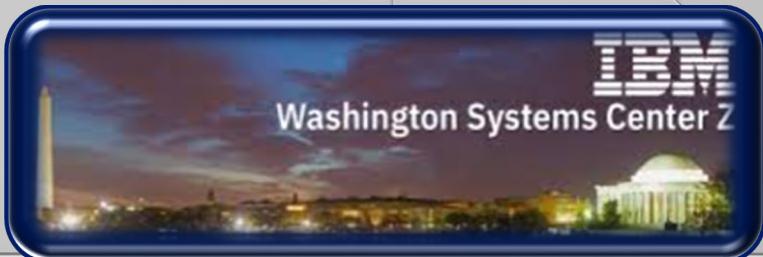
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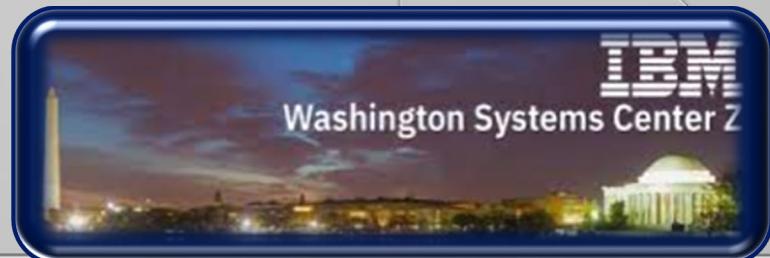
# Agenda

- z/OS 3.1 Release Overview & Big Picture
- Continues Delivery & Announcements & Learning Path
- z/OS - Z Hardware Support
- Format Of This Presentation
- z/OS Parallel Sysplex Updates
- AI on z/OS – OS & Workloads
- Application Development
  - Python AI Toolkit For z/OS & IBM SMF Explorer with Phyton
  - Compiler Offerings
  - Java & COBOL-Java
- Containers
  - zCX Containers
  - z/OS Containers



# Agenda

- z/OS Installation & Packaging Updates
- Memory RSM/VSM Updates
- Special Section For z/OSMF Updates
- Performance,WLM,RMF,Monitoring & Analysis Updates
- zFS & USS Updates
- JES2 Updates
- SDSF Updates
- DFSMS Hsm, Dfp,Dds,OAM,Catalog Updates
- z/OS Anomaly Mitigation, PFA,ZHR and Brand new Capabilities!
- Network & Other Critical Components Updates
- z/OS Requirements
- Takeaways!



# z/OS Support Summary



- ✓ Preview Feb 2019- GA announced July 2019 - GA Sep 2019
- ✓ Preview Feb 2021- GA announced July 2021- GA Sep 2021
- ✓ Preview Feb 2023- GA announced August 2023 - GA Sep 2023
- ✓ ‘Nothing has changed here with Continuous Delivery.’
- ✓ z/OS 3.1 ---- > No V no R in name ... Just 3.1
- ✓ z/OS 3.1 has new program number 5655-ZOS.

Release	z10 EC z10 BC <b>WdfM</b>	z196 Z114 <b>WdfM</b>	zEC12 zBC12 <b>WdfM</b>	z13 Z13s <b>WdfM</b>	z14 ZR1 <b>WdfM</b>	z15	z16	End of Service	Extended Defect Support
z/OS V2.2	X	X	X	X	X	X	X	9/20	9/23 <sup>2</sup>
z/OS V2.3			X	X	X	X	X	9/22	9/25 <sup>2</sup>
z/OS V2.4			X	X	X	X	X	9/24 <sup>1</sup>	9/27 <sup>2</sup>
z/OS V2.5				X	X	X	X	9/26 <sup>1</sup>	9/29 <sup>2</sup>
z/OS 3.1					X	X	X	9/28 <sup>1</sup>	9/31 <sup>2</sup>

**Notes:**

<sup>1</sup>- All statements regarding IBM's plans, directions, and intent are subject to change or withdrawal without notice.

<sup>2</sup>- Extended support dates are projected and are subject to change or withdrawal without notice.

**Legend**

Defect support provided with IBM Software Support Services for z/OS

Generally supported

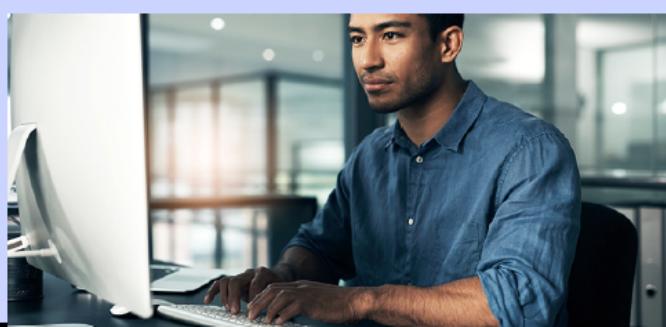
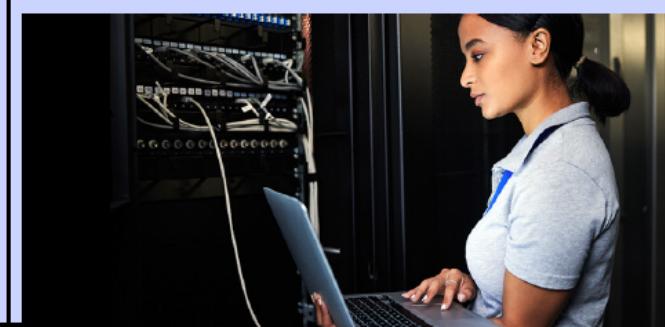
**WdfM** - Server has been withdrawn from Marketing



# z/OS 3.1 Release Highlights

## IBM z/OS 3.1: An AI-infused operating system for the next generation of computing

*IBM z/OS 3.1 marks a new era in operating system intelligence. The new version of z/OS infuses AI throughout the system, enabling intelligent systems administration guidance and automation that learns and improves. With z/OS 3.1 as the foundation of a hybrid cloud strategy, enterprises can deploy and co-locate Linux-based applications together with existing core business workloads and enjoy the unique value propositions of both environments.*

3.1 Overview		
 AI Infusion	 Application Modernization & Simplification	 Cyber Resiliency
Scale the value of data and drive digital transformation powered by AI and intelligent automation	Build new and modernize existing applications while optimizing and simplifying technology infrastructure	Protect and thrive with unparalleled security and resilience capabilities with quantum-safe technologies

# z/OS 3.1 Release Highlights

## IBM z/OS 3.1 – AI-Infused OS

Scale the value of data and drive digital transformation powered by AI and intelligent automation

- Continues support for HW accelerated AI and that allows clients to apply AI and machine learning to their most valuable enterprise data on IBM Z.
- AI capabilities have demonstrated strong opportunities to simplify and automate tasks, so we are building it into the OS!
- AI Framework for IBM z/OS, intended to augment z/OS with intelligence that optimizes IT processes, simplifies management, improves performance, and reduces skill requirements.
- AI-Powered WLM, designed to intelligently predict upcoming batch workload and react accordingly for optimized system resources is the first to leverage the AI System Services.



# **z/OS 3.1 Release Overview**

## **Usability and Skills**

z/OSMF File compare utility, upload/download, Security Configuration assistant, Sysplex Mgmt and CFRM Policy Editor (CF structure sizing), Release Upgrade, ServerPac improvements...

## **Application Development**

Artificial Intelligence, z/OS Container Extensions, Red Hat OpenShift, z/OS Containers, JSON Parser improvements, ISPF member generations, ABO, Java 11, Node.js, Python, Go, Enhanced zIIP usage

## **Enhancing Security**

RACF DB encryption, RACF custom fields, ICSF/Crypto, zACS monitor, compliance support, GIMZIP code package signing/validation, z/OS Validated Boot...

## **Scalability & Performance**

Greater than 4TB memory, Dedicated Memory Pools, RMF UI improvements, CF performance and scalability...



## **Data Serving & Storage**

Cloud Data Access, EzNoSQL APIs, DFSMSrmm z/OSMF plug-in, simplified Catalog recovery & management, DFSMShsm & SMS enhancements, NFS Server enhancements, Union File System, Data Set File System...

## **Availability**

Anomaly Mitigation, PFA and RTD improvements, System Recovery Boost, XCF Notepad resiliency...

## **Systems Management**

AI infused z/OS, JES2 expanded policy support, Change Tracker, z/OS System Provisioning Service, z/OS Management Services Catalog, zWIC, SDSF new displays...

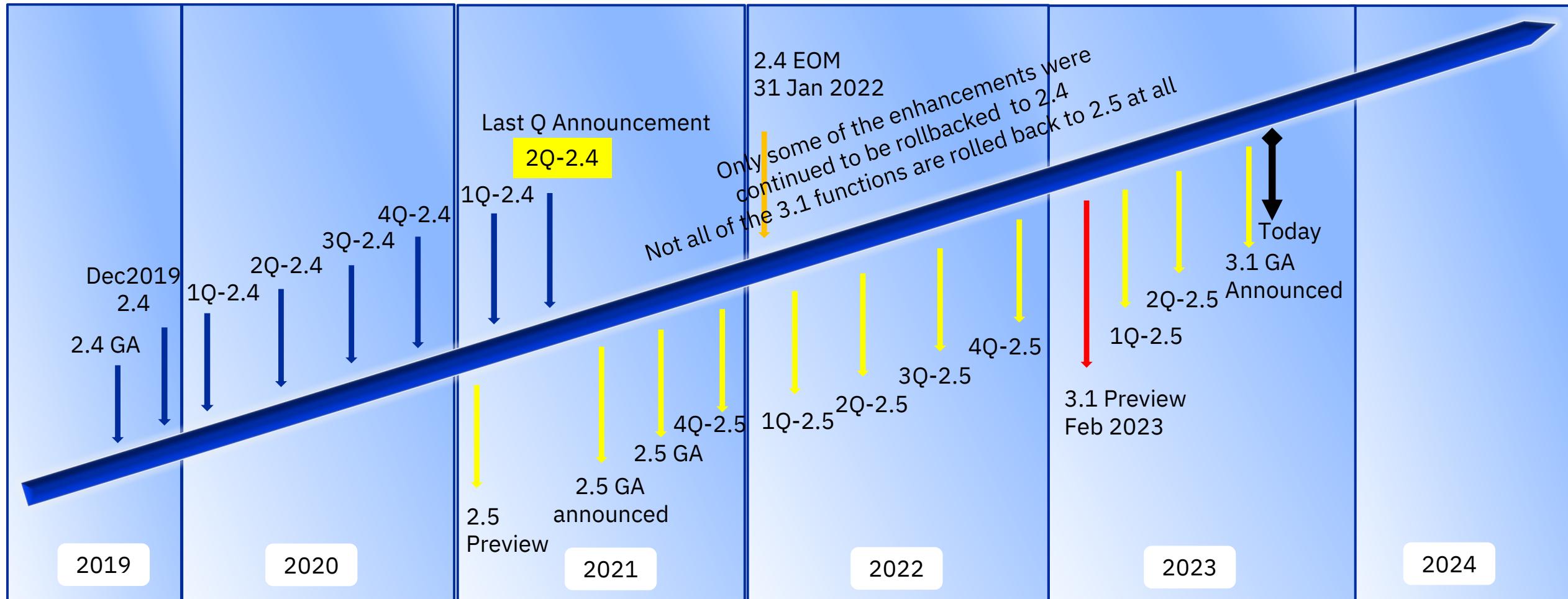
## **Networking**

zERT, RDMA over ROCE 3, SyslogD, FTP security...



# z/OS Versions & CD Enhancements

How can I continue to get the latest enhancements ?? 2.5 or 3.1 ? Benefit of being in current release!!!



# z/OS 3.1 Ordering - Critical Dates

**September 19, 2023** -> z/OS 3.1 ordering begins

---

**September 29, 2023** -> z/OS 3.1 general availability

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*If you decide on moving forward with z/OS 3.1 ,in addition to what is new in z/OS 3.1 , you will continue to get benefit more and will continue get several new functions, enhancements that are being developed for z/OS NEXT release in future months with Continuous Delivery*

*z/OS V2.5 Q22023 was the **last CD Quarterly Announcement** for z/OS V2.5*

*There will be new **z/OS 3.1 Q42023 Continuous Delivery Announcement** in 4 th Quarter that will contain items from **z/OS NEXT!***

**January 2024**                   -> Ordering complete for z/OS V2.5



# **z/OS Announcements & Continuous Delivery**

## **GitHub: z/OS Education Assistance**

# z/OS Version & CD Announcement Letters

[IBM z/OS 3.1 GA Announcement](#)

[Preview: IBM z/OS 3.1](#)

[IBM z/OS V2.5 2Q 2023 enhancements](#)

[IBM z/OS V2.5 1Q 2023 enhancements](#)

[IBM z/OS V2.5 4Q 2022 enhancements](#)

[IBM z/OS V2.5 3Q 2022 enhancements](#)

[IBM z/OS V2.5 2Q 2022 enhancements](#)

[IBM z/OS V2.5 1Q 2022 enhancements](#)

[IBM z/OS V2.5 4Q 2021 enhancements](#)

→ z/OS 2.5 GA Date : 30 September 2021

[IBM z/OS V2.5 GA Announcement](#)

[Preview IBM z/OS V2.5 Announcement](#)

[IBM Continuous Delivery Model Announcement](#)

[IBM z/OS Continuous Delivery Redpaper](#)

8 August 2023

28 Feb 2023

20 June 2023

21 March 2023

15 November 2022

20 September 2022

21 June 2022

15 Mart 2022

23 November 2021

27 July 2021

2 March 2021

Planned Availability Date: September 29, 2023

At the end of each announcement, you can find links  
previous ones



## In this presentation

(**2.4CD XQ20XX**) – 2.5 Base items that were rolled back to 2.4 as z/OS 2.4 CD

(**CD XQ20XX**) – 3.1 Base items that were rolled back to 2.5 as z/OS 2.5 CD

# z/OS Version & CD Announcement Letters – GitHub For Presentations

## IBM z/OS Education Assistance

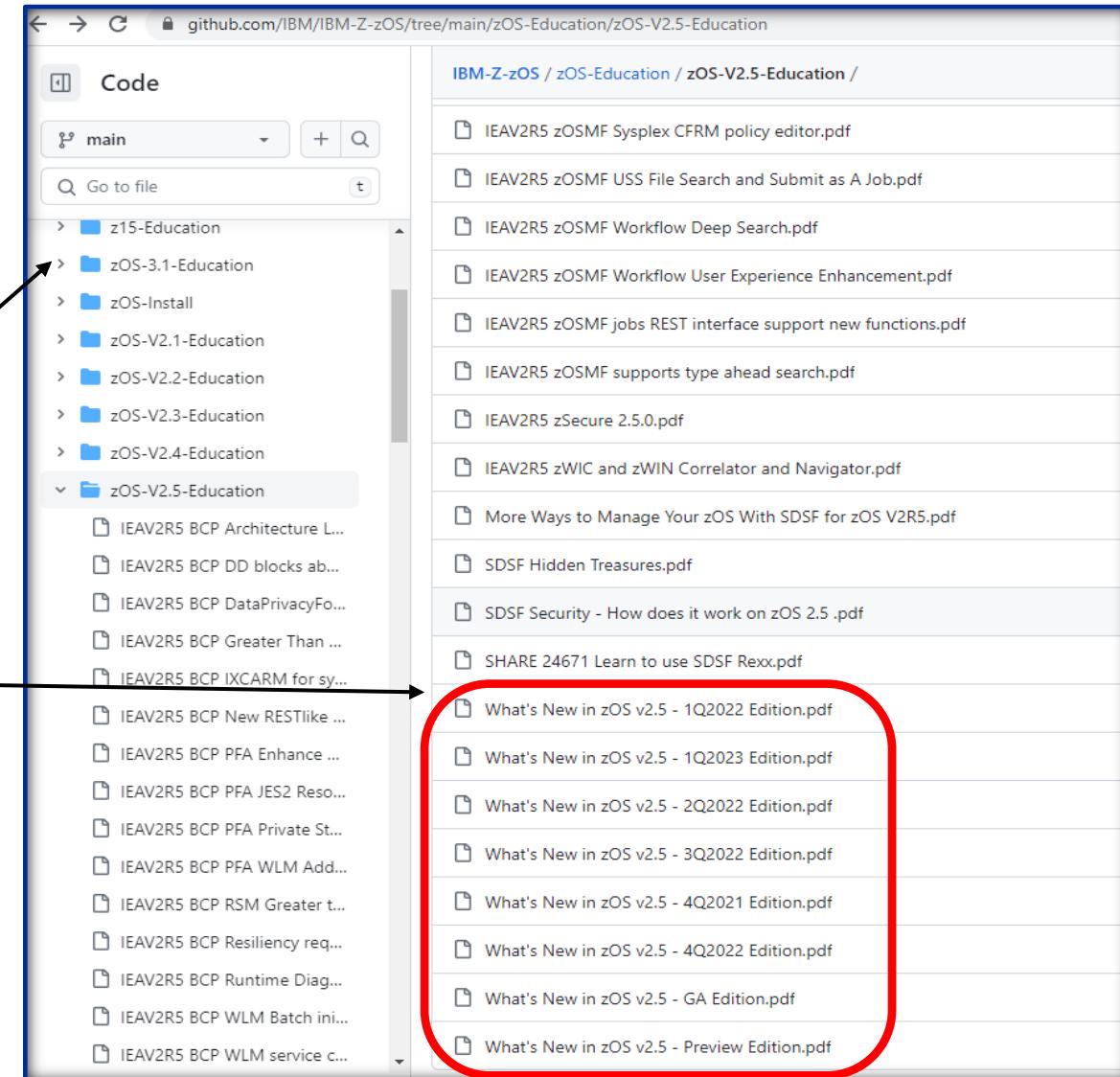
- Check GitHub for presentation version of these announcements .
- You can see all changes with Continuous delivery in latest version
- What's new 3.1 GA and preview edition pdfs. +80 specific topic files
- 86 pdfs about details of the items related to V2.5

[z/OS github entry](#)

<https://github.com/IBM/IBM-Z-zOS/tree/main/zOS-Education/zOS-V2.5- Education>

[z/OS github entry](#)

<https://github.com/IBM/IBM-Z-zOS/tree/main/zOS-Education/zOS-3.1- Education>



# z/OS Continuous Delivery

z/OS embraces continuous delivery through new function APARs

- Get weekly emails when APARs close with My Notification: start at
- <https://www.ibm.com/support/entry/portal/support>
- Look on the web, updated monthly:
- <https://www-03.ibm.com/systems/z/os/zos/installation/zosnfapars.html>

New Function APARs for the z/OS Platform

z/OS Library

When new function APARs are introduced in the IBM service stream, you can find them here collected in a convenient reference format. Use this information to review the latest enhancements from IBM and determine which ones to implement.

The APAR information is collected in the following files:

File name	Description
mvsstore.zosnewfu.html	New function APARs for the past 12 months (HTML)
mvsstore.zosallu.html	New function APARs for the past five years (HTML)
mvsstore.zosnewfu.csv	New function APARs for the past five years (CSV)

These files:

- Provide brief descriptions and links to the new function APARs that were released over a given period (previous 12 months or 5 years).
- Include information about closed APARs with closed PTFs, if available on the date of file creation.
- Are sorted by APAR close date with the most recent APARs appearing at the top of the file.

The files are available in two formats for your convenience:

- Browser-ready, web table (HTML). Save this file to your workstation, then click it to display the information in a web page.
- Comma-separated values (CSV). Save this file to your workstation, then import it into a spreadsheet program. The file uses semi-colons for delimiting items; you might need to indicate the use of this delimiter in your spreadsheet program.

The files are updated about once per month. See the file content for the date of the most recent update.

Document Information

More support for:  
z/OS

Component:  
z/OS

Software version:  
2.4.0, 2.5.0

Operating system(s):  
z/OS

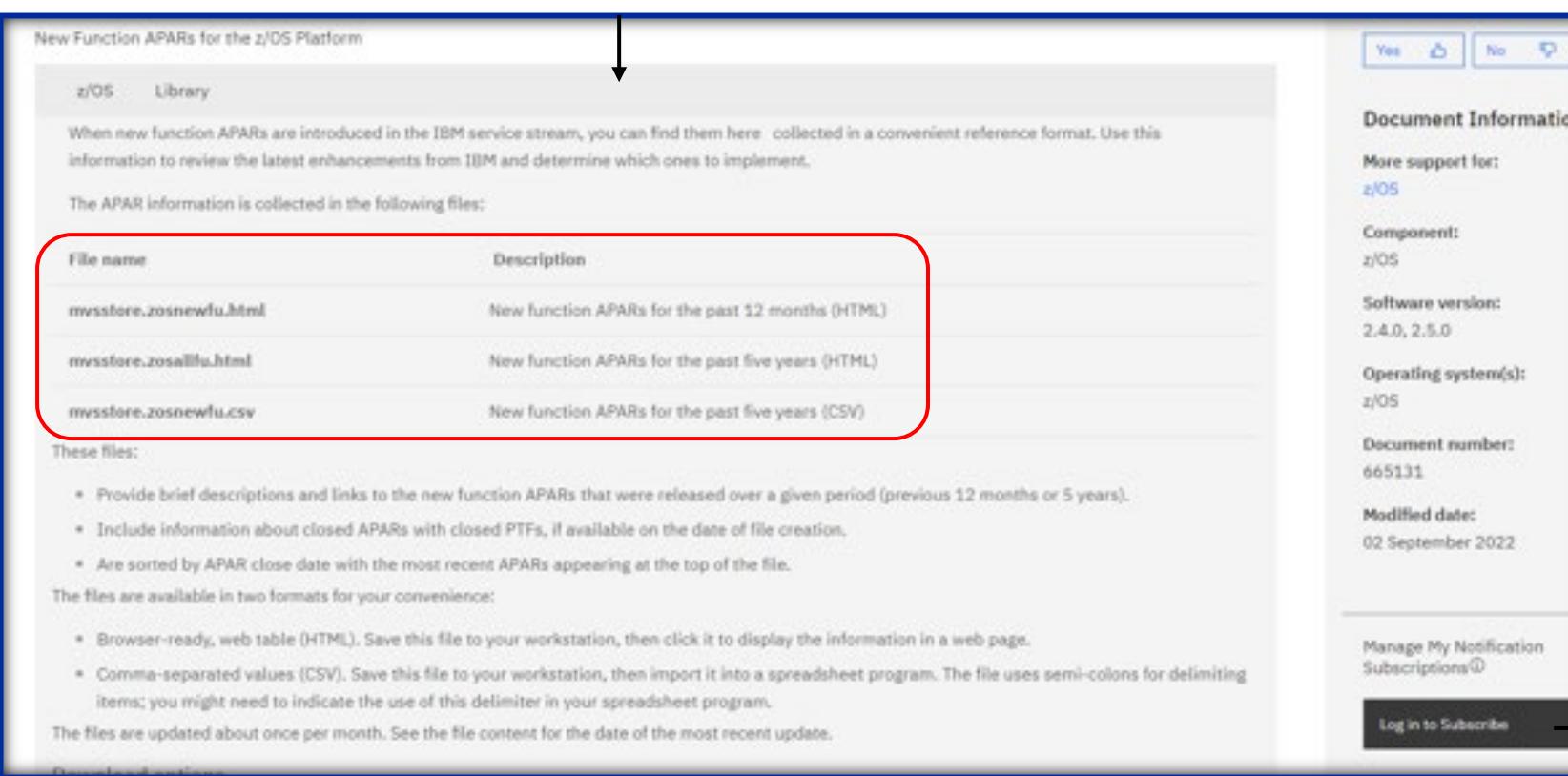
Document number:  
665131

Modified date:  
02 September 2022

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*z/OSMF, SDSF, DFSMS are one of the first  
implementers of CD!*  
All z/OS Components are participating in CD!

# z/OS Continuous Delivery

Mvstore.zosnewfu.html -> New Function APAR for last 12 months

A sample part of html is as below : When you click on APAR number , you can see details of APAR .

2023/05/10	<a href="#">PH53409</a>	568851500	DB2 ADMIN TOOL MVS	D10 U791758	NEW MASKING SERVICE STORED PROCEDURE
2023/05/09	<a href="#">QA61657</a>	5688505101	ICSP/MVS	7C0/ 7C1/ 7D0/ 7D1/ 7D2/	NEW FUNCTION
2023/05/09	<a href="#">QA61657</a>	5688505101	ICSP/MVS	7C0/ 7C1/ 7D0/ 7D1/ 7D2/	NEW FUNCTION
2023/05/09	<a href="#">QA61564</a>	5752SOCDE	ZCX SERVER	7C0/	NEW FUNCTION
2023/05/09	<a href="#">QA61564</a>	5752SOCDE	ZCX SERVER	7C0/	NEW FUNCTION
2023/05/09	<a href="#">PH51531</a>	694235B00	GDPS	440/ 450/ 460/	NEW FUNCTION - GDPS LCP Manager (MD) CAPTURE perfor
2023/05/08	<a href="#">QA61164</a>	565506805	SYSTEM SSL	450/ 451/ 453/	NEW FUNCTION
2023/05/08	<a href="#">QA61164</a>	565506805	SYSTEM SSL	450/ 451/ 453/	NEW FUNCTION
2023/05/08	<a href="#">PH54099</a>	5737B1610	AD MAINFRAME	611/	ROLL UP OF ALL EXISTING FIXES FOR IBM AD CONNECT
2023/05/04	<a href="#">QA61328</a>	5752SC133	ZACS AUTH CODE SCAN	7C0/ 7D1/	NEW FUNCTION

## **IBM Z Content Solutions Center**

**Documentations are always hot topic ...  
Here are nice capabilities...**

# IBM z Content Solutions Center

More than a year! Have you checked ? Great Place! Single Engaging place for everything you need to understand and use functions and products! <https://www.ibm.com/support/z-content-solutions/>

- A content solution helps you get started and provides a **single engaging place for everything** you need to understand and use a product or function. This can include product libraries in IBM Documentation, videos, workflows, Redbooks, and more. Visit this page often to find the latest content solutions
- Several of the existing items will be referred in this presentation

The screenshot shows the IBM Z Content Solutions Center interface. At the top, there's a navigation bar with tabs: 'IBM Z and LinuxONE Content Solutions' (which is active), 'Automation and management', 'Modernization', 'Optimization', 'Prediction', and 'Security'. Below the navigation bar, there are two main sections: 'Automation and management' and 'Modernization', each containing several items with icons and descriptions.

Automation and management		
IBM z/OS Change Tracker	Red Hat Ansible Certified Content for IBM Z	ServerPac Installation using z/OSMF
Software Update with z/OSMF	z/OS Management Services Catalog	

Modernization		
Automating and shift-left testing for z/OS hybrid applications	Developer experience for hybrid cloud with IBM Z	Discover and plan for z/OS hybrid applications
EzNoSQL for z/OS	IBM Z and Cloud Modernization Stack <small>New</small>	IBM Z Distribution for Zowe

# PDF version of IBM z Content Solutions' function specific all docs

The following **comprehensive content collections (c3s)** provide all of the product documentation for a function in one place. When there is a content solution associated with a c3, the title of the c3 is a link to the content solution homepage.

Content solutions help you get started and provide a single location for all of the technical content about the function, including videos, workflows, articles, and more.

<https://www.ibm.com/docs/en/zos/2.5.0?topic=z-content-solutions>

The screenshot shows a web browser displaying the IBM Z Content Solutions page. The URL in the address bar is <https://www.ibm.com/docs/en/zos/2.5.0?topic=z-content-solutions>. The page header includes the IBM logo, a navigation menu with 'Documentation' selected, and a search bar. On the left, a sidebar shows the 'z/OS' version as '2.5.0' and a 'Change version' dropdown. It also features a 'Show full table of contents' checkbox and a 'Filter on titles' input field. Below this is a list of 'IBM Z Content Solutions' which includes: Cascading FlashCopy, Cloud Provisioning and Management, z/OS Container Extensions, Integrated Accelerator for zEDC, JES2 Email Delivery Services, JES2 Small Environment and NOTIFY Enhancements, Pervasive Encryption for IBM Z, RACF Support for IBM Z Multi-Factor Authentication (IBM MFA), Remote Pair FlashCopy for XRC, System Recovery Boost, Tailored Fit Pricing for IBM Z, z/OS Trusted Key Entry Workstation (TKE), z/OS Workload Interaction Correlator, and z/OS Compliance Data Collection. At the bottom of the sidebar are 'Download PDF' and 'Offline docs' links. The main content area is titled 'IBM Z Content Solutions' and last updated on '2023-06-28'. It contains a 'Description' section and a table of contents. The table has columns for 'Title', 'Abstract Link', 'PDF Link', and 'Last Updated'. The data from the table is as follows:

Title	Abstract Link	PDF Link	Last Updated
Cascading FlashCopy	Abstract	PDF	September 2021
Cloud Provisioning and Management	Abstract	PDF	June 2022
Integrated Accelerator for zEDC	Abstract	PDF	September 2021
JES2 Email Delivery Services	Abstract	PDF	June 2023
JES2 Small Environment and NOTIFY Enhancements	Abstract	PDF	September 2021
Pervasive Encryption for IBM Z	Abstract	PDF	September 2021
RACF Support for IBM Z Multi-Factor Authentication (IBM MFA)	Abstract	PDF	June 2023
Remote Pair FlashCopy for XRC	Abstract	PDF	September 2021
System Recovery Boost	Abstract	PDF	August 2022
Tailored Fit Pricing for IBM Z	Abstract	PDF	September 2021
Validated Boot for z/OS	Abstract	PDF	May 2023
z/OS Compliance Data Collection	Abstract	PDF	September 2022

**IBM Documentation for z/OS (DOC4Z)- SOD from 3.1 GA Announcement**  
IBM intends to deliver a new component called DOC4Z on z/OS to replace Knowledge Center for z/OS (KC4Z). DOC4Z is a web application that provides IBM product publication content to web browser clients directly from a local z/OS server system. IBM also intends to provide IBM Documentation APIs for clients to programmatically interact with DOC4Z.

# z/OS - zHW Support



# IBM z16 Highlights - z/OS zHW Support

## IBM z16 (3931) Model A01 Functions & Features

<b>One hardware model, Five Features, 1-4 19" Frame System</b>
Up to 85 user partitions, 32 TB per partition, 200 CPUs/zIIPs/IFLs per partition, up to 224 Pus • Up to 16 TB per z/OS LPAR with z/OS V2.5
• 2 CP chips on a Dual Chip Module (DCM), 5.4 GHz • L1 Private 128K i & 128K d • L2 n/a • L3 Shared 32 MB / core, 192 MB effective shared • L4 n/a
256 GB HSA, 40 TB maximum, 10 TB per drawer
Channel Subsystem scalability • Up to six (6) Channel Sub Systems (CSSs) • 4 Subchannel Sets per CSS
HiperDispatch Enhancements
IBM Z Integrated Accelerator for AI
Hardware Instrumentation Services (CPUMF)
New machine instructions
Crypto Express8S
OSA Express7S 1.2



(z/OS support in blue)

<b>IBM System Recovery Boost</b>
<b>Coupling Express2 LR 10Gb (CX6-DX) PCIe adapter</b>
<b>CF Level 25</b> • Retry buffers for cache and lock commands • Cache residency time metrics • Scalability improvements • Request latency/performance improvements
<b>ICA-SR 1.1</b> Max ICA SR per CEC 48 adapters/96ports (same as z15)
<b>Max ICP CHPIs per CEC – 64</b>
<b>10 GbE and 25 GbE RoCE Express 3 SR and LR (CX6-DX)</b>
<b>FICON Express 32S</b>
<b>zHyperLink® Express1.1</b> • Maximum 16 Adapters /32 ports
<b>IBM Flexible Capacity for Cyber Resilience</b>
<b>Validated Boot</b>

- **Industry First AI-Onchip**
- **Hybrid Cloud**
- **Industry First Quantum Safe Ready Platform**

# IBM z16 Highlights - z/OS zHW Support

## [z/OS 3.1 Base & z/OS 2.5 CD 2Q-2022](#)

- Up to 16 TB of memory per z/OS instance used by select middleware
- 20 new instructions to help improve COBOL and AI applications, including instructions to leverage a new AI accelerator
- A new level of coupling facility support, CFLEVEL 25, which provides: (More Details in Next Slides...)
  - IBM z16 Coupling and Parallel Sysplex enhancements and CFLEVEL 25 support
  - CF cache and lock structure resiliency improvements
  - CF cache structure object residency time monitoring and metrics
  - CF latency and scalability enhancements
- Flexible Capacity for Cyber Resiliency is a new Capacity on Demand (CoD) offering available on IBM z16 machines that allows processing capacity flexibility between an organization's primary site and alternate data centers
- IBM Z Integrated Accelerator for AI is designed to provide machine learning acceleration with high throughput and low latency
  - IBM Deep Learning Compiler (DLC) enables deep learning models to be deployed on IBM Z, exploiting the IBM Integrated Accelerator for AI.
  - IBMZ Deep Neural Network library (zDNN) is a software library that provides high-level C APIs, which enable simplified exploitation of the IBM Z Integrated Accelerator for AI by AI frameworks and libraries.
- For z16, additional recovery process boosts added **(CD 2Q2022)**
  - Client-selected middleware starts and restarts
  - SVC dump processing
  - HyperSwap configuration load and reload
- ICSF Support For New CEX8 Coprocessor, New Quantum Safe Algorithms (Kyber& Dilithium8,7)
- z/OS IBM z16 Upgrade Workflow provided in PTF on V2.2 and higher to help position z/OS for use on IBM z16 server

# IBM z16 Highlights - z16 Model A02

## Z Hardware Support

### IBM z16 Model A02 functions & features

- Up to 68 Cores
- 7nm technology, 4.6GHz, 1.5x Cache
- Up to 13% per core performance improvement
- Up to 21% total system capacity growth
- Up to 16TB memory
- 1 19-inch frame, or rack mount for client-supplied racks
- Up to 7 billion HTTPS transactions per day with OLTP microservice applications running on Red Hat OpenShift Container Platform



- ***Industry First AI-Onchip***
- ***Hybrid Cloud***
- ***Industry First Quantum Safe Ready Platform***

# Format Of This Presentation

With z/OS continues delivery , several of the new functions for the new release are available to clients.

It might be easier for you to see all enhancements related to one component or one area in table view. You can use these tables

- To get some of the enhancements history easily
- If you have already installed maintenance but not have time to check , you can use these tables to check whether you have done necessary actions to make use of these enhancements
- You will also see how long they have been there, so that , you may take this time as trigger item for you to not to be late on using them
- It is been arranged based on components, parts of z/OS , so that , you can handle in one shot, easily and with history behind; makes it easier for you to do the planning to start implementing them.
- With history behind, you may get better understanding easily some of the enhancement that is referring to previous enhancements on same component with all history as item in a table view.
- We will keep these up to date for each Quarterly announcements and special announceents as well
- To differentiate easier the new release functions

Enhancements/New Features	Since When & Updates
Electronically deliverable Customized Offerings Driver	2.4 GA
First IBM ServerPac in a z/OSMF Portable Software Instance (z/OSMF ServerPac) – IBM CICS	2.4.10-2020 / 2.5 GA
IBM ServerPac in a z/OSMF Portable Software Instance (z/OSMF ServerPac) – IBM DB2 and IMS	2.4.10-2020 / 2.5 GA
Customized Offerings Driver update	2.4.40 -2020
Availability of the z/OS 2.5.5 ServerPac as a portable software instance	2.5 GA
Upgrade Workflow	2.5 GA
New z/OSMF Task - z/OS Software Update for applying maintenance very easily using z/OSMF	2.5 GA
z/OS upgrade improvements for the IBM z16	2.5.20-2022
Customized Offerings Driver Enhancements – z/OS 2.5.2 z/OSMF MinSCDS...	2.5.40-2022
GMZIP package signing and verification in z/OS SMP/E and z/OSMF Software Management	2.5.10-2023
Only way to install z/OS Release = z/OSMF - No ServerPac format any more. Only z/OSMF Portable Software Instance = 3.1	3.1 Preview

# z/OS Parallel Sysplex Updates



# z/OS Parallel Sysplex Updates

Enhancements/New Features	Since When & Updates
Logger support for single-system logger	2.4 GA
Dynamic activation of I/O configurations for stand-alone Coupling Facilities	2.4 GA
XCF Transport Classes simplification	2.4 GA
Automatic Restart Manager (ARM) support for restarting a system task	2.4 2Q-2020 / 2.5 GA
Coupling Facility (CF) monopolization avoidance	2.4 2Q-2020 / 2.5 GA
System Recovery Boost sysplex recovery enhancements	2.4 3Q-2020 / 2.5 GA
XCF note pad resiliency enhancements	2.5 4Q-2021 / 2.5 GA
Parallel Sysplex z16 Support –z16 Coupling & Parallel Sysplex Enhancements	2.5 2Q-2022
CF latency and scalability enhancements ( z16)	2.5 2Q-2022
CF cache and lock structure resiliency improvements ( z16 CF Level 25 )	2.5 2Q-2022
CF cache structure object residency time monitoring and metrics ( z16 CF Level 25)	2.5 2Q-2022
System Recovery Boost sysplex recovery enhancements ( z16 only updates)	2.5 2Q-2022
CF Sizer in z/OSMF CFRM Policy Editor	3.1

# z/OS Parallel Sysplex Update

- Parallel Sysplex Improvements With IBM z16
  - CF Connectivity (Performance)
    - Enhanced ICA SR Coupling Link Protocol in IBM z16
    - New Coupling Express2 LR Adapter giving more Throughput compared Coupling Express LR (in z15)
  - CF Level 25 - CF Image scalability improvements (Scalability)
  - CF Level 25 - Lock record data and structure full conditions (Resilience)
  - CF Level 25 - Cache residency metrics (Capability)
  - CF Level 25 - Improved IFCC Handling for subset of Cache and Lock Structure Commands (Resilience)
  - CF Level 25 - Only DYNDISP=THIN (Simplification)
- CF Structure Sizing With z/OSMF
- Storage Constraint Relief
  - More use of above the bar storage
  - More sensitive to frame shortages
- Compliance Center Data Support From XES/XCF
- z/OS 3.1 Requirement - SSD Capable Sysplex Couple Datasets

# IBM z16 Highlights – Sysplex Enhancements for CF LEVEL 25

## CF cache and lock structure resiliency improvements

IBM z16 CFLEVEL 25 provides improved resiliency support for CF cache and lock structure usage.

The CF now implements a functional retry buffer capability that applies to the subset of CF cache and lock commands that cannot always be safely retried when an interface control check (IFCC) or other link-related error interrupts the normal request flow to or from the CF image. Retry buffers make it possible for z/OS to always determine the outcome of such CFoperations following a transient link error, avoiding any ambiguities related to the CF structure updates made by those requests.

z/OS now makes use of CF retry buffers to improve the resiliency of these CF structure operations without requiring any software updates by the user function that is exploiting the CF structure for its data- sharing purposes.

With the PTFs for APAR OA60275, the z/OS operating system support for retry buffer enhancements is available on z/OS 2.2 and later.

Additionally, IBM z16 CFLEVEL 25 provides lock structure exploiters with the new capability to dedicate a subset of lock structure record data entries that are reserved for recovery use only. Exploiters may reserve these record data entries and thereby ensure that even when all the normal record data entries in a lock structure have been used up, the special pool of dedicated recovery-use entries remain available for use in recovering from this structure-full condition.

With the PTFs for APAR OA60650, the z/OS operating system support for reserved lock structure record data entries is available on z/OS 2.3 and later.

# IBM z16 Highlights – Sysplex Enhancements for CF LEVEL 25

## CF cache structure object residency time monitoring and metrics

New CF cache structure monitoring and metrics are provided for IBM z16 CFLEVEL 25 coupling facilities. These metrics provide cache structure exploiters with **additional cache object information** that can be used to provide **improved cache management**, either directly by the exploiter or through improved cache usage reporting by the exploiter.

New storage class statistics are provided to report on cache directory entry and data area "**residency times**", defined as the average time between when a cache directory entry or its associated data area is first created until the time that those cache structure resources are reclaimed for use to satisfy a more-current cache structure request.

Residency time metrics can be used to provide insights into the overall cache effectiveness for CF cache structures.

With the PTFs for APAR OA60650, the z/OS operating system support for cache structure object residency time metrics is available on z/OS 2.3 and later.

# IBM z16 Highlights - z/OS zHW Support

## System Recovery Boost support

### IPL and Shutdown boost

- Speed boost –run the general-purpose processors at full speed if they are running sub-capacity normally
- zIIPboost –allow general purpose work to run on the available zIIPs for increased capacity
- Up to 60 minutes of boost at IPL and up to 30 minutes of boost at shutdown

### Sysplex Recovery (2.4CD 3Q2020)–support for recovery process boosts

- Sysplex partitioning –boost surviving systems for recovery
- CF structure recovery –boost systems participating in structure recovery
- CF data sharing member recovery –boost all systems recovering
- Hyper Swap –boost systems participating in HyperSwap processing
- Up to 30 minutes per LPAR per Day

For z16, additional recovery process boosts added (**CD 2Q2022**)

- Client-selected middleware starts and restarts
- SVC dump processing
- HyperSwap configuration load and reload



# IBM z16 Highlights - z/OS zHW Support

## z/OS System Recovery Boost Summary

Stage	Boost Class <sup>2</sup>	Description	Duration	Usage	Trigger
1	IPL Boost and Shutdown Boost  z15, z16	IPL / Startup  ShutDown  GDPS® Enhancements <sup>3</sup>  Standalone Dump	60 minutes  At most 30 mins  N/A  Dump time or max 60 mins	Once per LPAR  Once per LPAR  N/A  Speed boost only	IPL  PROC IEASDBS  GDPS Script  IPL SADMP
2	Recovery Process  z15, z16	Sysplex Partitioning Recovery  CF Structure Recovery  CF DataSharing Member Recovery  Hyperswap Recovery	2 mins  1 min per structure  1 min per lock structure  2 mins	30 mins in 24 hours per eligible LPAR  Shared Among Invocations	Automatic  Automatic  Automatic  Automatic
3	Recovery Process  z16	SVC DUMP  Middleware Start/Stop/Recycle  Hyperswap load boost	2 mins <sup>1</sup>  5 mins  2 mins	Only 2 Reserved zIIPs brought online	CHNGDUMP RPBMINSZ=  WLM Policy  Automatic

<sup>1</sup> In order to see a benefit from zIIP Boost, you will need to turn on dump optimization, via the CHNGDUMP SET,SDUMP,OPTIMIZE=YES command.

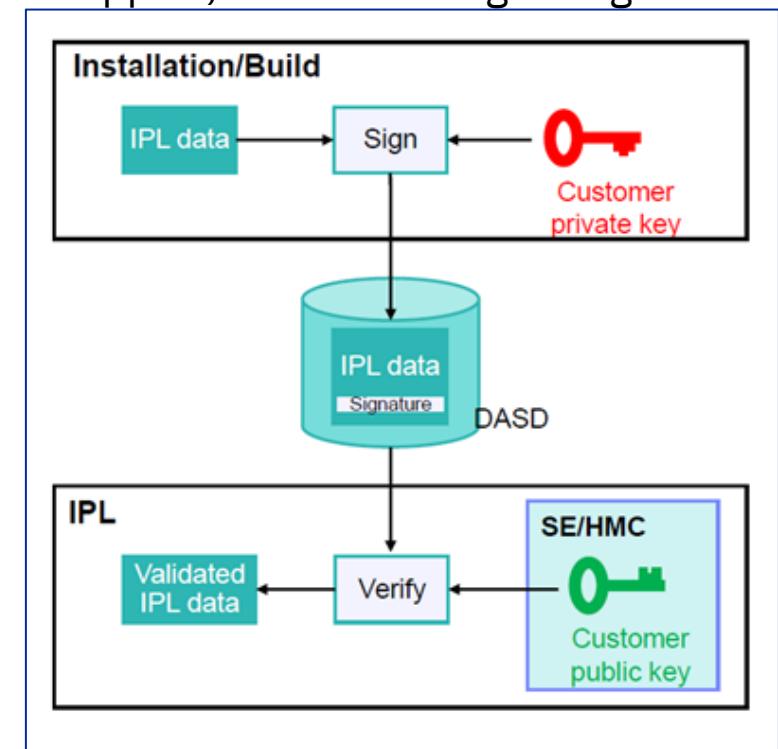
<sup>2</sup> WLM will implicitly set all single-period importance 1 or 2 work as CPU Critical for all boost classes for duration of boost

<sup>3</sup> GDPS provides configuration and orchestration parallelization, no SRB related activities

# IBM z16 Highlights – z/OS Validated Boot

## Validated Boot for z/OS (CD 2Q2023)

- z16 and z/OS are providing a solution for Validated Boot for z/OS, which will allow IPL-time validation of digital signatures for certain z/OS executables
- It uses digital signatures to provide an IPL-time check that the z/OS system, including z/OS nucleus and LPA load module executables, is intact, untampered with, and originates from a trusted source from the time at which it was built and signed.(Digital Signatures for z/OS Software Packages via GIMZIP)
- It works together with the Digital Signatures for z/OS Software Packages via GIMZIP support, which uses digital signatures to validate the delivery of code packages from the software vendor to the client
- This enables the detection of subsequent unauthorized changes to those software executables, whether those changes be accidental or malicious in nature.
- Designed to meet standards such as the National Information Assurance Program (NIAP) Protection Profiles 4.3.
- CLPA is always enforced for Validated Boot for z/OS



AI on z/OS  
OS, Workloads  
Now AI on everywhere...



**Never too late to jump into AI topics as  
z/OS System programmer – if not already done  
with your AI experts or your own.  
AI on z is there for many years.**

**Now much stronger and wider – inside OS and as AI System Services**



## AI on z/OS –New materials to help jump start your AI adoption journey

- Journey to AI on IBM zSystems and LinuxONE content solution → Guidance on identifying use cases, available solutions, recent developments and more.  
<https://www.ibm.com/support/z-content-solutions/journey-to-ai-on-z/>
- AI on IBM Z and LinuxONE community → Read recent blogs and announcements  
→ Engage with subject matter experts on the latest topics around AI on IBM Z  
<https://ibm.biz/BdPBud>
- Client Engineering for Systems Workshop → Learn about analytics and AI technologies and solutions on IBM Z and where you are in your AI Journey  
→ Each workshop is tailored to fit your needs  
Contact [ce4s@ibm.com](mailto:ce4s@ibm.com)or your local IBM Client Engineering team to find out more  
<https://ibm.biz/aionz-workshop>
- AI on IBM Z and LinuxONE Getting Started - 101 → Learn about the ecosystem and landscape for exploiting AI on IBM Z and LinuxONE systems.  
<https://ibm.github.io/ai-on-z-101/>

# AI-Infused Operating System – z/OS 3.1

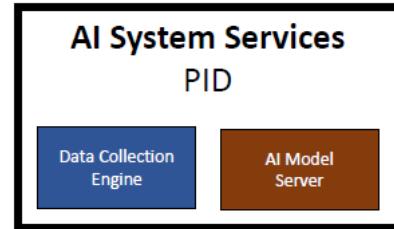
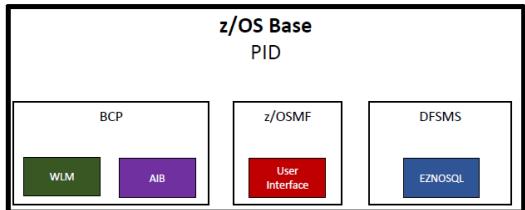
- ✓ *Optimize IT processes*
  - ✓ *Simply Management*
  - ✓ *Improve Performance*
  - ✓ *Reduce Skill Requirements*
- 
- ✓ ***Allows users to control and manage AI Capabilities without a need for additional AI and data science skills***

*Capabilities are planned to be delivered iteratively and will provide optimization of IT processes, enable intelligent operations, and strengthen the IBM strategic direction of providing intelligent infrastructure.*

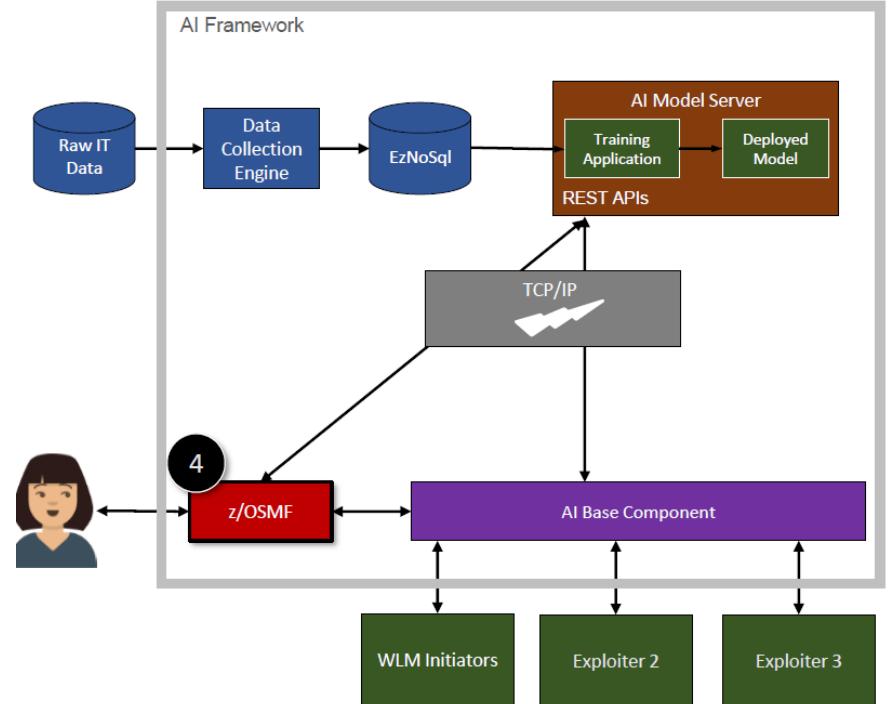
# AI Framework For z/OS 3.1

The AI Framework consist of

- Data collection engine (Included in new **AI System Services** Product)
  - AI model server (Included in new **AI System Services** Product)
  - AI base component (New **AI Base Component AIB** in z/OS )
- 
- A modern user interface, and providers that can plug into the framework for expandable future use cases. (New z/OSMF Plug-in)
  - New **z/OSMF workflows** for configuration of the AI framework.



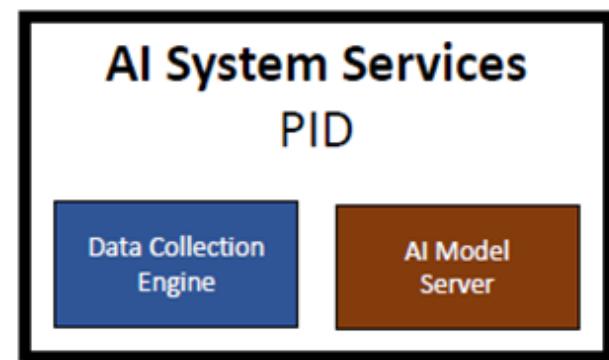
- z/OS 3.1 contains enhancements to WLM as first exploiter of AI Framework



- ***AI System Services for z/OS new product announced in same day as z/OS 3.1***

**Anouncement :** <https://www.ibm.com/docs/en/announcements/ai-system-services-zos?region=US>

- ***One of the Key component of AI framework, delivers foundational AI Capabilities***



# AI-Powered WLM in z/OS 3.1

- IBM is augmenting WLM with AI to optimize the management of IBM Z workloads. These iteratively delivered capabilities will allow z/OS to intelligently predict upcoming batch workload and react by allocating an appropriate number of initiators. This is designed to optimize system resources and batch management, thus eliminating overhead from manual fine-tuning and trial-and-error approaches.
- **AI-powered WLM** is the initial use case leveraging the AI Framework for IBM z/OS.
- AI-Powered WLM, designed to **intelligently predict upcoming batch workload** and react accordingly for optimized system resources is **the first to leverage the AI System Services**.

# AI on Z ( Application Development EcoSystem)

## Open-source AI frameworks on zCX (running Linux in z/OS)

- Deploy AI frameworks co-located with z/OS applications for low latency response times
- Popular machine learning and deep learning frameworks, such as TensorFlow and IBM Z Deep Learning Compiler (zDLC), are available as a pre-built image in the IBM Z and LinuxOne Container Registry
- Select frameworks will leverage the z16 Integrated Accelerator for AI
- Utilize Anaconda to install and manage data science packages:  
<https://www.ibm.com/blogs/systems/announcing-anaconda-for-linux-on-ibm-z-linuxone/>

## Optimize libraries and compilers to leverage Integrated Accelerator for AI

- zDNN is a high level language interface for the Integrated Accelerator for AI, packaged with z/OS
- IBM Snap ML now installable in Linux environments using PyPI (pip install)
  - Developed by IBM, a library for training and scoring traditional ML models.
  - Exploits the AI accelerator for inferencing of tree-based models. This includes random forest and boosted tree model types.

TensorFlow and the IBM Z Deep Learning Compiler (DLC) are available as pre-built images in the IBM Z and LinuxONE Container Registry. Both enable use of the IBM z16 Integrated Accelerator for AI.

For more details on exploiting AI frameworks on IBM Z, see: <https://ibm.github.io/ai-on-z-101/>

# AI on Z – Watson X Code Assistant for COBOL to Java with Generative AI capabilities

## IBM Unveils watsonx Generative AI Capabilities to Accelerate Mainframe Application Modernization

Just recently Announced → 22 nd August 2023

IBM announced watsonx Code Assistant for Z, a new generative AI-assisted product that will help enable faster translation of COBOL to Java on IBM Z and enhances developer productivity on the platform.

This product will be generally available in Q4 2023

Watsonx Code Assistant for Z is a new addition to the watsonx Code Assistant product family, along with IBM watsonx Code Assistant for Red Hat Ansible Lightspeed, scheduled for release later this year.

These solutions will be powered by IBM's [watsonx.ai](#) code model, which will have knowledge of 115 coding languages having learned from 1.5 trillion tokens.<sup>2</sup> At 20 billion parameters, it is on target to become one of the largest generative AI foundation models for code automation. The watsonx Code Assistant product portfolio will extend over time to address other programming languages, to improve time to value for modernization and address growing skills challenges for developers.

IBM is designing these capabilities to provide tooling for each step of the modernization journey. The solution is expected to include IBM's Application Discovery and Delivery Intelligence (ADDI) inventory and analysis tool. Following ADDI, key steps on the journey include refactoring business services in COBOL, transforming COBOL code to Java code with an optimized design, and validating the resulting outcome, including using automated testing capabilities

COBOL is NOT going anywhere , this is fit for purpose. It is just for clients who like to modernize their applications in different languages.

For more information → [IBM-Unveils-watsonx-Generative-AI-Capabilities-to-Accelerate-Mainframe-Application-Modernization](#)

## IBM Z Platform for Apache Spark

Apache Spark 3.2 available on z/OS

- In-memory compute engine and analytics runtime, supports big data popular languages Java, Scala, Python and R
- Foundational capabilities for leveraging lightning-fast data processing on large volumes of z/OS data.
- Simplified data access and streamlined development on a wide range of algorithms and to accelerate analytics results

[IBM Z Content Solutions | Journey to open data analytics](#)

The screenshot shows a web page titled "Journey to open data analytics" under the "IBM Z and LinuxONE Content Solutions" category. The page features a blue header with navigation links for "Automation and management", "Modernization", "Optimization", "Prediction", and "Security". Below the header, there's a large title "Journey to open data analytics" and a subtext "Everything you need to get started quickly." At the bottom of the main content area, there are several links: "Get started", "Play overview", and "Transcript". To the right, there's a sidebar with a "Related solution" section titled "Journey to AI on IBM Z and LinuxONE" featuring a small icon of a person with a brain and a gear.

Introduction  
Big picture  
Get started  
Technical resources  
Related solutions  
What's new  
Rate this content

With z/OS at the core of your business, a wealth of data is at your disposal. By charting your journey to open data analytics, you can derive new insights and advantages from each transaction. The following capabilities allow you accelerate this journey:

IBM Z Platform for Apache Spark allows multiple, disconnected data sources to be virtually integrated within a single application. Apache Spark is the enterprise engine for processing unified data and scaling integrations with business applications.

Python AI Toolkit for IBM z/OS maintains hundreds of open source packages available on z/OS for your data science, machine learning, and deep learning needs. Reviewing and acquiring the packages of your choice can be conducted through an intuitive and secure IBM repository.

IBM® Data Virtualization Manager for z/OS® provides virtual, integrated views of data residing on IBM Z. It enables users and applications read/write access to IBM Z data in place, without having to move, replicate or transform the data.

# Application Development – Strategic Offerings

## Watson Machine Learning for z/OS (WMLz)

- Real-time analytics at the source with machine learning and deep learning models without impacting SLAs.
- Supporting build anywhere and deploy on Z strategy: easily import, optimize and deploy Open Neural Network Exchange (ONNX) deep learning models to z/OS natively
  - Leverages the IBM Deep Learning Compiler
  - In-transaction scoring for native CICS, IMS & Batch COBOL applications with near-zero latency
  - Telum on-chip AI Accelerator exploitation for AI inferencing at scale
  - IMS and batch Cobol native scoring capability

## Watson Machine Learning for z/OS Core Edition ( WMLz Core)

- A lightweight version of Watson Machine Learning for z/OS providing the essential services that are REST-API-based for machine learning operations including online scoring capabilities on IBM Z
- Support full lifecycle management of models
- Provides developer-friendly APIs for applications on IBM Z
- Primarily aiming for AIOps use cases through AI solutions offered by IBM or IBM partners.
- Runs on IBM z/OS and leverages proven IBM machine learning capabilities on IBM Z, including IBM Z platform for Apache Spark serves as data processing cluster for WML for z/OS and delivers advanced data analytics through z/OS Spark ( Spark)
-

## **Python AI Toolkit For z/OS & IBM SMF Explorer with Phyton**

# AI on Z - Python AI Toolkit for IBM z/OS

## Python AI Toolkit for IBM z/OS

- Industry leading AI Python packages available on z/OS
- Unlocks verified open-source software with supply chain security
- Familiar, flexible, and agile package installation process leveraging PyPi

[IBM Z Content Solutions | Journey to open data analytics](#)



IBM Python® AI Toolkit for IBM® z/OS®

Get Started Resources

Name	Tags
aniso8601	utility
argon2-cffi	security
argon2-cffi-bindings	utility
asttokens	utility programming_tools
attrs	programming_tools
backcall	programming_tools
beautifulsoup4	utility web
bz2file	utility
cairocffi	graphics
certifi	security

Items per page: 10 ▾ 1-10 of 93 items

Contact Us

There is support available for Python AI Toolkit for IBM z/OS at IBM Shopz.

[Launch Shopz](#) 

## IBM SMF Explorer with Python (CD 4Q2022)

Data access and analysis toolkit designed to help access SMF data and extract insights in an easy and modern way

Leverages state-of-the-art technologies like JupyterNotebooks and Python

Understand, interpret SMF data and unlock value from it even with limited z/OS skills

<https://ibm.github.io/IBM-SMF-Explorer/>

Hot Topics Blog -How to turn your SMF data into valuable insights without z/OS expertise

## **z/OS is enhanced to allow IBM Open Enterprise SDK for Python to be zIIP enabled.**

With IBM Open Enterprise SDK for Python on z/OS, advanced data analysis can be performed, with popular Python packages, natively on z/OS where the data is stored. zIIP enablement of Python on z/OS provides a competitive option for running Python workloads, and **up to 70%** of Python will be eligible to run on a zIIP.

This support is available with the PTFs for APARs PH52983 and OA63406 on z/OS V2.4 and later.

# Latest Compiler Offerings on z/OS

## Latest Compiler Offerings on z/OS



Required for z/OS 3.1 (At GA)

IBM Enterprise COBOL for z/OS 6.4

IBM Automatic Binary Optimizer 2.2

IBM Enterprise PL/I for z/OS 6.1

z/OS 3.1 XL C/C++  
(entitled also to IBM Open XL C/C++ 1.1)

IBM Semeru Runtime Certified Edition for z/OS v11.0

IBM Open Enterprise SDK for Node.js – z/OS v18

IBM Open Enterprise SDK for Python v3.11

IBM Open Enterprise SDK for Go v1.20

IBM has issued a statement of direction indicating a future plan to deliver IBM Semeru Java 17.

# More About Java on z/OS

## [z/OS 3.1 and Java](#)

z/OS 3.1 supports Semeru 11 as the minimum required Java level for z/OS itself(\*1)  
Java 8 support for application compatibility

IBM Semeru Runtime Certified Edition for z/OS, Version 17 – [Statement of Direction](#)

## [Java service stream updates](#)

See [features blog](#) for latest service release levels

Java on z/OS security providers are available for download ([link](#))

Installing Semeru 11 via Installation Manager now available ([link](#))

[Ecosystem support of Semeru 11 on z/OS](#) – Liberty, CICS, IMS, Db2, MQ, etc ([link](#))

[Celebrating 25 Years of Innovation: Java on z/OS](#) – more details at the end of this presentation

\*1 Java 8 is temporarily still required for Capacity Provisioning Manager (CPM), XML, and Infoprint Server

# Application Development – COBOL – Java Interoperability

## COBOL-Java Interoperability

- Support to manage parallel 31-bit and 64-bit Language Environment addressing mode (AMODE) enclaves within the same address space.
- Enables transparent traversal between the two AMODE enclaves.
  - New callable services CEEMICT/\_le\_ceemict are introduced for 31-bit COBOL and 64-bit Java interoperability applications to share a Db2 connection. ([CD](#))
- This interoperability support enables clients to modernize their existing high-level language applications.
  - 31-bit COBOL applications can now be extended by calling 64-bit Java programs (or vice versa) directly, in the same application context and address space with the enhancements made to IBM Java 8/11 SDK.
- Other features of this support include coordinated condition handling, easier serviceability because both enclaves are automatically part of the same dump and having the same security context for the entire application.
- While the primary focus is for COBOL-Java interoperability, the LE support is designed to work for any combination of high-level languages interoperating between 31-bit and 64-bit addressing modes.
- New callable service allows an application to interrogate if it is running in this interoperability environment. ([CD](#))
- This support is available with IBM SDK Java 8 and now with IBM Semeru Runtime 11 ([CD](#))

# Containers

z/OS Container Extentions (zCX) & z/OS Containers



# zCX - z/OS Container Extensions

## **z/OS Container Extensions – Run Linux Containerized workloads on z/OS!**

- z/CX delivered first with z/OS 2.4 (July 2019 Announced)
- z/OS Container Extensions provides a virtual appliance for running Linux on Z workloads on z/OS
- The **same binary** container images that run on Linux on Z under z/VM or zKVM will run in zCX
  - No porting is typically required from Linux on Z
- The open mainframe project Ambitus provides an ecosystem for zCX
- Scalable to:
  - Up to 64 servers per z/OS image
  - Up to 1 TB of guest memory per server
  - Up to 245 virtual devices per server
    - Disk devices up to 1TB each
  - Up to 1000 containers per server
  - zIIP eligibility - 98%+ ziip offload in lab measurements\*
- A self service trial is available to all z/OS customers, after 90 days purchase Container Hosting Foundation product to continue using zCX

For more information, see the [zCX content solution \(<https://www.ibm.com/support/z-contentsolutions/container-extensions/>\)](https://www.ibm.com/support/z-contentsolutions/container-extensions/).

# zCX - z/OS Container Extensions

## zCX Currency and LDAP Function (CD – Announced 2.5 November 2021)

- zCX large UID and GID range support.
- zCX Linux kernel is updated to use 5.4.0-81-generic.
- zCX Docker update and latest container runtime packages

## zCX Workflow Recovery (CD – Announced 2.5 November 2021)

- zCX support to back out disk allocation failures

## zCX NFS persistent storage (CD)

- Securely store and access stateful data using z/OS NFS server

## zCX Support for WebSphere Hybrid Edition (CD)

- IBM zCX Foundation for Red Hat OpenShift can now support WebSphere Hybrid Edition co-located with z/OS

# Containers – Kubernetes – OpenShift & z/OS System Programmers

For mainframe teams, who like to get ready for z/OS containers, you will be surprised how familiar subject it is for you to deal with Kubernetes and OpenShift as well.

If you are system programmer who manage System Automation and similar Automation products , it is not much different from managing perspective.

For Kubernetes , Container experts, Container is Container whether it is in mainframe or distributed, there seems no change for their knowledge when managing containers running on z/OS even with nicer capabilities.

Juergen Holtz from IBM created this table and shared in his blog.

Here is one nice blog that shows terms in each management product Kubernetes Vs System Automation. You can find more in his blog [here](#).

Kubernetes	z/OS & System Automation
Cluster	Sysplex, SAplex
Node	z/OS system
Pod	BASIC APG and APL
Deployment	SERVER APG
High Availability, scalability, rolling updates	SERVER and MOVE APG <ul style="list-style-type: none"><li>▪ Availability targets</li><li>▪ Rolling recycle</li></ul>
Declarative management	Policy, goal-oriented automation

# zCX - z/OS Container Extensions

## IBM zCX Foundation for Red Hat OpenShift – 5655-ZCX

- Bringing Red Hat OpenShift Benefits to z/OS
- Key value
  - IBM zCX Foundation for Red Hat OpenShift that provides enterprise-level container orchestration and management capabilities around containerized software.
  - Clients can extend and modernize their native z/OS ecosystem through an agile and flexible deployment of Linux on Z applications in a self-contained Red Hat OpenShift cluster on z/OS while exploiting z/OS Quality of Service.
  - Enables Red Hat OpenShift applications to run on z/OS.
- Key information
  - Entitlement to Red Hat OpenShift is included in the purchase of IBM zCX Foundation for Red Hat OpenShift via ShopZ
  - The license for Red Hat OpenShift on z/OS (via zCX) is non-transferable between zCX and Linux on Z
  - Committed Term License options (1,3, and 5 years)
  - Price is based on zIIPs (not IFLs, as zCX and zCX for OpenShift do not run on IFLs)
  - Priced per core (this is comparable to OpenShift on Linux on Z)

Products like IBM Security and Compliance Center, IBM WebSphere Hybrid Edition, etc. will pre-req this new product.

# zCX - z/OS Container Extensions

## [zCX for OpenShift shared persistent storage support \(CD\)](#)

- IBM Storage Fusion, also known as Spectrum Fusion, provides highly scalable, resilient, enterprise-grade, persistent data storage options leveraging Red Hat OpenShift Data Foundation (ODF).
- It is now supported in zCX Foundation for Red Hat OpenShift.
- Clients that are licensed to deploy and use IBM Storage Fusion (5900-AOY) today can enjoy the benefits of enterprise-grade data storage and protection services on IBM zCX for OpenShift running on z/OS.

# Linux One & IBM Container Registry

*IBM Z® and LinuxONE Container Registry contains an ever-growing collection of common Open Source images that are used to create new workloads. Providing a trustworthy channel that enables IBM zSystems clients running z/OS®, Linux®, and LinuxONE to fully participate in the Open Source ecosystem*

## **Benefits of the IBM Z and LinuxONE Container Registry**



Images are built from source - no un-intended binary payloads



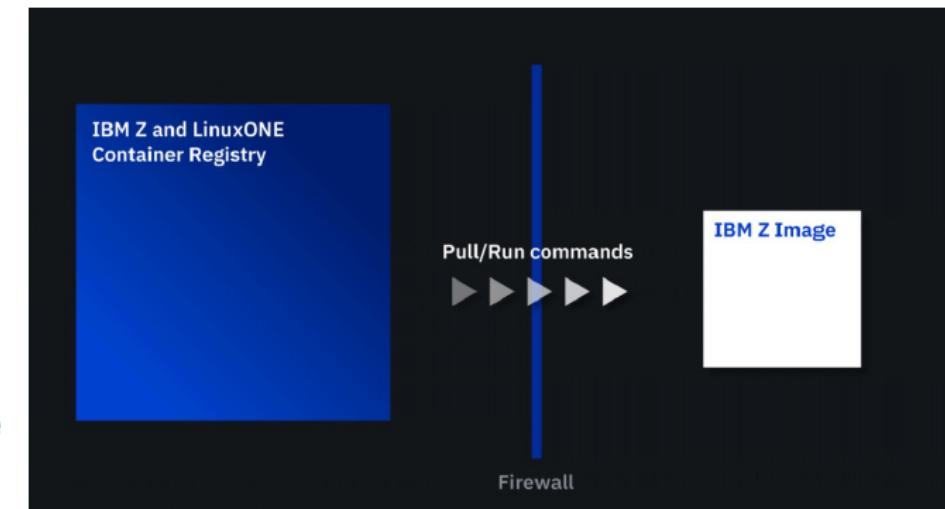
Images are scanned for known vulnerabilities with reports provided



Hashes for each image are published for reference and secure image pulls



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## z/OS Containers (SOD)

- In June of 2020 IBM® made the following statements of general direction:
  - *IBM intends to deliver a container runtime for IBM z/OS® in support of Open Containers Initiative (OCI) compliant images comprising traditional z/OS software.*
  - *IBM intends to deliver Kubernetes orchestration for these containers on z/OS.*
- z/OS intends to provide the basis for future support of an OCI container runtime and Kubernetes container orchestration for **IBM z/OS applications and workloads**. This will enable clients to adopt a container based cloud native strategy for application development and operation of mission critical z/OS applications
- As a future item in z/OS - z/OS Containers intends to provide an industry standard container experience for z/OS that is consistent and familiar to application developers.

# What is new with z/OS 3.1

[What is new with z/OS 3.1 – Part 1](#)

**What is new with z/OS 3.1 – Part 2**

Meral Temel  
z/OS Technical Engagement Leader  
IBM z Washington Systems Center

[Meral.temel@ibm.com](mailto:Meral.temel@ibm.com)



# z/OS Installation & Packaging



# z/OS Installation & Packaging

Enhancements/New Features	Since When & Updates
Electronicly deliverabe Customized Offering Driver	2.4 GA
First IBM ServerPac in a z/OSMF Portable Software Instance ( z/OSMF ServerPac) – IBM CICS	2.4 1Q-2020 /2.5 GA
IBM ServerPac in a z/OSMF Portable Software Instance ( z/OSMF ServerPac) – IBM DB2 and IMS	2.4 3Q-2020 / 2.5 GA
Customized Offerings Driver update	2.4 4Q -2020
Availability of the z/OS 2.5 ServerPac as a portable software instance	2.5 GA
Upgrade Workflow	2.5 GA
New z/OSMF Task - z/OS Software Update for applyin maintenance very easily using z/OSMF	2.5 GA
z/OS upgrade improvements for the IBM z16	2.5 2Q-2022
Customized Offerings Driver Enhancements – z/OS 2.5 ,z/OSMF,Min SCDS ...	2.5 4Q -2022
GIMZIP package signing and verification in z/OS SMP/E and z/OSMF Software Management	2.5 1Q -2023
Only way to install z/OS Release as Serverpac– z/OSMF : ServerPac format only as z/OSMF Portable Software Instance – 3.1	3.1

# z/OS Installation & Packaging

Enhancements/New Features	Since When & Updates
Enhanced z/OSMF z/OS Upgrade Workflow – Discovery Function	3.1
Invoking Upgrade Related HCs from z/OS Upgrade Workflow	3.1
Generating a Universally Unique Identifier (UUID) during the installation and deployment of z/OS, correlating the UUID with the z/OSMF Software Management software instance. (How do I know which SMP/E CSI represents my running z/OS system)	3.1

# z/OSMF Release Upgrade Enhancements

## z/OS Release Upgrade Enhancements

z/OSMF z/OS 3.1 Upgrade Workflow ***is part of and serviced with z/OS***

- Use the z/OS 3.1 Upgrade Workflow directly from your z/OS system. Resides in: /usr/lpp/bcp/upgrade/
  - z16 Upgrade Workflow is also be part of and serviced with z/OS.
  - Find the Workflow update PTFs with SMP/E FIXCAT IBM.Coexistence.z/OS.3.1
- 
- New enhancements for z/OS 3.1 Upgrade Workflow :
    - Assistance with coexistence service verification
    - Help with identifying those upgrade actions already performed during the service cycle
  - Continued enhancements still allow for discovering functions used, tailoring information specific to your system, and verification of many upgrade action.
  - The exported format of the z/OS 3.1 Upgrade Workflow continues to be available on IBM Documentation for those that prefer a viewable copy from IBM Documentation.

As of z/OS V2.4, IBM no longer provides a z/OS Migration publication

Starting in z/OS V2.5, IBM is shipping z/OS V2.5 Upgrade Workflow and z/OS IBM z16 Upgrade Workflow as part of the z/OS product deliverable and includes IBM service and support, which provide the steps for upgrading to this new release of z/OS. Depending on whether you are upgrading from z/OS V2.4 or z/OS V2.3, select the workflow that applies to your upgrade path and open it in z/OSMF to begin the upgrade process. In the workflow, discovery functions run automatically to further streamline your upgrade experience. The z/OS IBM z16 Upgrade Workflow, which provides all the necessary information to position z/OS on the IBM z16 server, was provided in a z/OS program temporary fix (PTF)

# z/OSMF ServerPac – z/OS Portable Software Instance

## [z/OSMF Software Management Installation of z/OS 3.1 ServerPac](#)

- Uses a simplified web-based GUI replacing the ISPF CustomPac Dialog
  - Manages allocation and placement of data sets, cataloging, and deployment in z/OSMF Software Management
  - Customization and verification is done in z/OSMF Workflows
  - Data set merge and disconnect Master Catalog on driving system . [\(CD\)](#)
  - Remove temporary catalog aliases are supported [\(CD 4Q2022\)](#)
  - REST APIs to run missing critical updates, missing FIXCAT updates, and software update search [\(CD 4Q2022\)](#)
- New Portable Software Instance Package signing –IBM plans to ship z/OS 3.1 ServerPac and PTF's with a signature that clients can verify. This will provide a means to verify the integrity of software. [\(CD 1Q2023\)](#)
- IBM (and participating major ISVs) deliver z/OSMF Portable Software Instances as a common installation method for z/OS stack software.
  - IBM z/OS, IMS, Db2, and CICS Transaction Server and associated products, all can be installed with z/OSMF today. CBPDO remains available and is unchanged.
  - z/OS 3.1 ServerPac is only provided as a z/OSMF Portable Software Instance
    - z/OSMF is a driving system requirement for all IBM ServerPacs. . [\(CD\)](#)

For more information, see the [z/OSMF ServerPac content solution](#)

Try a sample z/OSMF Portable Software Instance to be familiar with the install, before you install any ServerPac

# z/OSMF Workflows – Reminder

Workflows

Simplifies tasks through guided step-based workflows, and provides administrative functions for assigning workflow responsibilities and tracking progress.

Actions ▾ Active ▾

Süzgeç uygulanmadı

Workflow Name Filter	Description Filter	Version Filter	Vendor Filter	Access Filter	Owner Filter	System Filter	Status	Percent Complete	Date Created(GMT) Filter
<a href="#">d_grs_analyze.waiter - Workflow_3</a>	d grs.analyze.waiter	1.0		Public		UTCPLXJ8.J80	✓ Complete	%100	2019-12-31 08:24:07
<a href="#">d_grs_analyze.waiter - Workflow_4</a>	d grs.analyze.waiter	1.0		Public		UTCPLXJ8.J80	✓ Complete	%100	2019-12-31 08:29:33

✓ A series of steps to accomplish a task and a tool to track each steps status  
✓ Can involve one person or many people  
✓ Workflow authors decide on style and technical approach of a workflow  
✓ Can be: Manual instructions, Semi-automated instructions, Fully automated actions  
✓ Consist of Jobs, Shell scripts, REXX execs, REST calls, file updates etc.  
✓ Optionally retains a log of what has been done  
✓ Useful for Installation, Service, Upgrade, or any configuration actions

In this workflow definition, a basic set of elements and connections is defined for you. Specify the version of g Public UTCPLXJ8.J80 In Progress %0 2020-07-27 01:33:09

Toplam: 179 Seçilen: 0

Refresh Last refresh: 25 May 2023 11:40:15 local time (25 May 2023 08:40:15 GMT)

# z/OSMF Workflow Links

<https://www.ibm.com/docs/en/zos/2.5.0?topic=level-zos-upgrade-workflow>

## z/OS V2R5 Upgrade Workflow

The z/OS V2R5 Upgrade Workflow provides the steps for upgrading your system to z/OS V2R5. Two workflows are provided. Depending on whether you are upgrading from z/OS V2R4 or z/OS V2R3, select the workflow that applies to your upgrade path and open it in z/OSMF to begin the upgrade process. In the workflow, discovery functions run automatically to further streamline your upgrade experience. Only the upgrade actions that apply to your particular system are identified in the z/OSMF user interface (UI).

**Included with z/OS:** IBM provides the upgrade workflows as part of the z/OS product. Updates and fixes for the upgrade workflows are delivered through the standard z/OS service process.

To obtain the latest PTFs for the z/OS V2R5 Upgrade Workflow, run the SMP/E REPORT MISSINGFIX command on your z/OS systems and specify a FIXCAT value of "IBM.Coexistence.z/OS.V2R5".

The z/OS V2R5 Upgrade Workflow can be run on z/OS releases V2R3, V2R4, and V2R5.

Prior levels of the z/OS Upgrade Workflows for z/OS V2R2, V2R3, V2R4, and z14 are available online at the following location: [z/OSMF workflows for the z/OS platform \( Just for Checking and for some step up releases if you are in very old version...Hope you will go with the newer releases...\)](#)

Next, you create the workflow on your z/OS system, as described in [Creating the upgrade workflow in z/OSMF](#).

**Resources available to help you upgrade to a newer z/OS level? Get help if you are shortage on Human Resources but never be in older versions!**

IBM Systems Lab Services provides assistance to clients with Currency and Upgrades. You can contact IBM Systems Lab Services via:

<https://www.ibm.com/it-infrastructure/services/lab-services> or send an email to [ibmsls@us.ibm.com](mailto:ibmsls@us.ibm.com)

<https://www.openmainframeproject.org/all-projects/zorow>

Open Source Community For Workflows

# z/OSMF Software Update Task

Applying Maintenance is VERY EASY Now!

## **[z/OSMF Software update task \(2.4CD 3Q2020\)](#)**

- GUI provides a simplified and guided process to install any SMP/E-packaged PTF, regardless of software vendor.
- Enables you to review and track SMP/E HOLD data in an orderly fashion. All installation output is saved so you can review it at any time.
- Supports three update use cases:
  1. **Corrective.** Install individual software updates to fix a problem.
  2. **Recommended.** Install all software updates that are recommended by software vendors. The IBM recommendations are those designated as IBM Recommended Service Upgrade (RSU) fixes.
  3. **Functional.** Install software updates to support new hardware, software, or functions identified with a SMP/E FIXCAT.
- Existing traditional methods to install SMP/E-packaged software updates (batch JCL jobs) are still possible, but z/OSMF Software Upgrade is expected to provide a simpler experience requiring lesser SMP/E skill.

For more information about z/OSMF Software Update, including helpful instructions on how to get started, see the [Software Update with z/OSMF content solution \(<https://www.ibm.com/support/z-content-solutions/software-update-zosmf/>\)](#).

# z/OSMF Software Update Task

Applying Maintenance is VERY EASY Now!

Software Update

Software Update ①

Start New Software Update View Updates in Progress

Show completed updates +

Software Instances and Zones

Choose a software instance and select a zone for a software update.

Q

Name	System	Description	Status	Global Zone CSI	Categories	Created	Created by
Elvira's R13 CSI	LOCAL	②	Ready	OMVSSPN.ZOS113.GA.IT.CSI		16 Oca 2012 16:47:23	FLATES1
Fred's copy of Elviras	LOCAL	②	Ready	OMVSSPN.ZOS113.GA.IT.CSI		16 Oca 2012 17:16:44	FLATES1

**Zone**

③ TGT113 - No recommended updates have been installed.

Test_DB2V10_SMP	LOCAL	②	Ready	PETSMPP.DB2V10.CSI	PETDB2V10_SMP	1 Ago 2012 19:14:59	FLATES1
-----------------	-------	---	-------	--------------------	---------------	---------------------	---------

Items per page: 10 1-3 of 3 items

1 of 1 page

Refresh

Install Corrective

Install Recommended

Install Functional

Last refresh: 24 May 2023 18:56:17

Software Update

Software Update / Install Updates

Install Updates

Software Instance Zone

Fred's copy of Elviras TGT113

Enter Update Names ④

Q

Submit or Upload List (CSV, 500 kB max.)

Cancel

## **z/OS Software Package Signing (CD 1Q2023)**

- z/OS SMP/E and z/OSMF Software Management now provide the capability to digitally sign and verify the signature of GIMZIP packages of software that may be delivered both electronically and physically, on all supported z/OS releases.
  - This capability ensures that a software package has not been modified since it was created and the package was signed by the expected provider, designed for nonrepudiation and authenticity.
  - The choice to do this additional verification is left to the user upon receipt of the software package if the software provider has chosen to exploit this additional capability.
- IBM has chosen to sign the following software packages to allow clients more secure coverage for z/OS software deliverables:
  - z/OSMF ServerPac (also known as z/OSMF portable software instances)
  - CBPDO
  - Electronic Shopz PTF orders
  - SMP/E RECEIVE ORDER PTFs
  - HOLDDATA
- Designed to satisfy z/OS NIAP Certification with OS Protection Profile (OSPP) 4.2.1 package signing. Enabling package signing now facilitates enabling NIAP Certification in the future.
- Available with the PTFs for APARs IO28360.

# Memory RSM/VSM



# RSM/VSM /Memory Usage Related Updates

Enhancements/New Features	Since When & Updates
SMFLIMxx assembler exits support	2.4 GA
Removal of user key common storage	2.4 GA
Restricted Use Common Service Area (RUCSA) feature	2.4 GA
z/OS UNIX and POSIX memory-map 64-bit support	2.4 1Q-2020 / 2.5 GA
IBM JES2 memory usage enhancements	2.5 GA
Data set open limit relief	2.5 GA
RSM support for more than 4 TB of real memory – Up To 16 TB	2.5 GA / 2.5 2Q-2022
Dedicated Real memory pools	3.1

# RSM/VSM /Memory Usage Related Updates

## Increase z/OS Memory limit to 16TB

- 16TB of real storage in a single z/OS Operating system Image
  - Prior to z/OS 2.5 the limit for real storage consumption in z/OS was 4 TB
- Storage above 4TB is delivered in fixed storage with 2GB frame sizes.
- The new storage requires the use of new API's and is therefore limited to a subset of z/OS applications
- It can be used for z/OS Container Extensions, and is planned for other large memory consumers

## Dedicated Real Memory Pools ( **New z/OS 3.1** )

- Dedicated memory pools allow the installation to set aside assigned memory for specific applications
- These applications don't have to compete with the rest of the system for this storage
- Designed for zCX, DB2 Buffer Pools, SVC Dumps, Java etc.
- Expected to be in 2G, 1M, and 4K frame sizes

# **z/OSMF**

## Special Section For z/OSMF



# Special About Z/OSMF



The image shows a grid of 45 icons representing different management functions available through the z/OSMF interface. The icons are arranged in five rows:

- Row 1: Provide IBM Feedback, Job Output, Workflows, Workflow Editor, RMM, Management Services Catalog.
- Row 2: Systems, Import Manager, FTP Servers, ISPF, Capacity Provisioning, z/OSMF Diagnostic Assistant.
- Row 3: Software Services, Sysplex Management, Notification Settings, Incident Log, Network Configuration Assistant, SDSF.
- Row 4: General Settings, Software Management, Links, z/OS Operator Consoles, Application Linking Manager, System Status.
- Row 5: Workload Management, Resource Management, Security Configuration Assistant, IBM Z Common Data Provider, Resource Monitoring, Usage Statistics, IBM zERT Network Analyzer.

**Security Configuration Assistant (SCA since 2.4 GA )**  
**Software Update (Since 2.4CD )**  
**Service Management Catalog (Since CD 4Q2021)**  
**DFRMM Plug-in (Since 2.4 GA)**  
**Software Management – Must use for z/OS 3.1 Install**

We will talk about everything related to z/OSMF and what is new in 3.1 in detail more in z/OSMF Section

***z/OSMF is your cockpit for managing z/OS!!! Please Don't miss this!***



## z/FS & USS Updates



# zFS & Unix System Services Updates

Enhancements/New Features	Since When & Updates
Application transparency for unplanned outages affecting zFS file systems shared in a sysplex environment (New Mount Option)	2.4 GA
BPXWMIGF for zFS to ZFS (Files that are in use by the application during the movement process are automatically and transparently moved to the target file system without affecting the application)	2.4 GA
Faster mount of zFS file systems (IPL Time Enhancement)	2.5 GA
wildcard character in the aggregate name on the <b>zfsadm chaggr</b>	2.5 GA
Warning Capability on z/OS UNIX system limits (Change in default of LIMMSG keyword in BPXPRMxx)	2.5 GA
df utility provide the file system size in megabyte increments, instead of bytes, optionally	2.5 GA
New OVIEWS utility	2.5 GA
BPXCOPY utility is enhanced to enable file tagging where the target z/OS UNIX file can be tagged with a CCSID	2.5 GA
rm utility with new options protect from recursively deleting files	2.5 GA
BPXBATCH facility has been enhanced with two new keywords, PGMRC and SHRC, to get the proper return code for the submitted job	2.5 GA
Updates in BPXPRMXX syntax checker, to validate ZFS parameters on the ROOT and MOUNT statements, (validation prior to re-IPLing)	2.5 GA
UNIX component trace ( SYSOMVS CTRACE ) buffer size limit has increased from a maximum of 64 M to 2047 M for improved service	2.5 GA
z/OS UNIX SMF recording function ( __smf_record() ) has been enhanced to provide extended SMF record support	2.5 GA
NEW ! Data Set File System	2.5 2Q- 2022
su auditing capability by issuing SYSLOGD message	2.5 2Q- 2023
date utility support for Julian date conversion	2.5 2Q- 2023
find utility enhancement to print filenames with a null character	2.5 2Q- 2023

# zFS & Unix System Services Updates

Enhancements/New Features	Since When & Updates
grep -r/-R to search directories recursively	3.1
New utilities <b>readlink</b> and <b>banner</b>	3.1
OpenSSH 8.4p1 (Previously it was OpenSSH 7.6p1 )	3.1
XML Toolkit V1.11 included in z/OS Base	3.1
The Xerxes and Xalan XML parsers can now be used within the z/OS Operating system	3.1

# JES2 Updates



# JES2 Updates

Enhancements/New Features	Since When & Updates
JES2 new infrastructure – JES2 Policy Based Management (Removing exit needs)	2.4 GA
JES3 to JES2 conversion aids	2.4 GA
single- system image support for policy-based exits	2.4 3Q-2020 / 2.5 GA
JES2 policy enhancements	2.5 GA
JES2 memory usage enhancements	2.5 GA
FTP server JES access control	2.5 1Q-2022
JES3 will not be delivered in 3.1 (as SOD and announced before )	3.1

# JES2 policy based management & Enhancements

## JES2 policy-based exit reduction

- Intended to provide a non-assembler facility to *extend* JES2
  - Can be mixed with traditional JES2 exits
- In addition to end-of-conversion new exits points of pre-conversion, and SYSOUTGroup are added
- New predicates and actions
  - Look at and update attributes like jobclass, srvclass, destination, etc
  - Ability to access symbols during input processing
  - Ability to use symbols in JES2 Policy.
  - General SAF AuthorityCheck can be used with any attribute
- Character conversion to numeric in policy
- Policy files are Release neutral and do not require change during release or service upgrades (no reassembly required)
- Dynamically enabled – Changes can be applied and removed while JES2 is running (\$POLICY IMPORT Command)
- MAS Wide definitions for policy ([2.4CD](#))

## JES2 Spool compression and encryption ([2.4CD](#))

- Ability to compress spool to increase effective space
- Ability to encrypt spool for increased security

## JES2 Additional job notification capability

- With JES system symbol SYS\_JOB\_NOTIFYX job notification is extended to submission and start of execution with PTF for APAR OA62804 ([CD 4Q2022](#))

- Support for
  - Job input is new (approximately exit 20/50)
  - Pre conversion
  - Post conversion (approximately exit 44)
  - Sysout Group (approximately exit 40)

Example of Pre conversion policy: Test if the job's output is protected....if it is...then modify the job's msgclass to A and send a message.

```
{ "policyName": "PConv1",
  "policyVersion": 1,
  "policyType": "PreConversion",
  "definitions":
  [
    {
      "condition": "JobIsProtected",
      "actions":
      [
        {
          "action": "ModifyJob",
          "attribute": "MsgClass",
          "value": "'A'"
        },
        {
          "action": "SendMessage",
          "message": "JobName || ' now has MSGCLASS: ' || MsgClass"
        }
      ]
    }
  ]
}
```

# SDSF Updates



# SDSF Updates

Enhancements/New Features	Since When
SDSF enhancements Extended Operator Console Display, OMVS options, Link pack directory, Coupling (XCF) members and groups, JES2 Subsystems, JES2 resource monitor alerts, Enqueue by data sets, WLM policy information, SC, RC, RG, Workloads, Job memory objects, Job DD names, JES2 Checkpoint information	2.4 GA
SDSF Recover Boost Support	2.4 3Q-2020 / 2.5 GA
SDSF Several New Enhancements with 2.5 GA	2.5 GA
Key new feature Module Fetch Monitoring Planned to show modules fetched, where, when and who	3.1
Key new feature Significant Event logging Indication of events such as volumes coming on and offline, actions etc	3.1
z/OS 3.1 many new Primary Displays Planned, viewable field	3.1
The browser-based UI (in z/OSMF) is planned to be updated to continue to match function with ISPF	3.1
SDSF is planned to be enabled for the Security Configuration Assistant of z/OSMF to ease security settings	3.1

# SDSF Updates

NAME	Description	Group	NAME	Description	NAME	Description	NAME	Description
DA	Active users	Jobs	ENQC	Enqueue contention	APF	APF data sets	LPD	Link pack directory
I	Input queue	Jobs	ENQD	Enqueued data sets	PAG	Page data sets	XCFM	XCF groups and members
O	Output queue	Output	DYNX	Dynamic exits	PARM	Parmlib data sets	WLM	WLM policy data
H	Held output queue	Output	AS	Address space memory	PROC	Proclib data sets	SRVC	Service classes
ST	Status of jobs	Jobs	INIT	Initiators	SSI	Subsystem information	REPC	WLM report classes
JG	Job groups	JES	PR	Printers	CFC	CF connections	RGRP	WLM resource groups
SYM	System symbols	System	PUN	Punches	CFS	CF structures	WKLD	WLM workloads
LOG	System log	Log	RDR	Readers	VMAP	Virtual storage map	RMA	Resource monitor alerts
SR	System requests	Log	LINE	Lines	SMSG	SMS storage groups	JES	Job entry subsystems
MAS	Members in the MAS	JES	NODE	Nodes	SMSV	SMS volumes	JRI	JES resource information
JC	Job classes	JES	SO	Spool offload	FS	File systems	JRJ	JES resource by job
SE	Scheduling environments	WLM	SP	Spool volumes	CSR	Common storage remaining	LLS	Link list sets
RES	WLM resources	WLM	NS	Network servers	GT	Generic tracker	MEM	Memory contents
ENC	Enclaves	WLM	NC	Network connections	NA	Network activity	CFD	Couple data sets
PS	Processes	OMVS	RM	Resource monitor	DEV	Device activity	SVC	SVC routines
SYS	System information	System	CK	Health checker	EMCS	Extended consoles	SYSP	System parameters
ENQ	Enqueues	System	LNK	Link list data sets			CS	Common storage subpools
							PC	PC routines
							AD	Address space diagnostic
							ULOG	User session log
							HELP	SDSF help facility

# SDSF Updates

## SDSF Enhancements (**New z/OS 3.1**)

- Key new feature Module Fetch Monitoring Planned to show modules fetched, where, when and who (**New z/OS 3.1**)
- Key new feature Significant Event logging Indication of events such as volumes coming on and offline, actions etc. (**New z/OS 3.1**)
- Many new Primary Displays Planned, New viewable fields (**New z/OS 3.1**)
- The browser-based UI (in z/OSMF) is planned to be updated to continue to match function with ISPF
- SDSF is planned to be enabled for the Security Configuration Assistant of z/OSMF to ease security settings (**New z/OS 3.1**)

Performance  
WLM,RMF,Monitoring &  
Analysis  
Performance Management  
Updates



# z/OS Performance General & WLM & RMF & Monitoring & Analysing Enhancements

Enhancements/New Features 1/3	Since When & Updates
TFP ease of use SOLUT Parameter	2.4 2Q-2021 / 2.5 GA
WLM batch initiator enhancements	2.5 GA
WLM Policy Advisor (z/OSMF)	3.1
AI-powered WLM	3.1
IBM z/OS Workload Interaction Correlator	2.4 1Q-2021 / 2.5 GA
New entitlement structure for IBM z/OS Workload Interaction Correlator	2.5 4Q-2021
z/OS Workload Interaction Navigator Inspector support	2.5 1Q-2023
zWIC I/O data-IOS Support (z/OS component exploitation of z/OS Workload Interaction Correlator is planned to be extended to include I/O Supervisor (IOS), providing clients with 5-second synchronized, micro-summary, enriched I/O data)	3.1

# z/OS Performance General & WLM & RMF & Monitoring & Analysing Enhancements

Enhancements/New Features 2/3	Since When & Updates
zHyperWrite - Uncaptured Volume I/O Statistics	2.4 GA
zHyperLink write statistics	2.4 2Q-2020 / 2.5 GA
Faster Db2 active log writes with Media Manager parallel write support using zHyperLink	2.5 4Q - 2021
DFSMS zHyperLink write support for multivolume data sets	2.5 4Q -2022
zHPF VTOC I/O performance	2.4 2Q-2020 /2.5 GA
RMF System Recovery Boost Support Enhancements	2.4 3Q-2020 / 2.5 GA
RMF CF monopolization avoidance support	2.4 3Q-2020 / 2.5 GA
RMF storage class memory (SCM) busy percentage on a z15	2.4 3Q-2020 / 2.5 GA
RMF ICSF, Cyrpto HW Support	2.4 2.4 Q4-2020 / 2.5 GA
New Healtcheck- Verify the HTTPS (AT-TLS) configuration of the RMF Distributed Data Server (DDS)	2.4 4Q -2020 / 2.5 GA

# z/OS Performance General & WLM & RMF & Monitoring & Analysing Enhancements

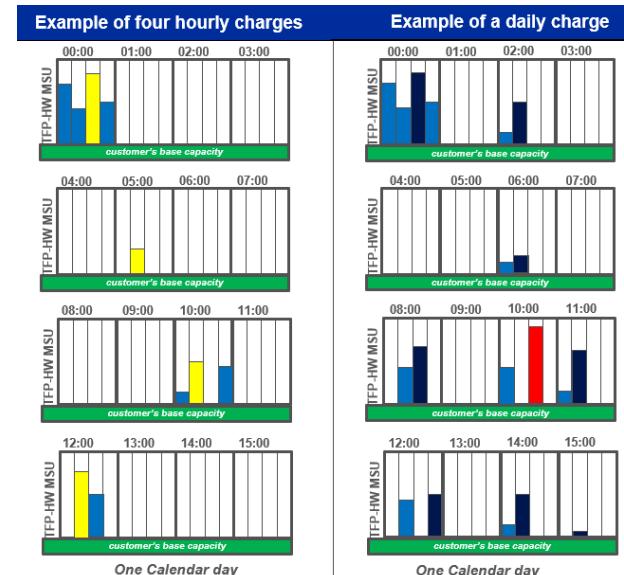
Enhancements/New Features 3/3	Since When & Updates
RMF - enhanced the Transport Class in XCF Singaling Report,more performance statistics	2.4 1Q-2021 /2.5 GA
RMF and z/OS ADG (Advance Data Gatherer) –New	2.5 GA
RMF and ADG optimizes CF data collection	2.5 GA
RMF and z/OS ADG z16 Support	2.5 2Q-2022
IBM SMF Explorer with Python	2.5 4Q-2022
z/OS Data Gatherer SMF REST Services ( z/OSMF)	2.5 4Q-2022
RMF ( The priced feature ) plans to be enhanced with a new, modern, web-based user interface supporting Monitor III Metrics and Reports	3.1
The RMF Distributed Data Server ( DDS) intends to be enhanced to increase security and the use of 64-bit for memory constraint relief	3.1
WLM Implicit Long-Term CPU Protection	3.1

# TFP – HW & TFP – SW

## Tailored Fit Pricing Ease of Use Features

- A new IEASYSxx parameter (SOLUT=) to identify an LPARs solution ID which helps with reporting on TFP
- The solution ID is passed through to SCRT in the SMF records captured about an LPAR
- This should reduce the manual updates needed in SCRT when reporting on Tailored Fit Solutions. SCRT 28.2.0 includes this support

- ▶ Improved and more predictable response times with lower latency (especially when compared to a public cloud solution)
- ▶ Faster transaction processing, with shorter spikes of high use
- ▶ Higher number of active processor engines have a positive n-way effect (higher parallelization) and delivers more cache, less contention, and overhead
- ▶ Optimized workload handling under customer-defined use thresholds
- ▶ Improved insight for future capacity planning
- ▶ Improved balance between physical and logical Central Processor (CPs)
- ▶ Reduced Processor Resource/System Manager (PR/SM) logical partitions (LPAR) management, less overhead



<https://www.ibm.com/support/z-content-solutions/tailored-fit-pricing/>

# z/OSMF – WLM Policy Advisor

## z/OSMF WLM Policy Advisor z/OS 3.1 (New 3.1)

z/OSMF provides an interface to display service definitions and their sections in structured tables and validates your service definitions based on built-in best practices. Users can define, modify, view, copy, import, export, install, activate, and print Workload Manager (WLM) service definitions. In z/OS 3.1:

- z/OSMF WLM intends to be augmented by the WLM Policy Advisor, enabling analysis of WLM policies through incorporating the performance data of their respective systems. The Policy Advisor provides a view that helps users identify error-prone WLM service definitions and determine more suitable goals and importance level settings for active workloads. This intends to enable system programmers to maintain a proper WLM policy, with fewer skill requirements.
- z/OSMF WLM task is intended to be enhanced to no longer require CIM server, which simplifies the technical stack of z/OSMF WLM.

## WLM Implicit Long-term CPU Protection (New 3.1)

- With z/OS 3.1, any service class defined with an importance of 1 is implicitly set to CPU critical YES
  - New OPT parameter to control level of implicit CPU
  - CCImp=0|1|2 parm sets what importance level (all service classes) have implicit CPU protection
  - Set to '0' to turn off implicit CPU critical
- Long-term CPU protection ensures less important work will generally have a lower dispatch priority—Outside of certain CPU promotions
- With IBM z15 and z16 SRB, any service class with an importance of 1 or 2 is implicitly set to have CPU critical for the duration of the boos

# RMF & z/OS Advance Data Gatherer (ADG) Structural Changes

## Advanced Data Gatherer – (z/OS 2.5 GA)

In z/OS 2.5, the priced feature, RMF, continues to provide the same functional capability that clients have come to expect. The function of RMF is delivered in two parts

- **RMF**
- **z/OS ADG**

- The RMF feature continues to provide performance reports, which are based on the metrics from the ADG feature, and is designed to be entitled to all clients of the RMF priced feature.
- The ADG is a new, separately priced feature of z/OS that provides the function of gathering performance data in raw form.
- The **data gatherer base element** will generally be running all the time to capture utilization information
  - This usage is entitled with **base z/OS**
- In “advanced” mode it will also capture detailed performance information required by performance monitors like RMF.
  - Advanced mode is a priced feature (**The RMF priced feature includes entitlement to the ADG priced feature. No action is required of RMF clients as a result of this change**)

# RMF & z/OS Advance Data Gatherer (ADG) Structural Changes

- A new browser-based UI is available with z/OS 3.1 for monitor 3 metrics and reports (**New 3.1**)
- The new UI supports setting thresholds and issuing alerts (**New 3.1**)

A new DDS server is coming with 64-bit exploitation and additional security options (**New 3.1**)

## **Pre-Req For z/OS V2.5 ( V2R4 to 3.1 effected as well)**

For z/OS V2.5, RMF and z/OS Data Gatherer, had several data sets restructured. Follow the RMF upgrade action to make the necessary parmlib and SYSPROC changes. If you are moving from V2R4 to 3.1 make sure you made all these changes (When the PTFs for APARs OA58281 and OA58759 are applied to z/OS V2.3 or V2.4, the RMF product is restructured into the Data Gatherer and Reporter components)

Some dataset names are changed in linklist,LPA. Procedures are changed.

For all details check in detail z/OS 3.1 Upgrade Workflow

## **Pre-Req For z/OS 3.1**

For all details check in detail z/OS 3.1 Upgrade Workflow

**Clients on z/OS V2.4 or later with an RMF license or z/OS V2.5 or later with an ADG license are entitled to use the z/OS Workload Interaction Correlator at no additional charge ( See Next Slide)**

# zWIC Workload Interaction Correlator

## zWIC—Workload Interaction Correlator Priced Feature

A priced feature of z/OS that implements a facility to report on high frequency events and can be used to improve diagnosis on z/OS

Addresses the problem of capturing data on a production system running under load by providing an efficient way to capture and report on various diagnostic items

Input/Output (IOS) information is planned to be added to zWIC.

IBM priced product IBM z/OS Workload Interaction Navigator can be used to visualize the data

**zWIC is now entitled with RMF or the Advanced Data Gatherer (ADG) feature, available (CD 4Q2021) For details see next slide**

Announce([IBM z/OS Workload Interaction Navigator V1.1](#))

Collect SMF 98 Records!. They are very useful!



# z/OS Workload Interaction Correlator (WIC)

z/OS Workload Interaction Correlator enables z/OS components and middleware to generate cost-effective and enriched summary data. In z/OS 3.1:

**Clients on z/OS V2.4 or later with an RMF license or z/OS V2.5 or later with an ADG license are entitled to use the z/OS Workload Interaction Correlator at no additional charge.**

For more information on this entitlement and to view IBM recommended best practices for proactive problem diagnosis, see this IBM Best Practice: Always Collect Correlator SMF Records flash.

z/OS Workload Interaction Correlator support for z/OS Workload Interaction Navigator Inspector enables subject matter experts to **proactively identify workload anomalies so they have an opportunity to diagnose and address these anomalies before workload impacts, critical situations, and outages occur**. Correlator enables Inspector analysis over the last 8 weeks to transform activity anomalies with context into anomaly signatures and correlate and prioritize them based on workload resilience risk.

z/OS component exploitation of z/OS Workload Interaction Correlator has been extended to include I/O Supervisor (IOS), providing clients with 5-second synchronized, micro-summary, enriched I/O data. This enhancement provides subject matter experts, using IBM z/OS Workload Interaction Navigator, the insights needed to reactively diagnose and proactively avoid I/O-related workload impacts, critical situations, and outages.

Record Provider	SMF Record Type.Subtype	Min Hardware Requirements	Min Software Requirements	License Requirements
z/OS Supervisor	98.1	None	z/OS 2.2 with <a href="#">APAR OA55887</a> z/OS 2.3 with <a href="#">APAR OA57165</a> z/OS 2.4 or 2.5 with <a href="#">APAR OA62268</a>	None
CICS	98.1024	z14	z/OS 2.3 with <a href="#">APAR OA57165</a> z/OS 2.4 or above with <a href="#">APAR OA62268</a> CICS 5.4 or above with <a href="#">APAR PH16392</a>	Correlator <sup>1</sup>
IMS	98.1025	z14	z/OS 2.3, IMS 15 with <a href="#">APAR PH15062</a>	Correlator <sup>1</sup>
Db2	100.n*	None	Db2 v12 with <a href="#">APAR PH18658</a>	None

\* Indicates all SMF record subtypes

<sup>1</sup> Indicates an IBM z/OS Workload Interaction Correlator license is required to generate this Correlator record. With [Correlator Entitlement](#), customers running z/OS 2.4 and above with a Resource Monitor Facility (RMF) license or z/OS 2.5 with an Advanced Data Gatherer (ADG) license are entitled to a Correlator license at no additional cost. Otherwise, customers must purchase a separate Correlator license to generate this Correlator record.

Collect SMF 98 records



New Best Practice

# RMF Updates

## IBM Resource Measurement Facility –RMF Priced Feature

- A new browser based UI based on Open Source Grafana is available for monitor III metrics and reports (**New 3.1**)  
Grafana has many libraries of open source visualization widgets including bar charts, line charts, timeline visualization etc.
- The new UI is designed to support setting thresholds and issuing alerts (**New 3.1**)  
A rich array of alerting mechanisms is available  
Configurable duration of a time-slice  
Data from various sources can be integrated into the dashboard
- A new DDS server is designed with 64-bit exploitation and additional security options (**New 3.1**)
- The new DDS server is zIIP eligible (**New 3.1**)
- Options exist to output data from the DDS server in JSON format to ease integration into other modern tooling (**New 3.1**)
- RMF is enhanced to report on crypto express 8S card (**CD 2Q2022**)
- RMF monitor III has been enhanced to show all logical partitions of a CPC and allows machine configurations up to 256 physical processors (**CD 2Q2022**)

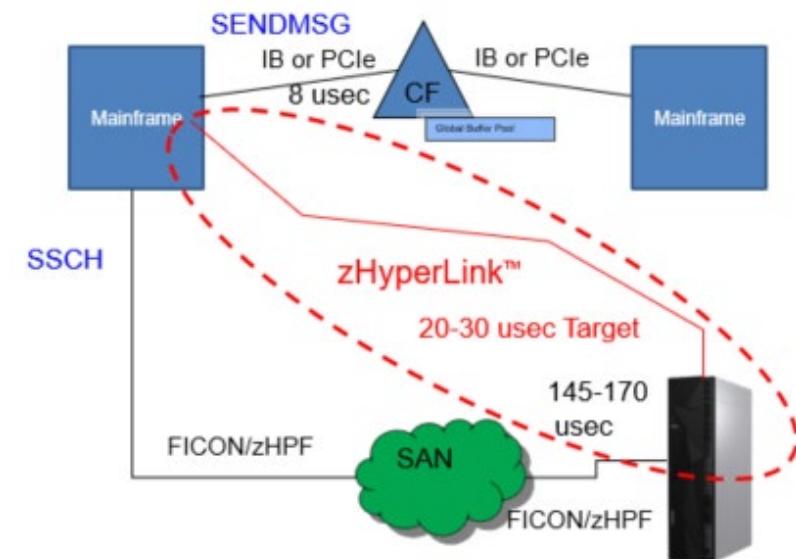
# Scalability & Performance

## zHyperLink write support for multi-volume data sets (CD 4Q2022)

With the DFSMS Media Manager support for zHyperLink writes, Db2 12 or Db2 13 for z/OS can improve log throughput by exploiting zHyperLink for active log writes.

- zHyperLink write processing can speed up commit by making the log write faster.
- Designed to improve transaction response time, reduce the latency for log writes, and potentially speed up commits of the transactions.

Enhancements to Media Manager provide support for multivolume data sets, which expands the zHyperLink use cases for Db2 log data sets and IMS write ahead data sets.



z/OS Anomaly Mitigation  
PFA,ZHR and Brand new  
Capabilities



# z/OS Anomaly Mitigation PFA , HZR, ....

Enhancements/New Features	Since When & Updates
z/OS anomaly mitigation	2.5 GA
New Runtime Diagnostics event for detecting and diagnosing active SLIP PER traps	2.5 1Q -2022
Reduce the impact of first failure data capture (FFDC) on a system	2.4 GA
z/OS Diagnostics Analyzer – Sensitive Data	2.4 3Q 2020 / 2.5 GA
MEMLIMIT diagnostics for CICS and Java	2.5 2Q-2022
zAIOps and Runtime Diagnostics integration	3.1
Predictive Failure Analysis (PFA) migration to Semeru 11	3.1

# Availability

## **z/OS Anomaly mitigation client pain points**

- Improve client triage of anomaly observations and predictions with IBM System Automation mechanism to capture report details, including recommended actions
- Predictive failure analysis (PFA)
  - Predicts health based on velocity metrics, JES2 spool consumption, common storage consumption, above the bar private area etc.
- Runtime Diagnostics (RTD) enhancements
  - A New REST API will expose RTD data to other management products.
- Detection of active SLIP/PER events enabled. **(CD 1Q2022)**

### **Statement of Direction (SOD)**

**August 2023 - Dashboard for resilience:** IBM intends to deliver a new dashboard for resiliency. This solution will be a z/OSMF plug-in that is expected to provide clients with capabilities to summarize their resiliency posture. The solution will help enable clients to proactively address resiliency deficiencies and to help to do better planning for future improvements on the resilience of their business environment.

## IBM z/OS Change Tracker: *Software solution for system management (CD 2Q2022)*

IBM z/OS Change Tracker is a comprehensive configuration change management tool for tracking, controlling, and managing changes in software across the z/OS platform

Real-time software configuration  
change tracking and control for  
system libraries

*IBM z/OS Change Tracker helps clients achieve a more secure, resilient IT system.*

### **Software management**

z/OS System Programmers can easily identify and control configuration files associated with software executables.  
Plan for a new strategic Change Tracker plug-in on z/OSMF.

Identify and protect against undesired configuration changes

### **Resiliency**

Member-level backup and recovery for immediate rollback to undo unwanted/unplanned changes.

Enhance system resiliency with automatic data set versioning and recovery

### **Compliance**

Reliable, comprehensive reports on hardened system configuration changes to satisfy audit requirements.

Only available for z/OS 2.5 and 3.1

Self-service 90-day trial planned with APAR PH51954.

For more information, visit the [z/OS Change Tracker content solution page](#).

DFSMS  
Hsm, Dfp,Dds,OAM,Catalog  
Updates



# DFSMS – DFP, DSS,Catalog,OAM, Storage Related Items

Enhancements/New Features	Since When & Updates
DFSMS provides several RAS enhancements	2.4 GA
Q4 relief for job throughput	2.4 GA
DS8000 object store DS8000-DFHSM –TS7770	2.4 – Dec-2019/ 2.5 GA
OAM support for Db2 stored procedures	2.4 2Q-2020 / 2.5 GA
Tape device fencing using SMStape and Storage Management Subsystem (SMS) policies	2.4 4Q-2020 / 2.5 GA
OAM address space Db2 connection management enhancements	2.5 GA
Data set open limit relief	2.5 GA

# DFSMS – DSS,DFP, HSM, Catalog, OAM, Storage Related Items

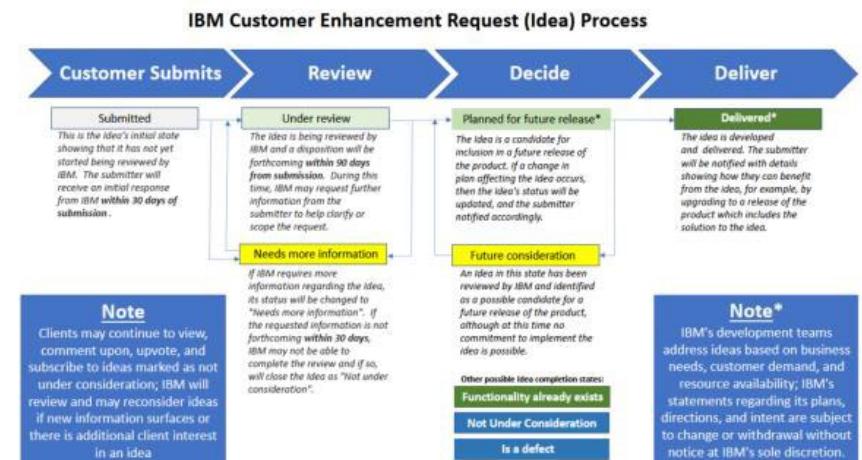
Enhancements/New Features	Since When & Updates
IEBCOPY support for PDSE member generations	2.5 4Q-2021
DFSMS archived key support	2.5 4Q-2021
TS7700 CUIR enhancement	2.5 4Q-2021
EzNoSQL APIs	2.5 3Q-2022
Remove temporary catalog aliases Wizard	2.5 4Q-2022

DFSMS-HSM Enhancements/New Features	Since When & Updates
zFS file-level backup and restore capability by DFSMShsm and DFSMSdss backup&restore	2.4 GA
DFSMShsm UNIX File Level Backup and recovery wit EXCLUDE criteria	2.4 1Q-2020 / 2.5 GA
DFSMShsm file mode hosts	2.4 2Q-2020 / 2.5 GA
DFSMShsm recover UNIX files to a new directory	2.4 2Q-2020 / 2.5 GA
Enhanced DFSMShsm EXPIREBV support for UNIX files and directories	2.5 4Q-2021
DFSMShsm support for read-only file systems during incremental backup	2.5 4Q-2021
DFSMShsm UNIX file incremental backup enhancement	2.5 4Q-2021
DFSMShsm TCT full-volume dump	2.5 3Q -2022

# Catalog

## Enhancements to address client RFEs and ideas

- Enhanced Catalog Recovery
  - Simplified catalog recovery with the use of more granular timestamps in the Catalog SMF records for more accurate merging of updates, and one IDCAMS command that drives the ICFRU recovery.
- MODIFY CATALOG Enhancements
  - Additional information about ICF catalogs and their environment to more effectively manage and maintain them.
  - Updates to the MODIFY CATALOG,REPORT output to indicate the current number of active tasks to provide a more accurate measure of the current activity in the Catalog Address Space (CAS).
  - Updates to the MODIFY CATALOG,ALLOCATED command to optionally filter by catalog name instead of VOLSER could potentially reduce the size of an IEC348I display for more efficient viewing.
- Simplified Catalog Address Space Startup
  - Enable the CAS and full catalog function to be available earlier during system startup and potentially improve the overall time it takes to startup or restart the system.



## Enhancements to address client RFEs and ideas

### Improved access control to DFSMShsmFIXCDS command

Provide controlled access to specific capabilities of the DFSMShsm (HSM) FIXCDS command to allow users to display records but limit who can modify the control data sets.

### Improved DFSMShsm Extent Consolidation Configuration

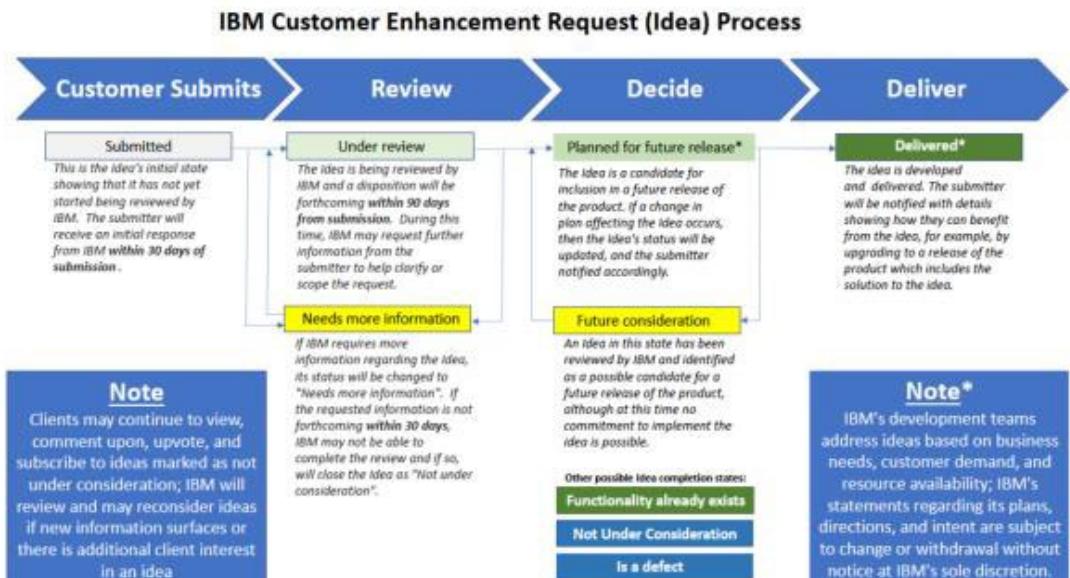
Configure HSM such that extent consolidation only occurs on data sets for which a valid backup exists, providing the ability to recover in case a problem occurs while consolidating the extents.

### Task Automation for DFSMShsm ARC0100I messages

Write ARC0100I message to syslog when HSM HOLD and RELEASE commands are issued from TSO or ISPF, to enable system automation to carry out necessary tasks to confirm the request.

### Direct DFSMShsm HSENDCMD commands to a specified host

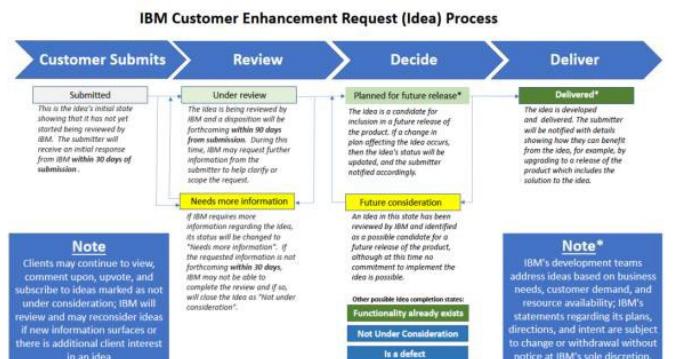
Provide equivalent TSO functionality to ARCHSEND macro.



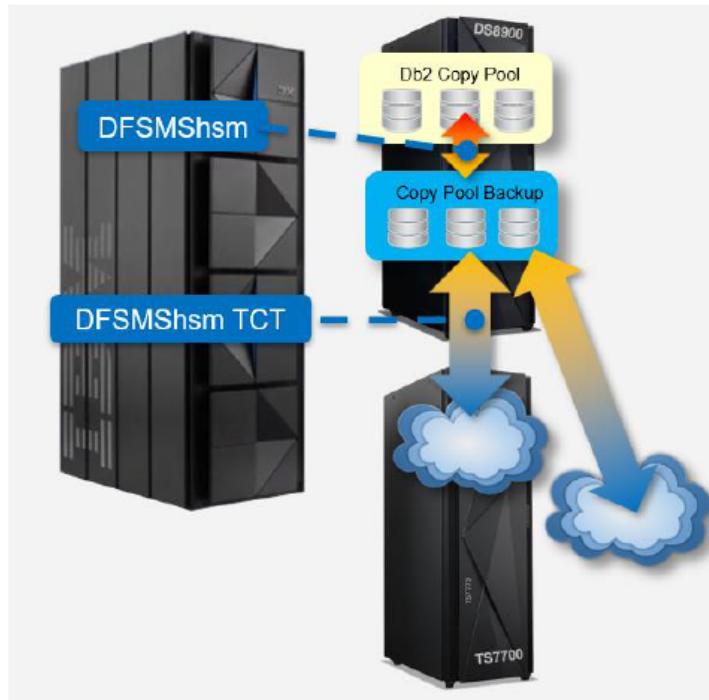
# DFSMS

## Enhancements to address client RFEs and ideas

- Simplified IGD306I Messages
  - SMS enhancements to clean-up logrec records cut due to internal errors and avoid filling up sys1.logrec datasets.
- Improved Data Set Allocation Processing
  - Display a new message indicating how many candidate volumes are marked as primary, secondary, tertiary, or rejected which can help determine the effectiveness of various configuration settings related to performance.
- Improved SMS Reporting
  - Provide additional message diagnostics to easily identify the datasets not assigned to a storage group so ACS routines can be reviewed and modified to rectify any issues.
  - Provide additional information to SMF 42.6 records to help optimize in-memory buffers for improved performance and utilization.
- SMS Storage Class Enhancements
  - Provide a storage class option that specifies if allocation should prefer or require an allocation to a storage controller that enables FlashCopy to be used as a copy technique.
- Improved SMS Storage Group WRITE Statement
  - SMS ACS WRITE statement will print out the entire list of assigned storage groups, instead of just the first one in the list, to assist in testing and troubleshooting SMS ACS routines.
- Dynamic SMS Exits
  - Install a new version or replace an existing version of SMS ACS installation exits (IGDACSDC, IGDACSMC, and IGDACSSC) without scheduling an IPL, as exits will use dynamic exit services.



## DFSMShsm Transparent Cloud Tiering full-volume dump (CD)



- DFSMShsm provides full-volume dump and restore support for transparent cloud tiering leveraging support provided by DFSMSdss.
  - Enables all I/O for full-volume dumps to be performed by a DS8000 directly to a TS7700 enabled as an object store, or directly to cloud object storage.
  - To minimize the time that a volume is locked, an initial full-volume FlashCopy can be performed that can then be dumped to the object store, with none of the data passing through the z/OS host.
  - Backup copies can be created as needed without impacting other workloads due to minimal CPU consumption.
  - Enables creating a complete Db2 system level backup, via FRBACKUP and FRRECOV functions, without any of the data passing through the z/OS host.

## UNIX file backup / restore enhancements (CD)

Clients want to use the same tools and applications to backup and restore individual z/OS UNIX files residing in z/OS File System (zFS) data sets as other z/OS data sets. Initial support to manage backup and restore of individual z/OS UNIX files is integrated into existing DFSMShsm/DFSMSdss functionality, allowing for centralized data management across the z/OS platform.

## DFSMShsm UNIX file-level backup and recovery with EXCLUDE criteria (CD)

Unix files can be filtered with a new exclude option that includes directories, specific file names as well as file name patterns.

```
BACKDS '/u/ibmuser/' RECURSE  
EXCLUDE('logs/,.log,.tmp,a??B.java,/u/ibmuser/app/logs/')  
hrecover-voX-e'logs/,.log,.tmp,a??B.java,/u/ibmuser/app/logs/' /u/ibmuser/
```

Specify a filename of a file that contains the exclude criteria ([CD 3Q2022](#)) Exclude criteria in a file works the same as criteria specified in a list on the EXCLUDE keyword. The same file can be used by multiple commands and is easily maintained.

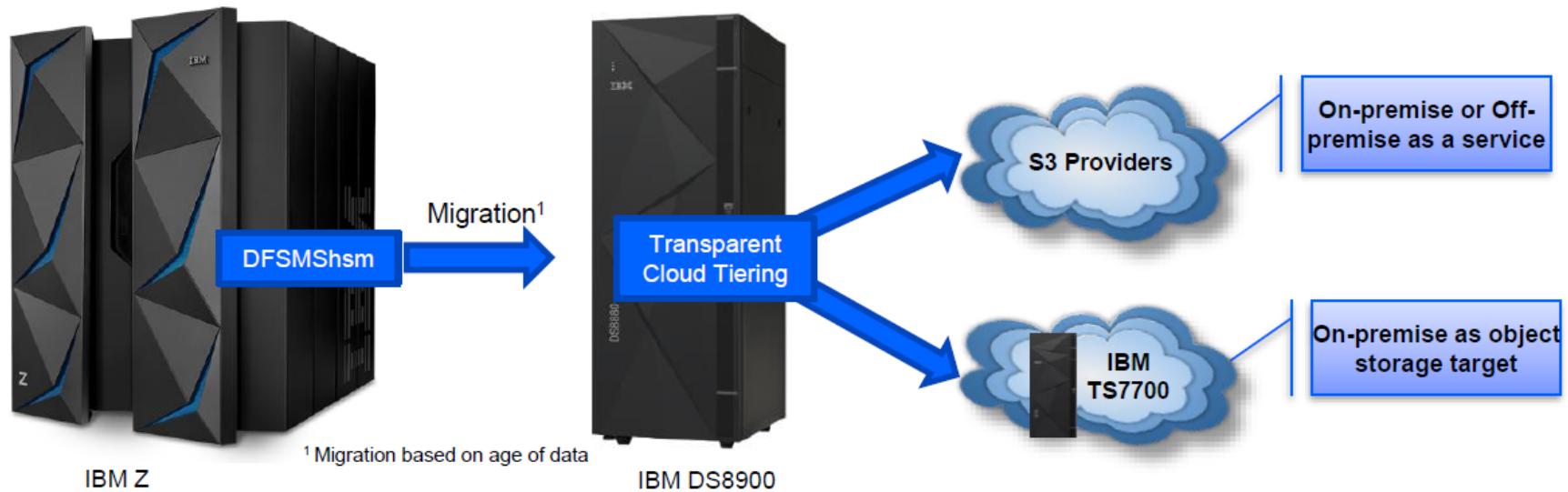


# Data Serving & Storage

Transparent Cloud Tiering improves business efficiency and flexibility while reducing capital and operating expenses with direct data transfer from DS8900 to hybrid cloud environments for simplified data archiving operations on IBM Z.

## Transparent Cloud Tiering

- Off-loads data movement responsibility to the DS8880 avoiding the need for additional HW infrastructure.
- Dramatically reduces CPU resources to be efficiently used in other business-oriented applications.
- Saves z/OS MIPS utilization by eliminating constraints tied to original tape methodologies:
  - 16K Block sizes, dual data movement, recycle, serial access to tape



# Network & Other z/OS Components Critical Updates



# z/OS Components Continue

BCPii - Enhancements/New Features	Since When & Updates
BCPii LPAR group control support	2.4 GA
A new z/OS BCPii API named HWIREST	2.4 2Q 2021 / 2.5 GA
BCPii HWIREST support for commands from ISV and TSO/E REXX environments	2.5 1Q 2022
zERT- Enhancements/New Features	Since When & Updates
IBM zERT Network Analyzer database administration enhancements	2.4 1Q-2020 / 2.5 GA
BM zERT aggregation recording interval	2.4 2Q-2020/ 2.5 GA
zERT policy-based enforcement	2.5 GA
zERT Network Analyzer z/OSMF plug-in is enhanced to support the use of passphrases as an authentication credential for the network analyzer's Db2 user ID on the plug-in's database settings panel.	2.5 2Q -2022
z/OS Communication Server - Enhancements/New Features	Since When & Updates
Shared Memory Communications Version 2 (SMCv2) multiple IP subnet support	2.4 3Q-2020 /2.5 GA
Notification of availability of TCP/IP extended services - Critical	2.5 GA
Communications Server exploitation of the IBM Function Registry for z/OS (Regularly store information about the maximum number of SNA applications and sessions in the IBM FunctionRegistry for z/OS. Insight into the amount of SNA application workloads executing on z/OS) – Critical	2.5 4Q 2022
SMTPD compatibility enhancements for Communications Server SMTP (CSSMTP) (Migrate from SMTPD- CSSMTP)	2.4 1Q-2020 / 2.5 GA

# z/OS Encryption Readiness Technology - zERT

## z/OS Encryption Readiness Technology (zERT)

zERTNetwork Analyzer, a z/OSMF plug-in, that provides an easy-to-use web UI for analyzing zERTdata reported in SMF 119 subtype 12 records

- Significantly improves Time-To-Value of gaining insights into zERTdata and driving a Pervasive Encryption strategy for all z/OS network communications
- **With z/OS 3.1, the zERTNetwork Analyzer is enhanced to automatically upgrade application and database settings from those configured for V2R4 or V2R5 releases.**
- Additionally, new tooling is provided to easily upgrade an existing V2R4 or V2R5 zERT Network Analyzer database to the 3.1 schema.

## zERT security improvements([CD 2Q2022](#))

- Support for passphrases
- Support for saving DB2 users password or passphrase values

## zERT policy-based enforcement – Critical ( 2.5 GA)

In z/OS 2.5, Communications Server extends zERT to provide enforcement of your network encryption standards through policy-based rules that describe different levels of cryptographic protection along with actions to take when TCP connections match those rules.

zERT rules and actions are processed by the Communications Server Policy Agent and are enforced by the TCP/IP stack. This feature enables immediate notification through messages, auditing through SMF records, and even automatic termination of connections when questionable or unacceptable cryptographic protection is used

The screenshot shows the IBM zERT Network Analyzer interface. At the top, there's a navigation bar with tabs for 'Data Management', 'Queries', 'Report' (which is selected), and 'Settings'. Below the navigation is a section titled 'Report: ALLTENDOTS' with a sub-section 'TCP Server Traffic'. A note says 'Use this panel to view the results of a query that is made over zERT data. Results can also be exported to a CSV file.' There are three tabs: 'TCP Server Traffic' (selected), 'TCP Client Traffic', and 'EE Peer Traffic'. A table below lists network traffic data. The table has columns: Type/ID, System, Stack, Server IP, Server Port, User ID, Job Name, Unprotected\* Total Conn, IPsec Total Conn, SSL Total Conn, and TLS Total Conn. The table shows five rows of data for various sessions. Below the table is a section titled 'CLIENT DETAILS FOR SERVER 10.21.505.1: 2221' with a table showing client IP details. The bottom of the page shows a footer with links for 'View security violation details' and 'Help'.

# z/OS Requirements



# z/OS Requirements

Engagement is great!. Add new ideas, Search, Vote and Follow ideas

z/OS accepts requirements through the Unified Ideas Portal at <https://ideas.ibm.com/>

Directly for **z/OS** at <https://ibm-z-hardware-and-operating-systems.ideas.ibm.com/?project=ZOS>

- z/OS also accepts requirements through user groups like SHARE

# Takeaways



# Takeaways

- Review benefits of being in **the most current release** : You see how many new capabilities are coming to current release...
- AI framework OS
- AI framework –Ecosystem . Journey to AI , many application development resources
- Availability, Performance, Resiliency improvements
- Tons of capabilities related to Usability and Skills
- Modern APIs and Open Source support
- z/OSMF – already proved face of z/OS – Many websites as HUB, guild. Use and courage to use!!! For 3.1 «must» to use!.
- New Function and Feature APAR website and subscription
- z/OS 3.1 and CDs of all 2.5 included with many additional capabilities
- More about z/CX, Containers, Open Container Runtime
- Bring capabilities to your shop, use and work with all developers, architects, container experts, Linux admins in your organization
- If you are system programmer, share these capabilities with devops experts, architects, application architects, developers in your organizations and courage to use them
- **Getting benefit of z16 and z/OS synergy**

# THANK YOU!

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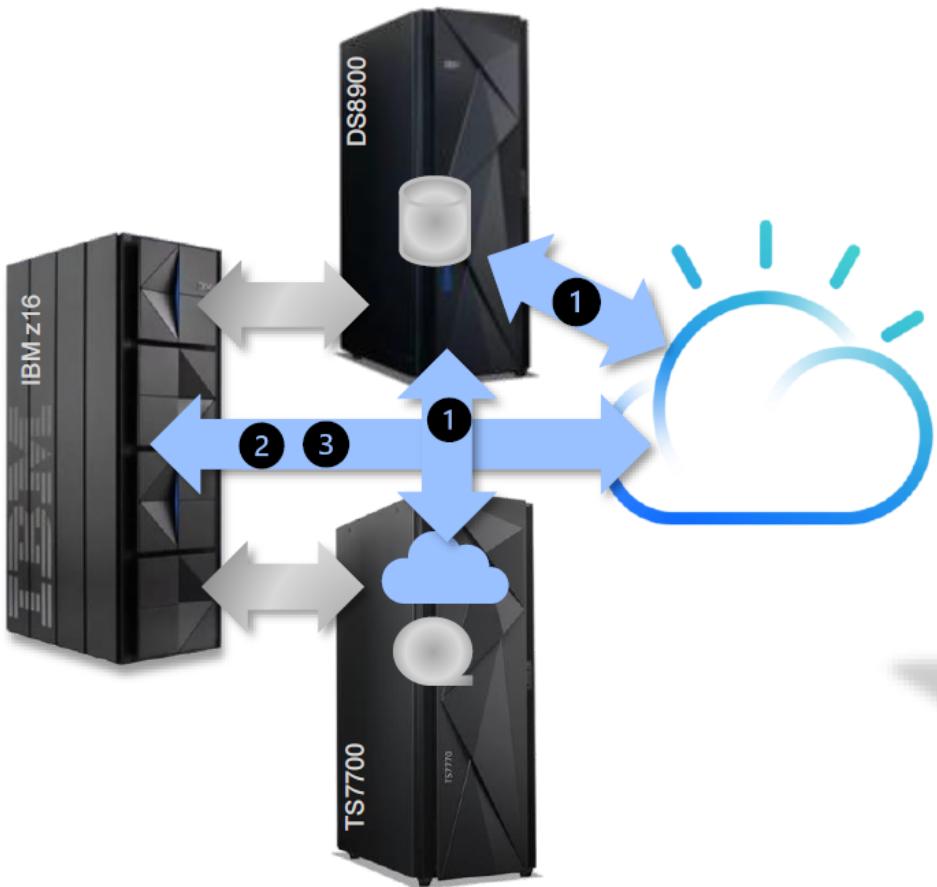
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# Backup Slides

# Data Serving & Storage



## Cloud Storage

z/OS clients are integrating cloud object storage into traditional disk and tape environments to create a hybrid storage architecture that enables clients to leverage the strengths of on-premises disk and tape storage while adding the intrinsic strengths of cloud solutions for backup, archive, and unstructured data to enable new use cases, increase business agility, reduce the complexity of storage environments, and provide cost optimization.

**There are several existing DFSMS Solutions that leverage Cloud Object Storage ...**

### Serverless Data Management

- ① [DS8900 Transparent Cloud Tiering \(TCT\)](#) and [TS7700 DS8000 Object Store](#) enable DFSMS backup and archive to be performed with *none* of the data passing through z/OS, *minimizing MIPS*

### Store Application Data Directly

- ② [OAM](#) stores and manages unstructured data as objects to public, private, or hybrid cloud infrastructures
- ③ [Cloud Data Access](#) will provide a simple method to store any z/OS data directly onto cloud object storage

# Data Serving & Storage

## Cloud Data Access (CDA)

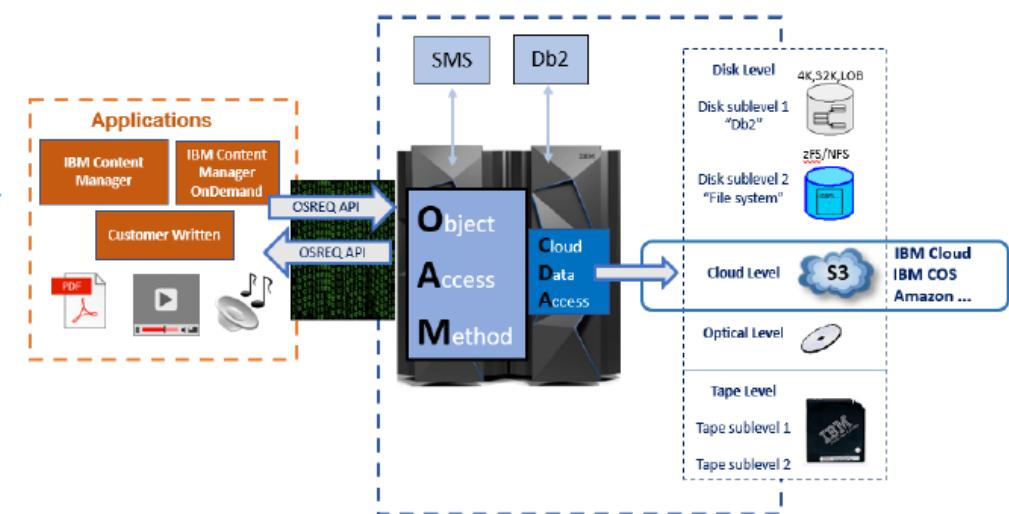
- Provides a simple method to store and share any z/OS data directly onto cloud object storage. Enables S3 / Cloud Object Storage as another tier for z/OS applications.
- Simplified data sharing –reduce and/or eliminate ETL.
- Simplified application development and flexibility with a single API to interact with various Cloud Object Storage providers.
- Simplified authentication with the Provider Configuration File describing the target Cloud Object Storage provider.
- Supported cloud providers include IBM Cloud Object Storage, Amazon Simple Storage Service (Amazon S3), Azure Blob Storage, and Google Cloud Storage.



# Data Serving & Storage

## OAM Cloud Tier Support (CD)

- DFSMS OAM has included a cloud tier to its existing storage hierarchy allowing objects to be managed and stored to public, private, or hybrid cloud infrastructures supporting the S3 API.
  - Through SMS policies, OAM objects can be stored directly to the cloud or can transition to the cloud, based on access requirements.
  - Objects stored in the cloud can be recalled to the disk level.
  - OAM-managed backup copies are also supported in the cloud.
- OAM has extended its cloud tier support to enable an alternate set of cloud credentials to be used.
  - Within a single cloud provider file an alternate (read-only) set of credentials can be used to access the production container or containers for the purposes of a disaster recovery (DR) test.

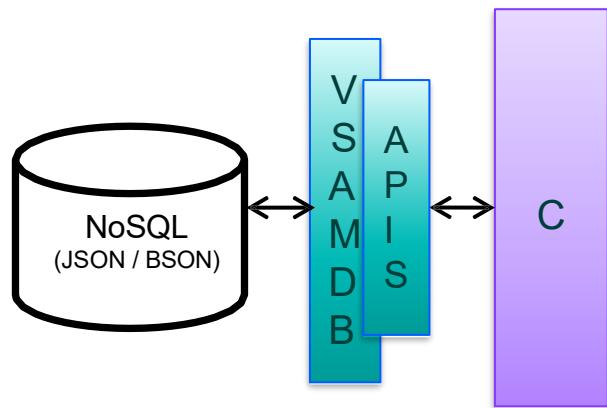


# Data Serving & Storage

## Cloud Storage Access for z/OS (CD)

- Cloud object storage enables a low-cost storage tier that's easily accessible and provides a simple mechanism to share data.
- A new utility, GDKUTIL, can download or upload between cloud objects and z/OS using S3 APIs.
  - Supported data set types include UNIX files, sequential data sets, PDS or PDSE members, or GDG versions.
  - Can be invoked through JCL.
  - Data can be converted from EBCDIC to UTF-8 on upload, and from UTF-8 to EBCDIC on download commands.
  - Requires software dependency for Web Toolkit.
  - [Quick-Start Guide](#) provided to help with initial configuration.





## EzNoSQL APIs (CD)

- NoSQL for z/OS provides a key:value document store on z/OS and allows applications the ability to store open standard BSON/JSON (UTF-8) objects.
- EzNoSQL provides a set of modern APIs, with a C-based, key-value interface, to simplify the application effort needed to access NoSQL VSAMDB data sets on z/OS in real-time, at scale, and with consistency.
  - C-based key-value interface to a NoSQL database enables higher level languages and interfaces.

17 th August 2023 Update : Java support for EzNoSQL is now available!  
The support is provided in z/OS release 2.4 and above with APARs OA64018 and OA64811.

[Content Solution website](https://www.ibm.com/support/z-content-solutions/eznosql) (<https://www.ibm.com/support/z-content-solutions/eznosql>) has everything needed to get started!

# z/OS Security

Enhancements/New Features	Since When & Updates
Authorized code scanner – Priced Feature	2.5 GA
z/OS Authorized Code Scanner Enhancements and Authorized Code Scanner Monitor	2.5 1Q -2023
RACF database encryption	2.5 2Q -2022
Removal of RACF for z/OS support for RACF database sharing between z/VM and z/OS	2.5 3Q-2022
ICSF Enhancements - Several - Special PART – z16 Support	2.5 2Q-2022
Dataset Encryption – Pervasive Encryption Enhancements - Special PART	
FIPS compliance support for platform interoperability by completing the FIPS enablement to the UNIX file- based Kerberos database	2.5 GA
Compliance support for z/OS – Announcement with z16	2.5 2Q -2022

## [z/OS Authorized Code Scanner and Monitor Priced Feature\(CD 1Q2023\)](#)

- The IBM z/OS Authorized Code Scanner is an optional priced feature of z/OS that provides system integrity testing in a development/test environment as part of DevSecOps modernization. It scans for Program Calls (PCs) and Supervisor Calls (SVCs) and generates a series of tests that dynamically scan them for integrity. [\(2.5GA\)](#)
- zACS has extended its scanning ability to include AC(1) code found in MVS data sets and USS files, providing users greater coverage in testing their development/test system for potential vulnerabilities for remediation as needed. [\(CD 1Q2023\)](#)
- The z/OS Authorized Code Monitor (zACM) is now available, as a non-disruptive tool for production systems, examining ABENDs from z/OS recovery processing and reporting on potential vulnerabilities found there for remediation as needed. [\(CD 1Q2023\)](#)

## Compliance Support for z/OS (CD 2Q2022)

- Modernize reporting
  - z/OS 3.1 is enhanced to enable the collection of compliance data from IBM z16 CP Assist for Cryptographic Function (CPACF) counters and several z/OS products and components.
  - A new ENF signal for compliance recording
  - SMF 115-4 records can be integrated into solutions, such as the IBM Z Security and Compliance Center product. To learn more, see the [IBM Z Security and Compliance Center](#) web page.
  - Available with PTFs in fix category IBM.Function.Compliance.DataCollection
- Simplified auditing Center for Internet Security (CIS) benchmark V1.0.0 provides best practices and guidance
- Expedited compliance A new health check to scan ICSF key data sets for clear key tokens
  - A new health check to verify that the ICSF address space is active
  - A new option on the CKDS Keys Utility ISPF panel to generate AES CIPHER keys

# Security

## ICSF Enhancements

- Distribution of Master Key Ownership
  - Allows customers to distribute the ownership of key parts across multiple users
  - When using ICSF panels to enter master keys
  - Controlled with a new SAF profile in the XFACILIT class.
  - Users can be permitted to enter the FIRST, MIDDLE, or FINAL master key parts individually.
  - Can also be separately permitted to the RESET capability.
- BCRYPT Hashing. The CSNBOWH callable service has been updated to support the BCRYPT hashing algorithm.

## TLS 1.3 Sysplex Session Ticket Caching

- System SSL's TLS v1.3 sysplex session ticket caching support will provide the ability for handshake session ticket information to be shared among like servers within a single system or across multiple systems in a sysplex. Sharing provides the ability to perform cached (abbreviated) handshakes instead of full handshakes when resuming connections to the servers.
- AT-TLS provides the ability to use the new System SSL function
- Network Configuration Assistant supports the new AT-TLS function

## RACF Database Encryption (CD 2Q2022)

- RACF supports the encryption of a RACF database which will be migrated to VSAM linear data set format. With this support, the RACF VSAM data set can be shared among z/OS systems in additional specified configurations.

## RACF Password Phrase Interval (CD 4Q2022)

- RACF provides a password phrase change interval, that is separate from the password interval, and can be set above the system limit for individual users.

## Custom Fields in the ACEE

- RACF adds support to allow security administrators to identify the user-related custom fields that should be anchored in the user's Accessor Environment Element (ACEE) at logon time.
- Problem-state applications can retrieve this information using the R\_GetInfocallable service (IRRSGI00) without incurring RACF database I/O.

# IBM z16 Highlights - z/OS zHW Support

## ICSF z16 Enhancements (CD2Q2022)

New ICSF support is required to administer a CEX8 coprocessor (which is new to IBM z16) **if using a TKE workstation**, due to exploitation of quantum algorithms.

- Otherwise, existing workloads will run on IBM z16 without requiring ICSF support.
- Required support is provided on: z/OS V2.2 with z/OS V2.1-V2.2 (Web deliverable HCR77C0) or higher + PTF z/OS V2.3 or higher + PTF

Common Cryptographic Architecture (CCA) Content:

- New CEX8 Coprocessor support
- New Quantum Safe Algorithms (Kyber& Dilithium8,7)

Enterprise PKCS #11 (EP11 ) Content:

- New CEX8 Coprocessor support
- EP11 New Quantum Safe Algorithms (Kyber& Dilithium8,7)

Exploitation of new function is supplied in ICSF PTFs on:

- z/OS V2.2-V2.4 (Web deliverable HCR77D1) or V2.5 (base, which is HCR77D2) or higher
- When exploiting new Quantum Safe Algorithms and sharing a KDS in a sysplex, ensure all ICSF PTFs are installed on all systems.

# Data Serving & Storage

## NFS Server Enhancements (CD)

NFS server restart recovery improved management of file handle errors

New AT-TLS security option to allow client certificate handshakes.

Improved authentication and end-to-end encryption

## Union File System (CD)

Union file system works on top of the other file systems.

It enables a user to obtain a merged view of one or more directories.

This merged view is obtained by accessing the union mount point and gives a single coherent and unified view of files and directories.

It is more of a mounting mechanism than a file system.

Usage: Union file systems are used extensively by containers.

They allow many containers to use one image without having to make multiple copies -saves on disk space.

Any changes made by one container will not affect any other container.

IBM built a Union File System from scratch -This is not a port of a union file system from Linux, but rather one that is purposefully built for z/OS.

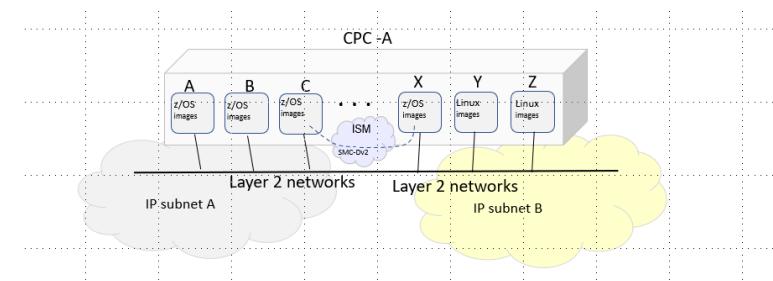
# Network

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

- SMC –Shared Memory Communication is a more efficient protocol for sending data to and from z/OS.
- An improved protocol SMCv2 allows for multiple IP subnet support.
  - SMC-Rv2 is used over IBM RoCE Express2 adapters beginning with the IBM z15.

## Communications Server support for RDMA over Converged Ethernet (RoCE) Express3 (CD)

- z/OS 3.1 Communications Server extends the Shared Memory Communications over Remote Direct Memory Access (SMC-R) function to support the next generation IBM RoCE Express3 feature. **The IBM RoCE Express3 feature is designed to allow TCP/IP stacks on different LPARs within the same central processor complex (CPC) to leverage the power of these state-of-the-art adapters to optimize network connectivity** for mission critical workloads by using Shared Memory Communications technology.



## [More Granular Control Over the FTP Server JES Mode \(CD 1Q2022\)](#)

New System Authorization Facility (SAF) resource to control which z/OS users are permitted to use FTP server JES mode.

## [z/OS UNIX syslogd support for secure logging over TCP \(CD\)](#)

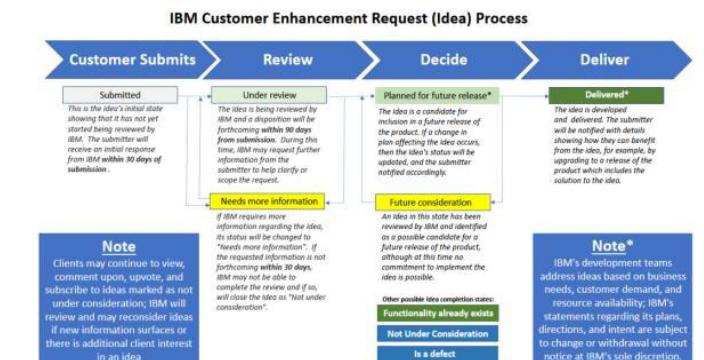
z/OS UNIX syslog daemon (syslogd) is enhanced to support network connectivity to other syslogd instances over TCP, with or without AT-TLS protection.

## [SNA Application and Session Reporting \(CD 4Q2022\)](#)

Communications Server is enhanced to regularly store information about the maximum number of SNA applications and sessions in the IBM Function Registry for z/OS. This information provides z/OS clients with insight into the amount of SNA application workloads executing on z/OS.

## Enhancements to address client RFEs and ideas

- Modify EDGUX100 IGNORE Processing
  - Eliminate DFSMSrmm (RMM) exit customization and usage but still appropriately handle security checking for tape volumes that are ignored by RMM to allow for improved security enforcement and tighter control over IGNORE processing.
  - Ensures RMM will only ignore the tape volume if the user is authorized to access it.



# Application Development

## ISPF Enhancements

- ISPF support for PDSE V2 member generations
  - Support specification of generation numbers in the Edit and View panels and primary commands BROWSE, EDIT, and VIEW.
  - A “generation list” can be viewed for members with generations, allowing the use of line commands to access commonly-used functions for desired generations.
  - Select ISPF services are also enhanced with additional member generations information.
- ISPF Allocate Data Set panel adds ‘dataset key label’ in support of pervasive encryption.
- z/OS UNIX Directory List Utility now supports case-insensitive sort option
- The settings from the “Edit Color Settings” panel are available programmatically through ISPF variables. ([CD](#))

## [zlib encryption Enhancement](#)

- Support for **CRC-32** - a practical algorithm commonly used in digital networks and storage devices to detect accidental changes to digital data.

## [New C runtime APIs and header constants](#)

- New APIs and constants to facilitate the porting of UNIX/Linux programs to z/OS

# DFSMS – Data Set File System

## Data Set File System (CD 2Q2022)

- A new file system type that will allow customers to access data in data sets from the z/OS UNIX space.
- Enables z/OS UNIX applications, tools, and utilities to use data in data sets in a secure and consistent manner.
- Supports Sequential, PDS, PDSE data sets.
- Supports RECFM = F, FB, FBS, V, VB, U
- Compressed or encrypted data sets are also supported
- Existing cataloged data sets (DASD) can be read and written.
- Data Set File System can also create new data sets or delete a data set or PDS / PDSE member.
- Data set serialization is consistent with serialization done by ISPF edit.
- Access to a data set is governed by user permission to the data set -UNIX permissions are **not used**.
- User needs to know the type of data that is in the data set in order to use it under z/OS UNIX.
- A new class of applications can be developed using this technology.
- New support that allows specification of multiple data set qualifiers for the HLQ directory -useful to reduce scope of data sets being accessed by DSFS (CD)
- Use case scenarios: Use **grep** to search for things in data sets.\Use **vito** to edit data sets \Write data sets into **tar** archives\Make data sets part of a **paxfile**\**sftp** data sets \ etc...

## Application Development

### Celebrating 25 Years of Innovation: Java on z/OS

*“From its beginning, IBM recognized Java as a key component of delivering innovation, performance and portability on IBM zSystems...”* ([blog](#)) Skyla Loomis, Vice President, IBM Z Software

*“After a quarter century of development, improvements, and name changes, the impact of IBM’s SDK for Java on IBM zSystems has been pervasive...”* ([blog](#)) Shereen Ghobrial, Director, Compilation Technology & Enterprise Products, IBM Z Software

IBM zSystems’ unique capabilities have accelerated Java workloads



IBM z13



IBM z14



IBM z15



IBM z16

**Leverages SIMD** (single-instruction, multiple-data) engine instructions for cryptographic, string, and matrix operations in Java, providing significant improvement in **cryptographic performance**.

New **pause-less garbage collection mode** to deliver significantly shorter pause-times for response-time sensitive applications. New **cryptographic enhancement** for GCM (Galois/Counter Mode), and **Vector Packed Decimal instructions** to accelerate computations in data access library.

Transparent exploitation of **Integrated Accelerator of zEnterprise Data Compression** improves performance. New instructions to accelerate Java’s **TimSort** and **String search APIs**. New cryptographic enhancement to **Elliptic Curve Cryptography**.

**Zoned Decimal conversion** routines are accelerated within the data access library and **BigDecimal / Integer / Long.toString()** methods are accelerated with new vector instructions.

WebSphere on z/OS benchmarks show an aggregate **21 times throughput increase** from IBM System z9 to IBM z16.

