What's New in z/OS V2.5

—

z/OS V2.5 – Preview Edition
Winter 2021 ([z/OS V2.5 Preview announce](#))

**Statements regarding IBM future direction and intent
are subject to change or withdrawal,
and represent goals and objectives only.**

IBM

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(CD) – Base V2.5 items that were **C**ontinuous **D**elivery on previous release(s)
(CD) – **C**ontinuous **D**elivery items post V2.5 General Availability

z/OS V2.5 Release Overview - Release Themes

The next release of IBM z/OS, version 2 release 5, intends to drive innovative development to support new business applications in cloud and AI by enabling next generation systems operators and developers to have easy access and a simplified experience with IBM z/OS. All while relying on the most optimal usage of computing power and resources of IBM Z servers for scale, security and business continuity.

z/OS V2.5 Messaging			
Workload Enablement	**OS Mgmt. Simplification**	**Cyberthreat Secure Z**	**Intelligent Resiliency**
Hybrid Cloud / Application Modernization		**Security / Cyber Resiliency**	
Built for scale and simultaneous deployment to support agile business use cases for hybrid cloud and AI capabilities.	Easier installation, management, and use of z/OS by administrators and developers with no special skills required for increased agility.	Cyber security systems integrity, heightened application availability and automated detection and mitigation procedures to protect against the impacts of cyber attacks and help maintain exceptionally resilient environments	

z/OS V2.5 Release Overview - Release Highlights

Feature	Description
Workload Enablement	**Workload Enablement:** An **Application Developer,** can treat z/OS the same as any other operating system platform with respect to hybrid cloud deployment, achieving rapid application development and provisioning, demonstrating z/OS's ability to match or exceed any other operating system.
Intelligent Resiliency	**Resiliency**: An **Infrastructure Architect** will gain enhanced resiliency capabilities that provide heightened application availability, modernized tools and automated detection/mitigation procedures, enabling them to maintain exceptionally resilient environments in half the time and with reduced skill requirements.
Cyber Threat Secure Z	**Security:** A **Security Architect** can leverage cyber security system hardening and analytics to readily exceed regulatory compliance requirements and to provide a new level of cyber resiliency for the enterprise.
OS Management Simplification	**Systems Management**: An **early tenure z/OS System Programmer**, can independently, confidently, and successfully deploy, maintain, and manage z/OS (and stack) software functions using guided and customized instructions and workflows.

z/OS V2.5 Release Overview – Workload Enablement

An Application Developer can treat z/OS the same as any other operating system platform with respect to hybrid cloud deployment, achieving rapid application development and provisioning, demonstrating z/OS's ability to match or exceed any other operating system.

UNIX Application Enablement and Standards

Cross-Platform and Cloud Interoperability / Communication

Cross-Platform and Cloud Interoperability / Filesystems

Programming Language Support

Container Extensions (zCX) Adoption items

Running LE Applications and Programs in 64-bit
Memory Space

z/OS V2.5 Release Overview – Intelligent Resiliency

An Infrastructure Architect will gain new and enhanced resiliency capabilities that provide greater application availability and scalability, faster recovery, and expedited triage and resolution of potential problems, enabling his team to easily and efficiently maintain exceptionally resilient environments.

Remote Pair FlashCopy Support for GM

z/OS Anomaly Mitigation

Parallel Sysplex Resiliency

z15 System Recovery Boost Use Cases

z/OS V2.5 Release Overview – CyberThreat Secure Z

A Security Architect can leverage cyber security system hardening and analytics to readily exceed regulatory compliance requirements and to provide a new level of cyber resiliency for the enterprise.

Security Standards, Crypto Support and Security Infrastructure

Definition and Protection of Sensitive Data in Dumps

Logical Corruption Protection & Recovery

Simplified Compliance via System Hardening

Digital Certificate Simplification

Network Encryption Enforcement

Pervasive Encryption Simplification

z/OS V2.5 Release Overview – OS Management Simplification

An early tenure z/OS System Programmer can independently, confidently, and successfully deploy, maintain, and manage z/OS (and stack) software functions using guided and customized instructions and workflows.

Platform Mgmt REST APIs, GUIs, and Simplification Apps

z/OS Cloud Provisioning and Management

zOSMF Software Management: Software Installation Support

Parallel Sysplex and Coupling Management Application Enhancements

z/OS V2.5 Release Overview – z/OS support summary

Release	z9 EC z9 BC **WdfM**	z10 EC z10 BC **WdfM**	z196 Z114 **WdfM**	zEC12 zBC12 **WdfM**	z13 Z13s **WdfM**	z14 ZR1	Z15	End of Service	Extended Defect Support
z/OS V2.1	X	X	X	X	X	X		9/18	9/21[2]
z/OS V2.2		X	X	X	X	X	X	9/20	9/23[2]
z/OS V2.3				X	X	X	X	9/22[1]	9/25[2]
z/OS V2.4				X	X	X	X	9/24[1]	9/27[2]
z/OS V2.5[3]					X	X	X	9/26[1]	9/29[2]

Notes:

[1] - All statements regarding IBM's plans, directions, and intent are subject to change or withdrawal without notice.

[2] - Extended support dates are projected and are subject to change or withdrawal without notice.

[3] - z/OS 2.5 is the last release of z/OS that will include IBM JES3

WdfM - Server has been withdrawn from Marketing

Legend

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

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Z Hardware Support

IBM z15 Model T01 functions & features

One hardware model, Five Features, 1-4 19" Frame System

z/Architecture Mode <u>ONLY</u>

- •L1 Private 128K i & 28K d   -L2 Private 2MB i & 2MB d
- •L3 Shared 256 MB / chip   -L4 Shared 956 MB / drawer

Up to 190 processors configurable as CPs, zIIPs, IFLs, ICFs or optional SAPs
- • Up to 190-way on z/OS V2.1 and later (non-SMT mode)

Up to 40 TB of Redundant Array of Independent Memory (RAIM) – 1TB Memory Increment – 8TB/Drawer - Max
- • Up to 4 TB per z/OS LPAR with z/OS V2.1 and later

256 GB Fixed HSA

Channel Subsystem scalability
- • Up to 85 LPARs
- • Up to six (6) Channel Sub Systems (CSSs)
- • 4 Subchannel Sets per CSS

HiperDispatch Enhancements

Two-way SMT for zIIPs, IFLs, and SAPs

30+ New instructions: Java, Vector enhancements for Analytics and sort acceleration

Hardware Instrumentation Services (CPUMF)

z/OS V2R4 XL C/C++ ARCH(13) and TUNE(13) exploitation:
- • New z15 hardware instructions
- • Aligned Vector Load/Store Hint instructions
- • Vector Enhancement Facility 2
- • Miscellaneous-Instruction-Extension Facility 3

IBM Virtual Flash Memory & CF Exploitation of VFM Up to 12 Features – Feature Size=0.5TB

IBM System Recovery Boost – Sysplex Recovery

IBM Integrated Accelerator for Z Sort

IBM Integrated Accelerator for z Enterprise Data Compression (on-Chip Compression)

Coupling Facility Level 24
- •Coupling Facility Fair Latch Manager 2
- •Message Path SYID Resiliency Enhancement
- •DYNDISP Default THIN
- •Coupling Facility Monopolization Avoidance

- • Coupling CHPIDs increased to 384 from 256 per CEC
- • ICA SR increased to 96; ICP increased to 64

Integrated Coupling Adapter (ICA-SR) links NB + CF

Coupling Express (CX3) LR, NB + CE LR CF

Next Gen RoCE 25/10 GbE RoCE-Express2.1 (CX4)

FICON Express16SA

OSA Express7S (1,10,25 GbE)
- • Greater than 16 Adapters support

zHyperLink® Express1.1 (FC 0451) / CF
- • Maximum 16 Adapters

Crypto Express7S (FC 0899 - 1 HSM, FC 0898 - 2 HSM)
- • Max 60, Combination of (CEX7S. CEX6S,CEX5S)
- • Up to 16 (CEX6S and CEX5S) can be Carried Forward but rest must be CEX7
- • Support for new CCA 7.1 functions
- • New ECC Edward Curves support

(z/OS support in blue)

Z Hardware Support

IBM z15 Model T02 functions & features

One hardware model T02 19-inch frame
zArchitecture Mode ONLY
Up to 65 processors configurable as CPs, zIIPs, IFLs, ICFs or optional SAPs
•L1 Private 128K i & 28K d   –L2 Private 2MB i & 2MB d •L3 Shared 256 MB / chip   –L4 Shared 956 MB / drawer
Up to 16 TB of Redundant Array of Independent Memory (RAIM) • Up to 4 TB per z/OS LPAR with z/OS V2.1 and later
160 GB Fixed HSA
Channel Subsystem • Up to 40 LPARs • Up to three (3) Logical Channel Sub Systems (LCSSs) • 3 Subchannel Sets per LCSS
HiperDispatch Enhancements
Two-way simultaneous multithreading (SMT) • Support for SAPs
30+ New instructions: Java, Vector enhancements for Analytics and sort acceleration
XL C/C++ ARCH(13) and TUNE(13) exploitation: • New z15 hardware instructions • Aligned Vector Load/Store Hint instructions • Vector Enhancement Facility 2 • Miscellaneous-Instruction-Extension Facility 3
Hardware Instrumentation Services (CPUMF)

(z/OS support in blue)

IBM Virtual Flash Memory & CF Exploitation of VFM Up to 4 Features – Feature Size=0.5TB
IBM System Recovery Boost
IBM Integrated Accelerator for Z Sort
IBM Integrated Accelerator for z Enterprise Data Compression (on-Chip Compression)
CF Level 24 •CF Fair Latch Manager 2 •Message Path SYID Resiliency Enhancement •DYNDISP Default THIN •CF Monopolization Avoidance
• Coupling CHPIDs increased to 384 from 256 per CEC • ICA SR increased to 48; CE-LR to 64; ICP increased to 64
Integrated Coupling Adapter (ICA-SR) links NB + CF
Coupling Express (CX3) LR, NB + CE LR CF
Next Gen RoCE 25/10 GbE RoCE-Express2.1 (CX4)
FICON Express16S+ (Fiber Channel Endpoint Security not supported)
OSA Express6S GbE, 10GbE, 1000Base-T OSA Express7S 25 GbE SR1.1
IBM zHyperLink® Express1.1 2 Port Adapter FC0451 / CF
Crypto Express7S (FC 0899 - 1 HSM, FC 0898 - 2 HSM) • Max 40 Combination of (CEX7S. CEX6S,CEX5S) • CEX6S and CEX5S can be Carried Forward (CF) • Support for CCA 7.1 • New ECC Edward Curves support

Z Hardware Support

IBM z15 highlights

- Improved compression performance (up to 17x throughput improvement*)
- Up to 20% More coupling links and up to 50% more CHPIDs for the T01 model and 2-3x more coupling links and up to 50% more CHPIDs for the T02 model (CD)
- CFCC improvements
  - Thin interrupt as the default for shared-engine CFs
  - Improved fairness in CF dispatching and better CF efficiency/scalability
  - Improved message path resiliency (CD)
  - CF monopolization avoidance exploitation for resiliency (CD)
- z/OS SLIP to monitor an address or range for a key change and take diagnostic action
- Sort accelerator – updates to DFSORT (CD)
  - New **SORTL** instruction, which is standard on the z15.
  - Designed to cut the CPU costs and improve the elapsed time for eligible sort workloads
  - DFSORT and DB2 for z/OS utilities Suite exploit the SORTL instruction
  - DFSORT is available on z/OS V2.3 with PTF UI90067 and V2.4 with PTF UI90068

  z15 DFSORT with the Integrated Accelerator for Z Sort vs z14 DFSORT
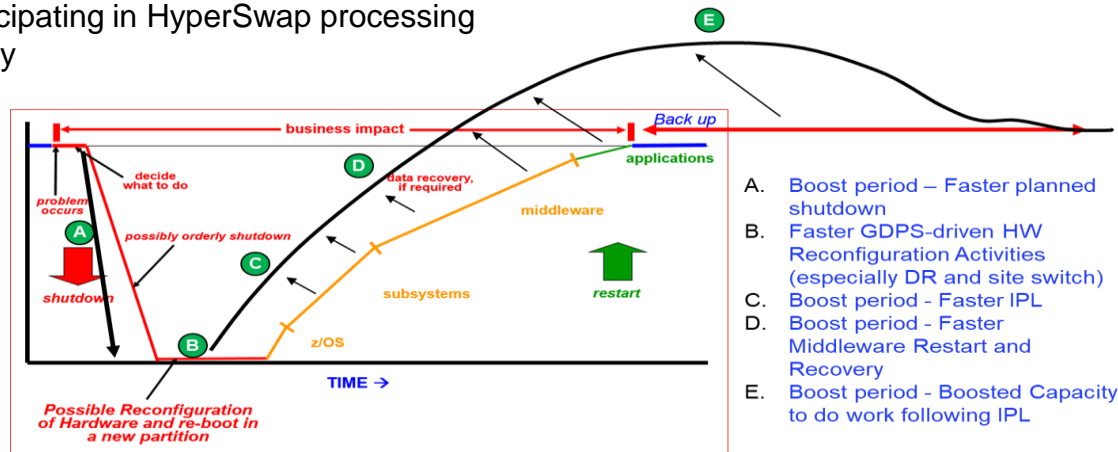
  - *Exploiting Z Sort for DFSORT in-memory sort jobs can reduce elapsed time by up to 30% and CPU time by up to 40% for large format data sets with record lengths up to 500 bytes.**

Z Hardware 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
  - zIIP boost – 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 (CD) – 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

A. Boost period – Faster planned shutdown
B. Faster GDPS-driven HW Reconfiguration Activities (especially DR and site switch)
C. Boost period - Faster IPL
D. Boost period - Faster Middleware Restart and Recovery
E. Boost period - Boosted Capacity to do work following IPL

Z Hardware Support

ICSF is changing how Cryptographic HW support is delivered (CD)

- No more web deliverables. ICSF will ship new HW support via APARs with SMP/E FIXCAT tags.
- New ICSF FMIDs will be delivered with new z/OS releases only. Older FMIDs will remain in service as appropriate.
- HW exploitation on older z/OS releases will be via updates to HCR77D1 only.

ICSF updates planned for z/OS V2.5

- Key data set updates to support larger keys, such as lattice based keys asymmetric keys.
- Improved capability to demonstrate compliance with key rotation policies related to CEX master key changes
- New protections for elliptic-curve cryptography (ECC) keys – the "private key name" in the token can now be SAF checked.
- The ability to restrict the use of archived keys to "decrypt" operations only, allowing re-encrypt of old ciphertext but not creating new
- Additional HW exploitation for certain SSL/TLS ciphers

With APAR OA58880, available on z/OS V2.4

- Digital signature support for Edwards curves, Ed448 and Ed25519, and lattice based keys
- CPACF protected key support for a subset of ECC keys
- TR-31 key block support for HMAC keys.
- CVN-18 support for EMV (Europay MasterCard, and Visa) services

With APAR OA60317, available on z/OS V2.4

- Clear key capability added to Hash-based Message Authentication Code (HMAC) related callable services with CPACF exploitation.

With APAR OA59593 (z15) and OA60355 (z14), available on z/OS V2.4

- Additional ISO-4 format PIN bock integration, and the addition of AES DUKPT capability
- New Format Preserving Encryption (FPE) services exploiting FF1, FF2, and FF2.1 algorithms

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z/OS V2.5 Release Overview

Usability and Skills
z/OSMF Desktop filter and type ahead, Workflow management and logging, simpler configuration, performance improvements, SCA for external apps, Diag Assist, Sysplex Mgmt and Policy Editor, Console UI enhancements, zMSC…

Application Development
z/OS Container Extensions, Web Enablement toolkit, OAM with DB2, ISPF, ABO, Java, Node.js, Python, Go…

Scalability & Performance
VTOC I/O, zHyperLink write Stats, WLM batch improv., IWQ for zCX, TCT, RMF…

Enhancing Security
PassTicket Improv, spool encrypt, Certificate simplification, FIPS, Data Privacy for Diagnostics, TCT full volume dump, zACS…

Availability
ARM, Anomaly Mitigation, Catalog improvements, logical corruption protection, system recovery boost, CF monopolization avoidance…

Systems Management
z/OSMF install of products/fixes, DFSMShsm UNIX indiv file backup and to new directory, Multiple NFS servers on a system, JES2 MAS-wide policy support, CP&M time limits, zWIC, SDSF SRB displays, DFSMSrmm z/OSMF plug-in...

Networking
SMC-Dv2, TLS V1.3, zERT, Sysplex Network Health, stack services…

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Usability & Skills

- Bring a browser based ecosystem to z/OS Management
  - Consistent with other platform User interfaces
  - Modern compared to ISPF 3270
  - Client platform agnostic – OS, devices etc.
  - Exploit graphics and other techniques where appropriate

- Develop Applications focused on z/OS unique needs
  - Task Oriented
  - Reduced effort

- Integrate and expand the z/OS ecosystem
  - Provide REST API's for public consumption
    - Securely and efficiently

- Reduce Reliance on Assembler Skills
  - Provide solutions that don't require code where possible
  - Support higher level language extensions of z/OS

Overview, Goals & Directions

z/OSMF

Desktop style user interface
- Built-in support for data set filter and display, browse, edit etc.
- Built-in support for Unix file filter and display, browse, edit etc.
- Built-in support for JOB filter and display, browse, cancel, purge, etc
Workflow Support – guided actions
- A series of steps to accomplish a task and a tool to track each steps status
- Can involve one person or many
- Workflow authors decide on style and technical approach
- 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
Task focused activities
- Sysplex configuration, Workload Manager Policy setup, Network Configuration, Security Configuration validation, Sending doc into IBM, Performance and status monitoring, etc.

Usability & Skills

z/OSMF Desktop – Replaces Tab UI in z/OS 2.5

- Customer grouping of items in folders, such as data sets via PH24527 (CD)
- Search, Browse, Edit files and data sets via PH16076 (CD)
- Submit, query, browse jobs – Job Output Task via PH16076 (CD)
- Syntax highlighting, user created links, improved performance PH24527 (CD)
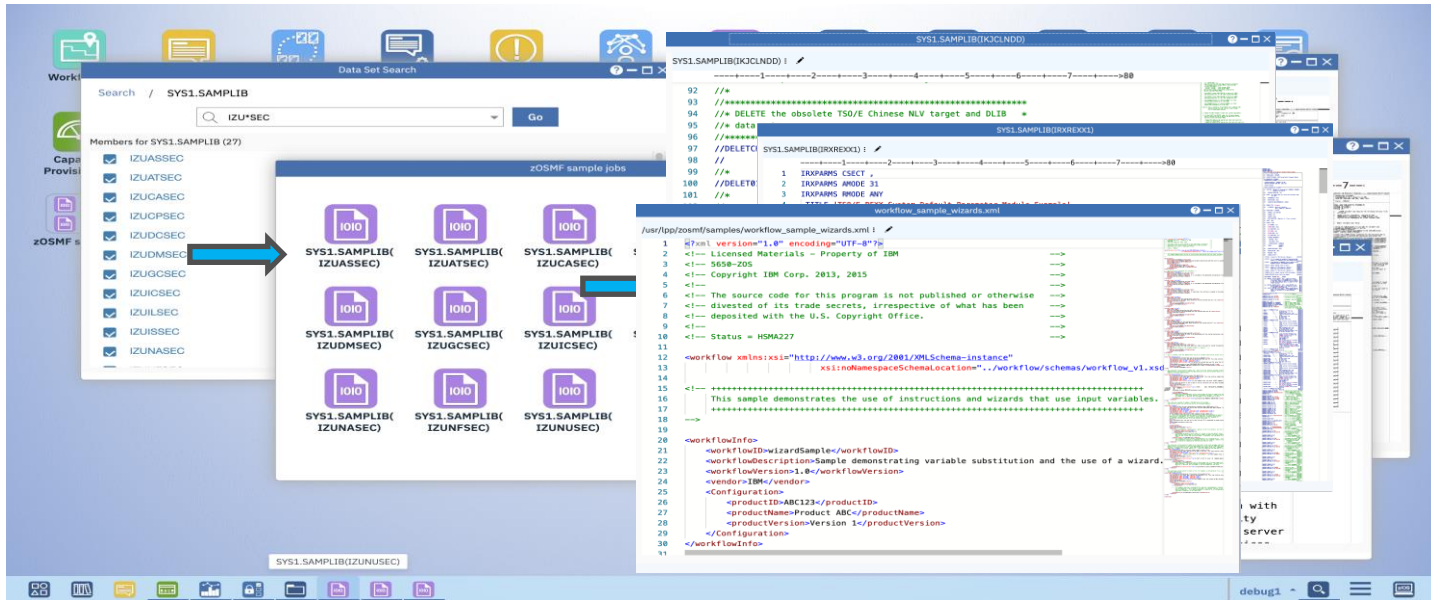
Usability & Skills

z/OSMF Type Ahead Search (CD)
- The z/OSMF desktop utilities are enhanced with the PTF for APAR PH28692. The search function is enhanced to provide typeahead capability for searching data sets, UNIX System Services (USS) files, and USS directories.

z/OSMF Create Data Set (CD)
- The PTF for APAR PH30398 also adds the function of "create data set" into the z/OSMF desktop. Clients can create a new physical sequential or partitioned data set based on an existing data set, a predefined template, or fully specified attributes.

Usability & Skills

z/OSMF Improved configuration (CD)

- Start up performance improvements when there are no changes to PARMLIB, delivered via PH19227

z/OSMF Granular Configuration (CD)

- z/OSMF is enhanced by the PTF for APAR PH24527 to provide a simple UI to enable or disable most z/OSMF services.
- Simplified settings deployment with a simple JSON file

z/OSMF Start Up Improvements (CD)

- z/OSMF startup time and resource consumption during startup is improved with the PTFs for APARs PH28921, PH28920, PH28971, PH28990, PH28451, PH29230, PH29243, PH28832, and PH28872. In laboratory measurements of a small z15 LPAR, the startup time improved by 30% elapsed time and 48% CPU time. Results depend on a client's configuration.

z/OSMF Updated Liberty (CD)

- z/OSMF now uses the default path in embedded liberty, delivered via PH17867

Usability & Skills

z/OSMF Dynamic Parmlib Update (CD)

- New z/OS operator commands (SETIZU and SET IZU) are planned to be added for z/OSMF to dynamically change z/OSMF parmlib options without requiring an IPL or in some cases a full server restart. This function is also available on z/OS 2.3 and higher with PTF for Apar PH24088

Usability & Skills

## z/OSMF Improved Configuration (CD)

- Security Configuration Assistant
  - A new z/OSMF application to help in configuring security, is enhanced to support validation by user group with the PTF for APAR PH17871.

- Support for external applications

- Support for variable substitution
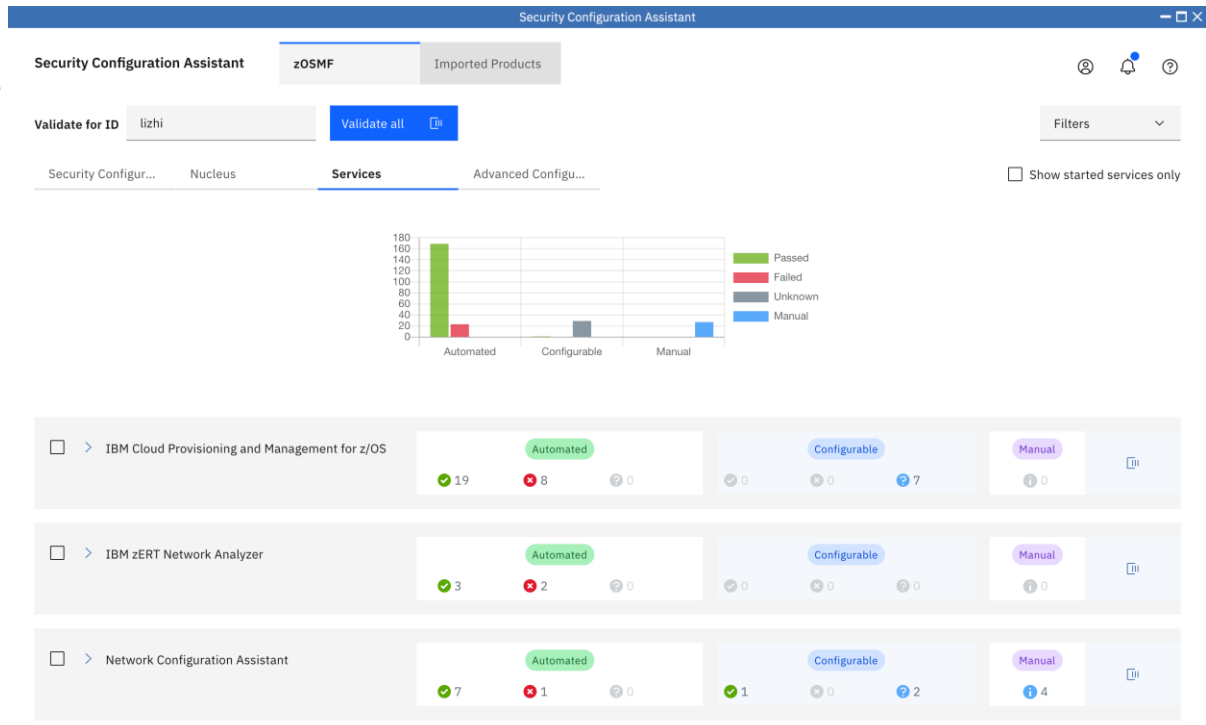
Usability & Skills

z/OSMF Diagnostic Assistant

- Collect z/OSMF diagnostic data with one click
- Display of z/OSMF data file system utilization (CD)
- Automatic cleanup of z/OSMF diagnostic data based on a predefined policy with PTF for Apar PH25691 (CD)
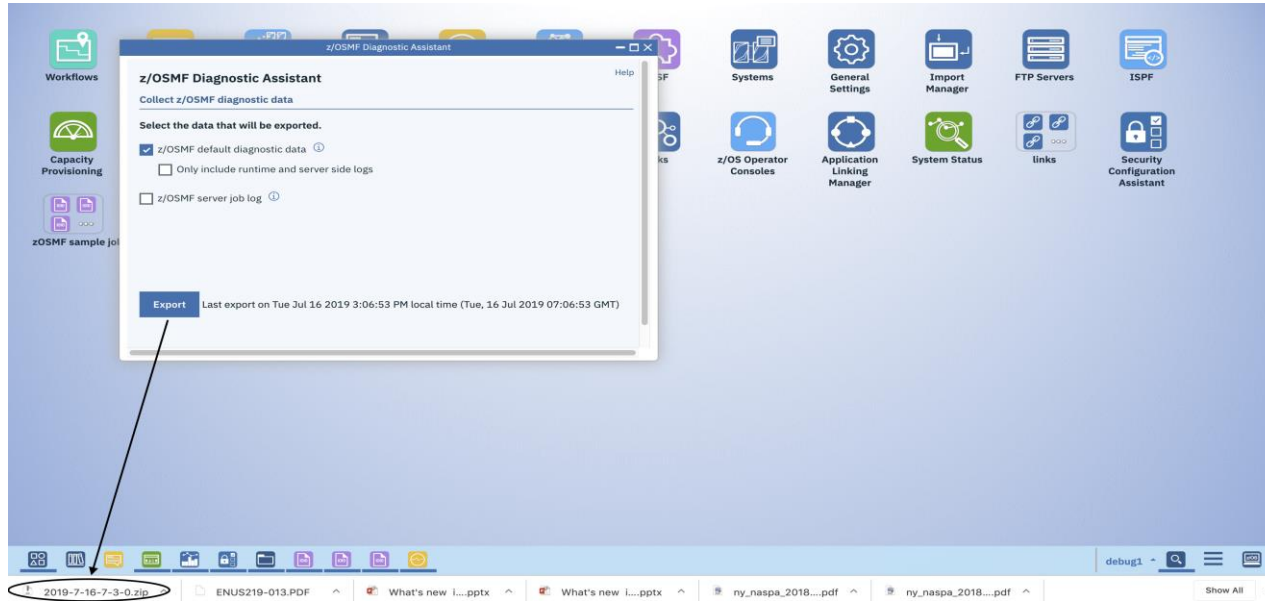
Usability & Skills

z/OSMF Sysplex Management

- View Sysplex configuration
  - Table and graphical views
    - Physical and logical views, by CPC, by sysplex, by Coupling Facility, by Structure
    - Coupling Facility, Links, Structures
  - Available in z/OS 2.2 and up

- Modify Sysplex configuration
  - Sysplex-wide commands and results display
  - Command Log retained across IPL'
  - Allows review of who took what action when (and the detailed results of each action)
  - Optionally view generated commands before issuing them
  - Actions include Rebuild, Duplex, Reallocate, CF actions, CF connectivity management, Couple Dataset mgmt. via PTF for Apar PH15554 (CD)

- Sysplex CFRM Policy Editor
  - Edits information about Sysplex CFRM policy including structure sizes
  - Bulk editing capable

Usability and Skills

Sysplex Management App Phase 3b – CFRM Policy Editor

- A long-standing customer requirement is to simplify the complexity improve the "ease of use" for CFSIZER, and address its lack of integration with the CFRM policy utility that defines CF and CF structure resource
  - We have a roadmap (Sysplex Mgmt App Stage 3) as to how to address both of these concerns
- Builds on prior support for Sysplex Mgmt App Phase 3a REST APIs and abilities to update CFRM policy programmatically
- Stage 3b provides a GUI in zOSMF for CFRM policy editing, replacing IXCMIAPU batch utility
  - Policy actions – create, delete, rename, activate
  - CF and CF structure definition, modify, delete, rename, etc
  - Bulk editing of CF structures
  - Policy import/export functions
  - Bulk copy of CF structures to clone datasharing groups
  - Full referential integrity, health checking and best practices, etc – prevent mistakes rather than recover from them!
  - Coexists and interoperates with IXCMIAPU batch utility

Usability and Skills

Modify Multiple CF Structures

Modify Mode ⓘ | Absolute | Relative |

Input fields that you enter values for will be applied for all the CF structures selected to modify.

| Maximum size | | Initial size | | Minimum size |
| M | | | M | | |

| Duplexing site | Duplexing mode | Allow automatic alte |

| Encrypt | Rebuild threshold percentage | Recovery priority |

| SCM algorithm | Enforce CF order | Allow reallocate |

| List notification delay interval (μs) | Key range notification delay interval (μs) |

Selected CF Structures to Modify

CACHE1

CACHE2

Cancel

Modify Multiple CF Structures

Modify Mode ⓘ | Absolute | **Relative** |

Input fields that you enter a value for will increase or decrease by the specified percentage and will be applied for all the CF structures selected to modify. Fields that are left empty will not be modified.

☐ Modify all four input fields by a single specified percentage: 0 ⇕ %

| Maximum size | Initial size |
| 0 ⇕ % | 0 ⇕ % |

| Minimum size | Maximum SCM size |
| 0 ⇕ % | 0 ⇕ % |

Selected CF Structures to Modify

CACHE1

CACHE2

Cancel   OK

Usability & Skills

Console application

- Support for WTOR/HOLD messages via PH30881 (CD)
- Improved handling of large amounts of messages
- Simplified Configuration of console by APAR PH24072 (CD)

Usability & Skills
z/OSMF Software Management Installation of ServerPac

- Installation method 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 Workflow

- IBM has been delivering ServerPac as a Portable Software Instance format (CD)
  - IMS, DB2, and CICS Transaction Server and associated products, all can be installed with z/OSMF today.
  - Consistent packaging and installation method as other leading software vendors.

- z/OS 2.5 ServerPac
  - Is available in Portable Software Instance format, and only that format after January 2022.
  - Initially available in the existing ISPF CustomPac Dialog format, will be disabled in January 2022 *for all products (z/OS, IMS, Db2, CICS, MQ, and program products).* Prepare now.
- z/OS V2.4 will not be offered as a Portable Software Instance, and remains installable with the ISPF CustomPac Dialog.

- Learn more: https://www.ibm.com/support/z-content-solutions/serverpac-install-zosmf/ and try a sample Portable Software Instance to be familiar with the install.

- z/OSMF is required on your driving system to install a ServerPac in Portable Software Instance format

Usability & Skills

z/OSMF Software update task (CD) with APAR PH28412 on z/OS V2.3 and V2.4.

- 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 HOLDDATA 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.

- To learn more about z/OSMF Software Update, including helpful instructions on how to get started, see the Software Update with z/OSMF web page.

Usability & Skills

z/OS Release Upgrade Enhancement

- z/OSMF *z/OS V2.5 Upgrade Workflow* **will be a part of and serviced with z/OS** (CD) with APAR OA60711 on V2.3 and V2.4
    - Use the z/OS V2.5 Upgrade Workflow directly from your z/OS system, since you do not need to retrieve from github.
        - /usr/lpp/bcp/upgrade/

    - z15 Upgrade Workflow will also be part of and serviced with z/OS in that same APAR.
    - Will be identified with FIXCAT IBM.Coexistence.z/OS.V2R5

    - IBM strongly recommends that you become familiar with z/OSMF Workflows to take advantage of these benefits!
        - Allows for discovering functions used, tailoring information specific to your systems, and verification of many upgrade actions.

- *z/OS Migration* publication will not be provided for V2.5
    - However, an exported format of the z/OS V2.5 Upgrade Workflow will be available on KnowledgeCenter for those that prefer to use it.

Usability & Skills

IBM Software Download move to TLS 1.2 for FTPS

- Planned for April 30 2021
- IBM will remove support for TLS 1.0 and TLS 1.1 from the IBM Download Servers
- This affects the following, for those that use FTPS:
  - Receive Order
  - PTF's from Shopz
  - PTF's ordered using ServiceLink
  - Products in ServerPac and CBPDO offerings ordered using Shopz
  - Products in CustomPac offerings

- Customers directly accessing from z/OS can convert FTPS to TLS 1.2 using AT-TLS

- IBM recommends using HTTPS instead of FTPS. If you are using HTTPS, this change will not affect you at all.

Usability & Skills

IBM z/OS Management Services Catalog – Planned new plugin

z/OS Management Services Catalog in z/OSMF plans to leverage the power of z/OSMF workflows to enable system programmers to run services that help complete z/OS management tasks faster and with fewer errors.

- Experienced z/OS system programmers are planned to be able to create a catalog of customized services, each written with unique institutional knowledge, protocols, and processes.
- These services can then be run by less experienced colleagues.
- IBM plans to provide an initial set of services to help z/OS system programmers of all skill levels get started, demonstrate accepted practices, and simplify information sharing.
  - Such as grow a ZFS.

Capabilities:
- Planned are a powerful graphical interface for creating new services, editing IBM-provided services, and updating existing services
- Step-by-step guidance for completing z/OS management tasks
- History of all services performed on a system is planned

You can learn more and watch for future developments on the release at the z/OS Management Services Catalog content page.
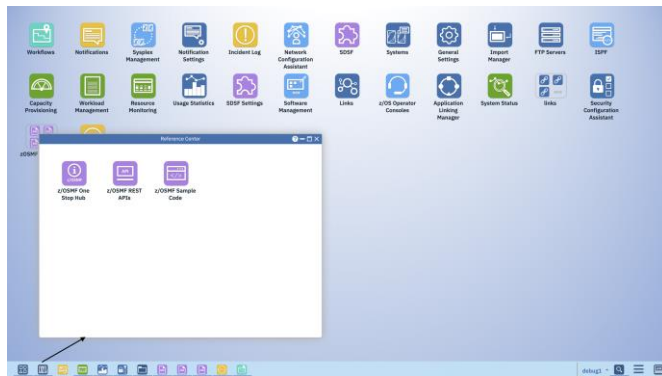
Usability & Skills

z/OSMF Incident Log Task Support for CASE numbers (CD)

- The z/OSMF Incident Log task is enhanced to support the CASE parameter in addition to the existing PMR number when sending diagnostic data to the IBM support site. The CASE parameter is a new format for problem management.

z/OSMF Open API 1.0 or Swagger Support (CD)

- OpenAPI 1.0 support for most z/OSMF REST Services
- Shipped with z/OSMF

Usability & Skills

IBM z/OSMF support for JSON Web Token (CD)
- z/OSMF supports JSON Web Token (JWT) by returning JWT token during authentication and accepting JWT token for authorization of z/OSMF services by the PTF for APAR PH12143.

z/OSMF Remote REST APIs (CD)
- REST data set and file service is enhanced to support accessing data sets and files in remote systems by the PTF for APAR PH15263.

z/OSMF REST JOBS Updates via Apar PH23046 (CD)
- New spool Search options, improved spool codepage support, option to retrieve active jobs, return additional data (submit time, system etc)

Usability & Skills

z/OSMF REST files and datasets Updates via Apar PH22030 (CD)
- Allocate Like another dataset, handling carriage returns automatically

z/OSMF Files and Datasets Compression (CD)
- Support is added to compress content when retrieving large amounts of data. This can speed up the REST files and Datasets API when transferring over long or slow links. This function is also available with PTF for Apar PH22030

z/OSMF Request Queueing (CD)
- z/OSMF REST Data Set and File service is enhanced to queue concurrent requests from the same user when the number of Time Sharing Option (TSO) address spaces are exhausted. This can improve the processing when a large number of requests are sent to z/OSMF. This function is also available on earlier z/OS releases with the PTF for APAR PH29745

z/OSMF CEA Increased TSO Sessions (CD)
- z/OS CEA is updated to increase the maximum TSO sessions allowed per user from 10 to 99. This function is also available on earlier z/OS releases with PTF for Apar OA57346

Usability & Skills

z/OSMF Workflow updates (CD)

- z/OSMF Workflow task will now support parallel-step workflows. One or more automated steps of a parallel-step workflow can run at the same time
- Workflow support for array type variables via PH03053, support creating workflow instances from workflow definitions located in remote systems by the PTF for APAR PH14185.
- z/OSMF Workflows task is enhanced to support saving job output in a specified zFS directory with APAR PH21919. auto-
- Deletion after a workflow is completed with the PTF for APAR PH24190
- Workflow selection now supports typeahead searching with PTF for Apar PH28532
- Workflow steps can be keyword searched with PTF for Apar PH27725
- z/OSMF Workflow Engine has several enhancements with the PTF for APAR PH28532. The workflow administrator can delete multiple workflow instances at a time.
- To perform a workflow on a remote sysplex, a single sign-on among z/OSMF instances is no longer strictly required. In the absence of a single sign-on, the request prompts for a user and password, if necessary.

Usability & Skills

z/OSMF Workflow Editor (CD)

- z/OSMF Workflow Editor is planned to be enhanced to use the VS code editor, already included in z/OSMF, when working with large amounts of text. This is planned to provide a large area to do editing as well as standard editor support such as find/replace string, line numbers, and the file overview. Also available on previous releases with PTF for Apar PH24190
- A test action is planned to be added to the workflow editor to make it easier to try out workflows as you create them
- A raw text option is planned to be added to the workflow Editor
- An expand option is planned to be added to input fields where more area would be helpful
- The editor plans to remember where files were found so that they can be saved back in the same location if needed

Usability & Skills

Assembler exit reduction

- JES2 policy-based exit reduction – intended to provide a non-assembler facility to extend JES2

  - MAS Wide definitions for policy (CD)

  - Also available on z/OS 2.4 with PTF for Apar OA58190

  - New predicates and actions are planned

  - Release neutral and is planned to not require change during release upgrade

  - Dynamically enabled – Changes can be applied and removed while JES2 is running

Additional C Header files for SMF records generated by z/OS

Usability & Skills

Simplification via Removal of Obsolete Function

- Removal of native TLS/SSL from TN3270 Telnet server, FTP server, DCAS – replaced by AT-TLS policy
- Removal of Comm Server HFS support – use zFS
- Removal of Comm Server support for Data Power load balancing – no longer offered
- Removal of LFS support for HFS – use zFS
- Removal of ISPF support for HFS and the ISPF Workstation Agent
- Remove MAXSHAREPAGES as a limit – no longer consumes common storage

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Scalability & Performance

- Goal is release to release equivalence
  - Ensure smooth release to release migration
  - Performance focus on selected areas

- Exploit hardware features
  - Synergistic improvements with new hardware including:
    - Hardware instructions and memory topology
    - Accelerators
    - I/O technology exploitation
  - Expand the software that can exploit features

- Constraint relief
  - Identify and remediate constraints before client impact
  - Long term - continue AMODE 64 and RMODE 64 roadmap items

- System scalability and performance metrics
  - Metrics for resource consumption
  - Capacity planning tools

Overview, Goals & Directions

Scalability & Performance

zHPF VTOC I/O performance (CD)

- Prior to the new enhancement, CVAF uses a FICON channel program to read/write VTOC (volume table of contents) records which may cause high channel utilization when the entire VTOC is read with sequential access.

- Enhancements in DFSMS extend the use of zHPF to VTOC I/O done by CVAF and Fast VTOC/VVDS (FVV) services.
  - Available on z/OS 2.3 and later with APAR OA58111.
  - Enablement and disablement of the new function is managed by the DEVSUPxx PARMLIB member or by using the MODIFY DEVMAN command.

- Intended to provide improved performance when sequentially reading the VTOC.

Scalability & Performance

zHyperLink write statistics (CD)

- Enhancements in DFSMS provide a command to allow users to display zHyperLink write statistics for a data set and optionally clear them.

- Additionally, new SMF fields are created in the SMF type 42 subtype 6 record to show information related to zHyperLink write failures.

- Support is available on z/OS V2R2 and above with APARs OA57717, OA57718, and OA58230.

Scalability & Performance

WLM Batch Initiator Enhancements

- Historically Workload Manager has managed initiators based on the available capacity of general-purpose processors. New support is planned to start and stop batch initiators also taking into account available zIIP capacity.
- Separation of heavy zIIP using batch jobs by service class will allow WLM to start initiators for zIIP using jobs on systems in a sysplex that have available zIIP capacity

Scalability & Performance

Inbound Workload Queueing (IWQ) support for IBM z/OS Container Extensions (CD)
- z/OS Communication Server's OSA-Express Inbound Workload Queueing support is enhanced to add a new input queue for zCX network traffic.
- The OSA-Express IWQ separation of the zCX traffic from native z/OS traffic provides optimized Communications Server processing for zCX network traffic.
  - When IWQ is enabled, the z/OS TCP/IP inbound processing for the zCX traffic becomes zIIP eligible.
  - OSA-Express will direct zCX traffic for protocols TCP and UDP to the zCX input queue. The z/OS IWQ zCX solution will be made available on OSA-Express6S and beyond.
- IWQ zCX is also available on z/OS V2.4 with PTFs for APARs PH16581 and OA58300.

Scalability & Performance

Faster Mount of zFS Filesystems

- Improved IPL time is planned to be provided when mounting zFS filesystems
    - In the event that the file system was copied while it was mounted the process of mounting the copy has to go through a quiesce period. That period has been reduced or eliminated.
- Requires apars to be applied on both the copying and restoring systems in the Sysplex
- Available on z/OS 2.3 and later with PTF for Apar OA59145
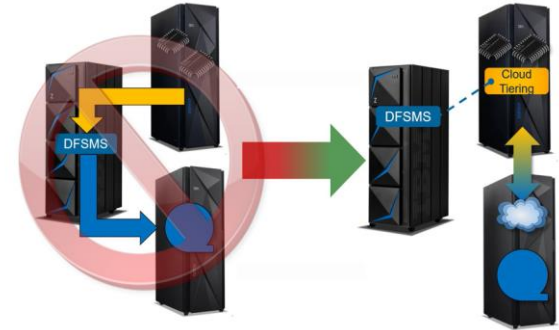
Scalability & Performance

More Concurrently "Open" Datasets

- More VSAM linear data sets (LDS) are planned to be able to be concurrently "opened" in address spaces such as DB2
    - Each data set is represented by several internal z/OS data areas which reside in below the bar storage.
    - This support moves both VSAM and allocation data areas above the bar to reduce the storage usage in the below the bar storage area
- The support is optional
- DB2 Apar PH09189 is required to enable this support
- IBM also recommends DB2 Apar PH33238 get the most value out of this support

Scalability & Performance

Enhanced Transparent Cloud Tiering (CD)

- The new TS7700 DS8000 Object Store capability enables DFSMShsm DS8000 transparent cloud tiering migration requests to target a TS7700 through existing GRID interfaces.

- Within the TS7700, the DS8000 object data is logically partitioned out of the existing resident cache and managed separately from traditional FICON logical volume data that coexists within the same physical TS7700 cluster.

- DFSMShsm manages the TS7700 DS8000 object store data identically to classic cloud object storage data.
  - 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 (ie 16K Block sizes, recycle).

- Enables automated, policy-driven DFSMShsm migration and recall processing to move data through the entire traditional storage hierarchy with none of the data passing through your Z server.

Scalability & Performance

IBM Resource Measurement Facility (RMF) (CD)

- Display information about System Recovery Boost also available for z/OS 2.3 and above with the PTFs for APARs OA59852 and OA59321
- CF monopolization avoidance is supported and is also available with the PTF for APAR OA58726
- Reports about storage class memory (SCM) busy percentage on a z15. RMF adds input/output processor (IOP) utilization SCM busy percentage for all IOPs in the I/O Queuing Activity (IOQ) report this enhancement is also available with the PTF for APAR OA58727

RMF Enhancements (CD)

- RMF reports on z/OS performance and includes the following enhancements:
  - The capability to analyze the performance of recently delivered hardware using callable services, such as Integrated Cryptographic Service Facility (ICSF) format-preserving encryption, Feistel-based encryption, and Quantum Safe digital signatures, is now available with the RMF Postprocessor Crypto hardware report. This is included with the PTF for APAR OA60202 and OA59330.
  - Two remote health check are now available to:
    - Verify the HTTPS (AT-TLS) configuration of the RMF Distributed Data Server (DDS) with the PTF for APAR OA60403.
    - Warn users when SESSION_PORT(8801) and DM_PORT(8802) are still being used with the PTF for APAR OA60404. RMF client code no longer uses both ports and IBM recommends removing the options SESSION_PORT, MAXSESSIONS_INET, TIMEOUT, DM_PORT, and DM_ACCEPTHOST from the GPMSRV## PARMLIB member.

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Availability

- Provide industry-leading availability
  - For mission-critical application workload through synergy between resilient hardware, operating system, middleware, and storage technologies
- Exploit Parallel Sysplex and the coupling technology to mitigate impacts from planned or unplanned outages
  - Extend Data Sharing exploitation and efficiency
  - Provide workload balancing and routing optimizations and efficiencies
  - Enhance sysplex recovery mechanisms for improved performance and recovery time (e.g. CF structure duplexing)
  - Provide near-continuous access to data stored in Filesystems (e.g. zFS, NFS)
- Detect and Mitigate system resource problems
  - Monitor resource consumption and system/sysplex operations in real-time
  - Provide operational insight into anomalies and trends that require attention
  - To mitigate problems quickly, proactively, and autonomically
- Support dynamic modification of shared resources without incurring disruptions in which the resources are temporarily unavailable ("always on")
- Support state-of-the-art disk replication technologies
  - Data availability (Hyperswap) – locally and at distance
  - Disaster recovery for 2-site, 3-site, and 4-site DR configurations
- Provide support for protecting data against malicious or accidental logical data corruption or deletion, through the use of multiple point-in-time protected copies of the data that can be used to restore or recover the data to its pre-corruption state, either granularly or in aggregate
- Extend Geographically Dispersed Parallel Sysplex (GDPS) environments
  - Multi-site "stretched" Parallel Sysplex across metro distances and improved isolation/availability of the GDPS k-system
  - Continuous Availability (Active/Active Sites) solution through improved software replication technologies, and innovative solutions to improve the achievement of RPO and RTO objectives to near zero

Overview, Goals & Directions

Availability

Automatic Restart Manager (ARM) support for restarting a system task (CD)

- Enhancement to IXCARM REGISTER support, to enable system tasks (for example, ICSF) to register with ARM and be restarted. This is provided on z/OS 2.3 and later with PTF for APAR OA59120

Availability

Coupling Facility (CF) Monopolization Avoidance (CD)

- New function introduced by coupling facility control code level (CFLEVEL) 24 on z15 servers to prevent a runaway sysplex application from monopolizing a disproportionate share of CF resources. Also available on z/OS 2.3 and higher with PTF for Apar OA56774

Availability

z/OS Anomaly mitigation client pain points

- WLM-based triggering based on changes in velocity metrics (and other anomalies)
- Specific RTD enhancements
  - Allow address spaces time to warm up before SERVERHEALTH event – avoid anomalies detected during component startup
  - Remove HIGHCPU event (CPU usage data) in favor of other instrumentation such as RTM Loop Detection
  - Add parameterization to allow RTD to analyze subsets of symptoms – messages only, for example – and to have RTD process address spaces without re-analyzing the system for all other events
- Invoke and consume the output of Predictive Failure Analysis (PFA) and Runtime Diagnostics (RTD), along with other diagnostic inputs, to create…
- Report-style output from analysis in these components, containing diagnostic summary *and recommended actions* – with sorting/grouping by component
  - Graphical-style output for visualization of trend lines, growth over time, etc.
  - JSON description of report contents, consumable by z/OSMF, automation, or ISV/other products
- Improve client triage of anomaly observations and predictions with IBM System Automation mechanism to capture report details, including recommended actions, in problem report

Availability

z/OS Catalog Enhancements

- Catalog address space is planned to be re-startable and to support dynamically changing the Master Catalog. (Previously this required a re-IPL)
- Catalog Modify command plans to support comments following the command parameters
- Catalog entries can be validated for the rename in progress indicators using IDCAMS DIAGNOSE function

Access Method Services - IDCAMS

- DELETE MASK has two new options TEST and EXCLUDE
  - TEST will return all the objects that would have been deleted if TEST wasn't specified
  - EXCLUDE will allow a subset of objects that match the MASK to be excluded from those being deleted
- DEFINE MODEL is enhanced to also model the KEYLABEL parameter to support encryption attributes
- REPRO is enhanced to move its I/O buffers above the line to reduce the instances of out of space (878) abends

Availability

Logical corruption protection and recovery

- Cyber threats to enterprise data are increasing from a range of different sources including
  - External Malware Infection, External Hacking, and Insider Threats
- Depending on the platform, some risks may be more likely than others
  - For core systems running on Z or Power, many organizations believe the threat from a privileged insider is the greatest risk
- Similarly, inadvertent loss or corruption of data is still also possible from other causes such as Application error or Operational error
- IBM GDPS solutions designed to address these concerns are referred to as Logical Corruption Protection and are being designed to provide
  - Capabilities to regularly create secure, Point-in-Time copies of data to use for Logical Corruption Protection scenarios – at the core of this is the DS8000 Safeguarded Copy
  - Increased security capabilities to prevent privileged users from compromising production data and systems as well as protected copies of this data
  - Functionality to enable various use cases for the Logical Corruption Protection copies (ie data validation, forensic analysis, surgical & catastrophic recovery, and offline backup)
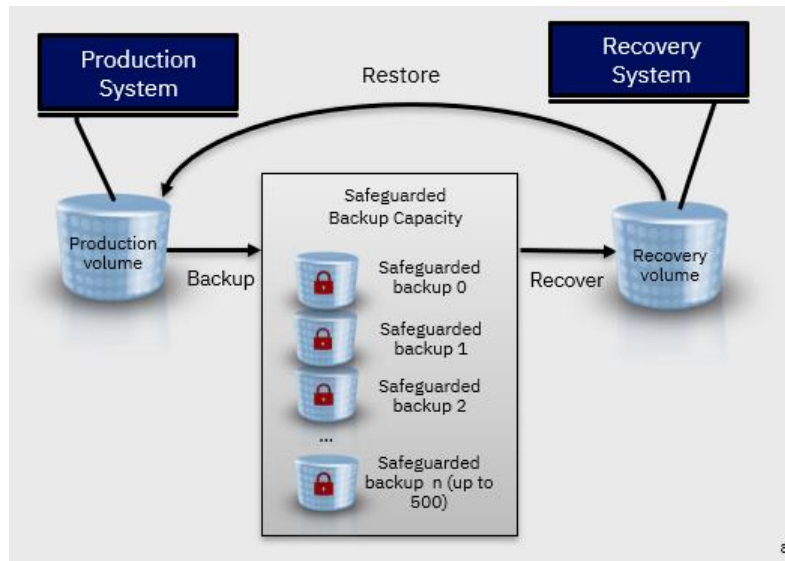
Availability

Logical corruption protection and recovery (CD)

DS8880 Safeguarded Copy:

- Safeguarded Copy provides up to 500 backup copies to restore data in case of logical corruption or destruction of primary data
  - The Safeguarded Capacity does not consume any of the regular DS8K volume addresses
  - Management and data consistency is provided by CSM or GDPS and copies can be maintained at production and/or recovery sites
  - Data can be restored to an additional recovery copy and can be used or copied to the source device depending on scenario
- A new TSO query, SGCQUERY, allows users to query the state of Safeguarded Copy relationships for a volume and the available recovery points (consistency groups)
  - Enables a storage administrator to access Safeguarded Copy information from TSO when other interfaces are not usable or not available and thereby continue to leverage persistent SGC recovery copies, potentially improving data availability.
  - Available on z/OS V2R2 and above with APAR OA58172.

IBM DS8880 Safeguarded Copy prevents sensitive point in time copies of data from being modified or deleted due to user errors, malicious destruction or ransomware attacks

Availability

System Recovery Boost – Sysplex Recovery enhancements (CD)

- Initial support for System Recovery Boost provided recovery acceleration via additional processor capacity and parallelism, but only during image-level events like image Shutdowns and re-IPLs
  - IPL and Shutdown boosts
    - Speed boost and/or zIIP boost
    - GDPS orchestration enhancements
    - Up to 60 minutes of boost at IPL and up to 30 minutes of boost at shutdown
    - Optional, priced SRB Upgrade temporary capacity for zIIP Boost
- New support extends this to provide recovery boosts for smaller-scope, occasional sysplex recovery activities, that introduce small-scale disruptions when they occur
  - Boosts automatically initiated when these events occur
  - And on the relevant set of systems in the sysplex where the recovery is taking place
  - Short-term boost periods, limited in total amount (30 minutes per LPAR per day)
- Sysplex recovery activities that are boosted include:
  - Sysplex Partitioning – planned or unplanned removal of a system from the sysplex
  - CF Structure Recovery – recovery from CF or CF structure problems that require structure-level rebuild or duplexing recovery
  - CF Datasharing Member Recovery – recovery from disconnect or failure of a CF locking datasharing member with locking resources held
  - HyperSwap – planned or unplanned HyperSwaps from primary to secondary disk sets
- No increase in IBM software licensing costs!

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Systems Management

- Provides system programmer efficiency, confidence, and consistency
  - Consistent z/OS installation platform for IBM & Vendors
    - Packaging, delivery, installation, deployment, configuration, and validation
  - Simplified installation of SMP/E service
  - Improved security integration
    - Detection, validation and correction
  - Focus on common tasks
    - Deliver standard service catalog
    - Capturing site unique activities
    - Can be integrated with change management
    - Optionally self service provisioning (Cloud)
  - Enhanced z/OS release upgrade process
    - More discovery and more automated actions

- Basic facilities to 'get the job done'
  - Entitled with the operating system

- Enhanced facilities available
  - Features or products (IBM or Vendor)

Overview, Goals & Directions

Systems Management

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.
- The initial support to backup and restore individual z/OS UNIX files residing in zFS (z/OS File System) data sets is integrated into existing DFSMShsm backup / recover and DFSMSdss dump / restore capability, allowing for centralized data management across the z/OS platform and shipped on z/OS .
  - The support shipped on z/OS V2.3 and is intended to subsume the capabilities provided by the existing IBM Tivoli Storage Manager (TSM) z/OS UNIX System Services Backup-Archive Client.
  - DFSMS will **not** provide support for z/OS UNIX files found in Hierarchical File System (HFS) data sets.

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.
- This is available on z/OS 2.3 and later with APAR OA57868.

Systems Management

DFSMShsm file mode hosts (CD)

- A new FILEMODE for DFSMShsm enables an additional HSMplex to exclusively process UNIX files.
  - Any DFSMShsm requests for UNIX files are automatically directed to the DFSMShsm hosts configured with FILEMODE.
  - This support enables clients with very large existing DFSMShsm environments to add DFSMShsm UNIX data set backup processing without impacting their classic volume and data set environment.
- This support is available on z/OS V2R3 and later with APAR OA58870.

DFSMShsm recover UNIX files to a new directory (CD)

- DFSMShsm adds the capability to recover UNIX files to a directory other than the original directory from the time of the backup.
- This support is available on z/OS V2R3 and later with APAR OA58612.

Systems Management

New support in NFS to help customers migrate from DFS/SMB (CD)

- A new migration health check to help customers identify their usage of DFS/SMB (Distributed File System / Server Message Block)
- To aid in NFS Server configuration, a z/OSMF (documentation only) work flow with step-by-step instructions - especially useful for the first time user.
- New z/OS NFS Client utilities, namely MVSLOGIN and MVSLOGOUT (that allow a non-z/OS client to manage SAF authentication to a z/OS host) and SHOWATTR (that displays the z/OS NFS server attributes) are delivered for the Windows 10 NFS Client.
- Kerberos support has been provided for NFS V3 - the level of protocol supported by Windows 10 to control access to NFS network shares
  - Also allows for integration with Active Directory for UID/GID specification
  - Can enable end-to-end encryption between z/OS and Windows environments
- Multiple NFS servers in a single LPAR (OA57577)
- New Windows Prefix support improving windows client integration. This is available for z/OS 2.3 and higher with PTF for Apar OA57493
- **Note:** z/OS V2.3 was the last release to support the DFS/SMB file-sharing protocol

Systems Management

JES2 enhancements

- Spool compression and encryption via Apar OA57466 (CD)
- Replace exits with policies
  - JES2 will provide support for conditions and actions
  - Built-in policies that allow actions based on conditions
  - Condition: job name is ABC, action: set job class to Q
- MAS wide Policy support updated and is also available on V2.4 with the PTF for OA58190 (CD)
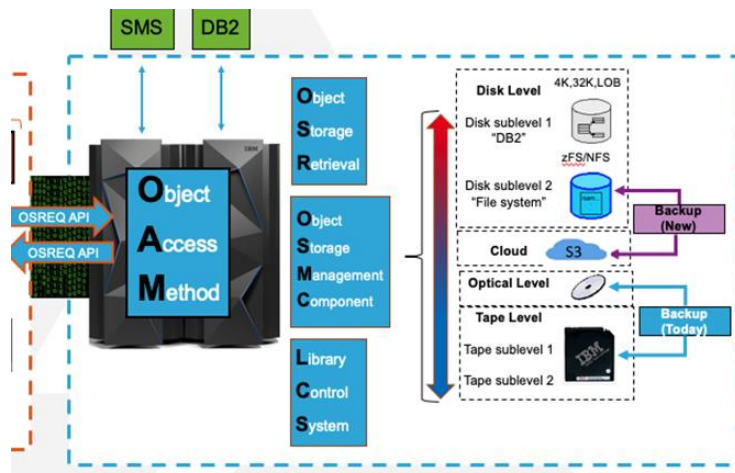
Systems Management

z/OS Cloud Provisioning and Management

- Entitled part of z/OS that delivers a self service Cloud aligned Provisioning tool for Software including IBM Middleware
- Support for Red Hat OpenShift (CD)
    - Via the IBM z/OS Cloud Broker (Announcement)
- Provision a single item or a composite within a system or Sysplex, or even across Sysplexes also available with PTF for Apar PH16513 (CD)
- Define a time limit for a provisioned instance also available with PTF for Apar PH29813
- z/OS Cloud provisioning security and security simplification
    - Support for policy using Users and/or Groups also available with PTF for Apar PH16513 (CD)
    - Simplified security using a domain shared resource pool Apar PH29813 (CD)
- Metering and capping for memory and Disk in addition to CPU also available with PTF for Apar PH16513 (CD)
    - Providers can monitor memory consumed by any instance or tenant
    - Providers can isolate Disk and apply Disk limits (caps) for a tenant
    - Providers can enforce memory maximums (caps) for a tenant
- The Workflow Editor task enhancements (CD)
    - The Workflow Editor includes a "toolbox" of IBM-supplied steps
    - The files for a workflow, also support sequential or partitioned data
    - The editor retains long pathnames, has a large editor area, and also edits property files
- For additional details about these enhancements, see the What's new in IBM Cloud Provisioning & Management for z/OS blog.

Systems Management

OAM Cloud Tier Support

- DFSMS OAM has included a new cloud tier to its existing storage hierarchy. OAM objects can be managed and stored as objects to public, private, or hybrid cloud infrastructures supporting the S3 API.

  - Through SMS policies, OAM objects can be stored directly to the cloud or can transition to the cloud, based on access requirements. Also provided is the capability to recall an object stored in the cloud to the disk level of the storage hierarchy.

  - This support is available for z/OS V2.3 and later with APAR OA55700 and satisfies a previously announced statement of direction.

- New with z/OS V2.5 is the ability for OAM-managed backup copies to be additionally supported in the cloud, a zFS, or NFS.

  - OAM is planned to continue to support up to two backup copies of an OAM object.

Systems Management

Tape Allocation Enhancements (CD)

- The existing keyword, SMSHONOR, currently available with the **UNIT** parameter on the DD statement is enabled through the SMS tape storage group construct.

- The new support is intended to broaden the original SMSHONOR support and make it easier, through SMS policies, to reserve a set of devices for critical applications by limiting the devices used by their less critical applications.

- This support is available for z/OS V2.3, and later with APAR OA59161.

Systems Management

zWIC – Workload Interaction Correlator (CD)

- 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
- IBM priced product IBM z/OS Workload Interaction Navigator can be used to visualize the data
- This support is also available with PTFS for Apars OA57165 and OA60372

Systems Management

SDSF – System Display and Search Facility

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

Systems Management

RMF refactoring

- Resource Monitoring Facility is refactored into two components
  - RMF reporter with all the existing capability
  - Advanced Data Gatherer – ADG
- Provides a clean separation between the collection of data and the reporting of the data
- All RMF customers are automatically entitled to ADG and will require no action to continue on z/OS 2.5
- ADG is planned to be a new priced feature on z/OS that surfaces performance data in raw form

Systems Management

DFSMSrmm plug-in for z/OSMF (CD)

- In addition to the ISPF dialogs and TSO user interfaces available today for DFSMSrmm (RMM), support for a modern graphical user interface via a z/OSMF plug-in is now available on V2R4 with APAR OA59499.

- The RMM plug-in for z/OSMF has been improved to view data sets defined to RMM and the related data set information and export this data to a CSV format file.

- This support is available for z/OS V2.4 with APAR OA59727

Coming soon:
IBM Knowledge Center Transformation

Modernization:

Makes it easy for subject matter experts to participate in the delivery of high-value content

Improvements in content creation lets us we can deliver new content and updates faster

Updated look and feel

Personalized Content:

As a client I want content relevant to my environment

As a client I want content to be more easily discoverable

As a client, I want to see all relevant content and communities for the product I am using

Better integration:

As a client, I want the ability to be able to find all related content (such as downloads, training and support) within the page that I am currently on.

As a client, I want KC search results to include all content, regardless of who wrote it and where it lives.

Information Currency

Make it easy for authors to make timely updates so clients always have the most current, most accurate information they need to do their job quickly and confidently.

IBM Knowledge Center Transformation
Before and After

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Networking

- Exploit platform features and enable efficient network access
  - Support latest OSA and RoCE hardware adapters, HiperSockets, and provide for efficient network communications, including external network and intra-CPC communications
- Provide support for network security standards and enable network security monitoring and compliance
  - Support pervasive encryption by protecting data-in-flight with evolving security standards such as TLSv1.3
  - Assist in determining security compliance posture through the use of z/OS Encryption Readiness Technology (zERT) and the zERT Network Analyzer (zNA)
- Simplify network configuration through the IBM Network Configuration Assistant (NCA)
  - Simplify networking configuration, including the configuration of TCP/IP stacks as well as policy-based networking functions
- Application development and workload enablement
  - Enable efficient network access to Linux applications deployed in z/OS Container Extensions (zCX)
- Enhance availability and resilience
  - Enhance application availability in parallel sysplex environments through improved sysplex autonomics

Overview, Goals & Directions

Networking

System SSL and AT-TLS support for TLS V1.3

- Basic support for the latest TLS version standard (RFC8446)
- RACF and PKI support for new signature types
- Improves the security of TLS-protected traffic

- AT-TLS is enhanced to allow new System SSL TLS 1.3 features to be exploited via policy enhancements (transparently to software depending on AT-TLS configuration)

- Exploitation is component specific, check component documentation for support

Networking

z/OS Encryption Readiness Technology (zERT)

- zERT aggregation recording interval
  - The recording interval for zERT can be customized up to one call in 24 hours. This reduces the records produced and improves the performance of the zERT Analyzer. This support is also available for z/OS 2.3 and up with PTF's for Apars PH25049 and PH24543. (CD)
- zERT Network Analyzer, a z/OSMF plug-in, that provides an easy to use web UI for analyzing zERT data reported in SMF 119 subtype 12 records
  - Significantly improves Time-To-Value of gaining insights into zERT data and driving a Pervasive Encryption strategy for all z/OS network communications
  - Enhances flexibility in the zERT Network Analyzer Db2 for z/OS database schema definitions and reduces the access privileges required by the zERT Network Analyzer's database user ID through the use of Db2 partitioned tables. Available for z/OS V2.3 and z/OS V2.4 with Apar PH24492 and Apar PH24494, respectively.(CD)

- SOD: IBM Plans to Enhance zERT to not only report but to optionally enforce cryptographic policy on TCP connections.

Networking

Enhancements for CSSMTP

- Enhancements are intended to facilitate migration from SMTPD to CSSMTP
  - These are also available on V2.3 and later with PTFs for apar PH18237 (CD)

Networking

TCP/IP Sysplex Autonomics Enhancements (CD)

- Sysplex autonomics support enhanced to monitor health of IPsec infrastructure relative to sysplex traffic
- For use with critical applications that depend on Sysplex Wide Security Associations (SWSA)
- Delay joining the sysplex until IPsec infrastructure ready to go
- Ongoing monitoring once the system joins the sysplex
- Honors existing SYSPLEXMONITOR parameters like RECOVERY, AUTOREJOIN
- Support provided in z/OS 2.4 by PTF's for Apars PH12788 and PH16303

Networking

Shared Memory Communications Version 2 (SMCv2) multiple IP subnet support
- Currently, SMC for SMC-R and SMC-D is limited to communications for hosts attached to a common IP subnet. SMCv2 defines SMC over multiple IP subnets. The SMCv2 multiple IP subnet support extends SMC capability to additional application workloads that were previously ineligible for SMC. z/OS V2.5 delivers SMCv2 multiple IP subnet capability for SMC-D (SMC-Dv2) This support is also available for z/OS 2.4 with the PTFs for APARs PH22695 and OA59152. SMC-Dv2 is enabled with new IBM Z capability provided by the IBM Z Internal Shared Memory (ISM) function. The new ISMv2 capability is available on the z15. (CD)
- SOD
  - IBM plans to provide support for SMC-RV2 in a future z/OS release.

Networking

Notification of Availability of TCP/IP extended services

- Currently, TCP/IP issues a message when the stack completes initialization. This is planned to be enhanced with a new message and ENF event when optional extended TCP/IP services have completed initialization. These optional services include Sysplex DVIPA, IP security, and Network Policy initialization.

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Security

- Pervasive Encryption
  - Additional support for more data (in flight and at rest)
  - Simplified ability to achieve security compliance

- System hardening
  - Detection of elevating privilege
  - Multi-Factor Authentication advancements
  - Provide password alternatives for APIs
  - Identification of common configuration concerns

- Standards
  - Continue strong encryption support for the platform
    - Evolve ahead of industry standards

Overview, Goals & Directions

Security

Pervasive encryption
- z/OS V2.5 plans to continue to drive pervasive encryption efforts within an enterprise:
  - z/OS policy-based encryption options that can help clients protect their critical business data have been enhanced to support additional z/OS data set types, including:
    - Basic and large format SMS data sets provided on z/OS 2.3 and later with PTF's for APAR OA56622 (CD)
    - JES2 spool encryption (CD)
    - Support for the EXCP API for encryption of data sets accessed vis EXCP (CD)
  - These enhancements allow users the ability to encrypt data, in most cases, without application changes and simplify the task of compliance.

Security

RACF Enhanced PassTicket Support
- z/OS V2.5 plans to add additional RACF PassTicket support. This includes:
  - Stronger cryptographic algorithm
  - Configurable expiration time
  - Optionally Expanded character set
  - Improved diagnostics
  - Recording to SMF
  - Co-existence and Migration
- Available on z/OS 2.3 and up with PTF's for Apar OA59196 and OA59197 (CD)

Security

RACF Support for Restricted Profile Management

- z/OS V2.5 Includes a new installation option to limit a user who has ALTER access to a discrete profile from changing the profile
- This is intended to separate profile management from the access rights that a profile represents which should improve compliance.

Security

RACF New Health Checks

- New Health checks are provided to:
  - Verify all datasets are protected by RACF by verifying that SETROPTS PROTECTALL(FAILURES) option
  - Ensure all residual information is erased when data sets are deleted by verifying that SETROPTS ERASE(ALL) is enabled
  - Verify that all Passticket keys are encrypted and stored in ICSF
  - Verify that the RACF Address space is active
  - Verify that either RACF Sysplex communication or datasharing mode is active

Security

Certificate Fingerprint Support

- New support to display the certificate fingerprint using RACF RACDCERT command
- Add certificate fingerprints to SMF records
- Add search and display options for certificate fingerprints in PKI Services

- This is intended to improve security policy management and implementation when using certificates

Security

IPsec Certificate Reporting
- ipsec –k display command, NMI and SMF 119 subtype 73 and 74 records are updated to include IPsec X.509 certificate information
  - This includes certificate serial number, certificate expiration, subject and issuer distinguished names

Security

System SSL, AT-TLS, and IPsec diagnostic Improvements

- New System SSL support to provide applications with peer certificate failure diagnostics
- AT-TLS support to log peer certificate failure diagnostic data to syslogd when handshakes fail
- IPSEC support to log peer certificate failure diagnostic data to syslogd for IKE failed negotiations
- The intent is to improve failure diagnosis by ensuring the certificate information is available in many common error scenarios

Security

FIPS Compliance

- IBM Plans to support FIPS compliance support for interoperability by completing the FIPS enablement to the UNIX file-based Kerberos database.

Security

Network Security

- New capability is added to z/OS for capturing, verifying and enforcing network security compliance – See Networking Section for details

Security

Data Privacy for diagnostics (CD)

- Support redacting sensitive user data in dumps
- Mark sensitive memory areas and remove from a dump before sending to IBM or a vendor
- New options on z/OS API's to tag known sensitive memory areas
- New optional post-processing step will remove previously tagged sensitive pages, and new z/OS Diagnostics Analyzer will detect and redact additional sensitive data in untagged pages
- All intended to be done without impacting the dump capture time.
- Required and available maintenance for Data Privacy for Diagnostics:
    - Fix Category IBM.Function.DataPrivacyForDiagnostics

Security

IBM SMF Quantum Safe Signatures (CD)

- z/OS extends the digital signature support for SMF records written to log streams to optionally include a second digital signature. When enabled, the second signature uses a quantum safe algorithm to provide an alternative to current algorithms that have been deemed at risk in a quantum computing environment
- SMF signature verification function is extended to include this second signature to help you determine if SMF records have been altered or removed. This function is intended to protect SMF data into the future.
- The support is provided on z/OS 2.4 through PTF for APAR OA57371 and requires Cryptographic Support for z/OS V2.2 - V2.4 (HCR77D1) and IBM z15.

Improved auditability (CD)

- Support is added to the password syscall to include the caller's Port of Entry IP address when calling the System Authorization Facility (SAF)
- The security product can include this IP address in SMF Type 80 records.
  - Improving logging and auditing
- This support is available on z/OS V2.3, and later, with the PTF for APAR OA59444.

Security

Transparent Cloud Tiering Full Volume Dump Support (CD)

- Full volume copies of data can be backed up to the cloud with DFSMSdss where they can later be used to repair or recover a production environment that has been corrupted by system failures, human error, or compromised by either a cyberattack or internal attack.

- DFSMSdss leverages transparent cloud tiering to target either cloud object storage or a TS7700 configured as an object store.
  - To minimize the time a volume is locked, an initial full volume FlashCopy can be performed which can then be dumped to the object store.
  - Because the I/O for the FlashCopy is also completed within the DS8000, this could provide a point-in-time full volume dump to TS7700, with **none** of the data passing through the z/OS host.

- Utility commands, list and delete, added to assist in managing full volume dumps.

- Available on z/OS V2R3 and z/OS V2R4 with APAR OA57526.
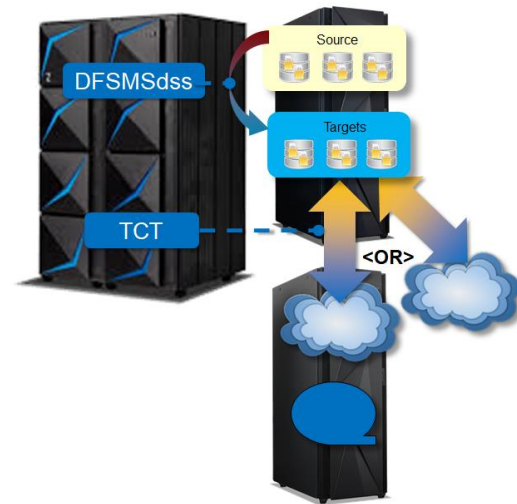
Security

z/OS Authorized Code Scanner (feature)

- The IBM z/OS Authorized Code Scanner is an optional priced feature of z/OS that provides automated system integrity testing in a dev/test environment as part of DevSecOps modernization. It scans for Program Calls (PCs) and Supervisor Calls (SVCs) available to all address spaces on a z/OS image and generates a series of tests that dynamically scan them for integrity.
- The output of this scan provides in-depth diagnostics whenever a potential vulnerability is found to facilitate remediation in order to further strengthen the security posture of the client's configuration of z/OS.
- It is also available on z/OS 2.4 with PTF's for Apar OA59702 and OA60166

- **New Feature Announce** (Announce)

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Application Development

- Expand scope of existing application functions driven mainly by customer usage scenarios
  - Provide new APIs or services
  - Unique support for building and deployment of executables
  - Enhance debugging capability
  - Support for specific standards where required

- Provide timely internationalization support
  - Support Unicode character sets
  - Other support driven by world events

- Upgrade open source and other imbedded IBM technology to current levels and take advantage of z/OS QoS
  - OpenSSH, Xvfb
  - WAS Liberty

- Exploitation of IBM Z-specific technology (including HW) to further advantage application deployment on our platform

Overview, Goals & Directions

Application Development

z/OS Container Extensions – Run Linux workloads on z/OS!
- 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 VM or KVM will run in zCX
- The open mainframe project Ambitus provides an ecosystem for zCX

z/OS Container Extensions Performance Enhancements (CD)
- Improved performance and reduced locking
  - zIIP eligibility improved - 95%+ ziip offload in lab measurements*
  - Also available on z/OS 2.4 via PTF for Apar OA58296
- Support for SIMD – single instruction multiple data
  - Also available on z/OS 2.4 with PTF for APAR OA59111
- Support for 1MB and 2GB Large pages, containers per server raised up to 1000, and maximum guest memory raised to 1 TB
  - Also available on z/OS 2.4 with the PTF for APAR OA59865
- The number of data and swap disks per appliance is increased to as many as 245.
  - This enables zCX to address more data at one time
  - Also available on z/OS 2.4 with the PTF for APAR OA60452

Application Development

z/OS Container Extensions trial (CD)
- 90 day trial without HW feature code 104

  (90-day trial is free subject to normal hardware and software consumption when adding a workload to z/OS)
- Customer self service
- Also available on z/OS 2.4 with PTF for Apar OA58969

z/OS Container Extensions IBM License Metric Tool (ILMT) (CD)
- For use with sub-capacity pricing of IBM Linux on z software
- Manual counting no longer required

z/OS Container Extensions IPv6 Support (CD)
- Support is added to zCX in support of IPv6
- Also available on z/OS 2.4 with the PTF for APAR OA59508

Application Development

z/OS Container Extensions resiliency (CD)

- Support to monitor and log zCX resource usage of the root disk, guest memory, swap disk, and data disks in the servers job log.
- A new operator command option to display the version and service information about any zCX server and all the relevant components used to provision and run it.
- The zCX instance root disk can be enlarged when using the software upgrade workflow of the zCX appliance.
- zCX resource shortage z/OS alerts. These proactive alerts are sent to the z/OS system log (SYSLOG) or operations log (OPERLOG) to improve monitoring and automated operations. This function is available with PTF for APAR OA60303.
- These changes are also available for z/OS 2.4 PTFs for APARs OA59835 fand OA60303

Proxy server for IBM z/OS Container Extensions (CD)

- zCX is enhanced to support proxy configuration, allowing the Docker daemon to use the proxy server in your enterprise to access external public and private Docker registries.
- The optional proxy configuration for z/OS Container Extensions can be configured using the provisioning and reconfiguration z/OSMF workflows.
- The proxy capabilities are also available for z/OS 2.4 with the PTF for APAR OA58267

IBM Z Container Image Registry
Early Access Program

A registry for open source container images*
- Building blocks for creating workloads
- IBM Z versions of popular images
- Foundational distros, languages, databases, web serving, CI/CD infrastructure

Hosted at the IBM Container Registry
- Images are built from scratch by IBM
- IBM controls the contents of the channel
- Images are scanned by IBM Vulnerability Manager
  - Reports available to review
- Image digest hashes published to enable secure pull
- Deploys in IBM z/OS zCX and Linux on Z/LinuxONE

Accommodate common Z security requirements by working with a source you can trust to deliver container images built using best practices

* This program has important terms and conditions for use of the images of this registry. Please see the program agreement for a full details of these terms.

(and many more)

Contact Joe Bostian (jbostian@us.ibm.com) for an invitation

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Application Development

Web enablement toolkit (CD)
- "Patch" & "Options" added to Web Enablement Toolkit
- Server Name Indication (SNI) when System SSL usage is specified, and support for TLS 1.3
- Enhanced tracing to help with debugging using environment variables.
- Support provided on z/OS 2.3 and later by PTF for APAR OA58707

- Support for TLS 1.3 when using system SSL. Also available on z/OS 2.4 with PTF for Apar OA58708

Application Development

DFSORT enhancements

- Sort accelerator – see hardware

OAM support for Db2 stored procedures (CD)

- DFSMSdfp OAM is providing a new sample, CBROSRSP, available in SYS1.SAMPLIB, that can invoke the OAM OSREQ API in a Db2 stored procedure environment.
- Managing multiple Db2 connections within a single stored procedure, to access different databases without having to create multiple programs.
- Support is available on z/OS V2R2 and above with APAR OA57837.

Application Development

Cryptographic hash utilities (CD)

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

Application Development

ISPF Enhancements

- Updates to ISPF in support of PDSE V2 member generations, providing improved messages for edit, browse, and view of members.
- Enhancement to SUBMIT command to add an optional parameter SUBSYS which allows submission of jobs to an alternate JES other than the Primary subsystem. This is useful for directing jobs to the JES2 emergency subsystem if required.

Latest Compiler Offerings on z/OS

Enterprise COBOL v6.3

Automatic Binary Optimizer v2.1

Enterprise PL/I v5.3

z/OS v2.4 XL C/C++
(entitled also to IBM Open XL C/C++ V2.4.1)

IBM SDK for z/OS, Java Technology Edition

IBM SDK for Node.js – z/OS v14

IBM Open Enterprise SDK for Python on z/OS v3.9

IBM Open Enterprise SDK for Go 1.16 (GA March 12)

Application Development

z/OS V2.5 and Java

- The Java 8 level of Java will be supported at z/OS 2.5 GA.
- Anticipate z/OS 2.5 may support newer Java levels when they are available

Application Development

New IBM Open XL C/C++ compiler adds support to help IBM z/OS UNIX users port applications from distributed platforms (CD)

- The IBM Open XL C/C++ V2.4.1 web deliverable for z/OS V2.4 delivers C11, C++11, and C++14 language standards support, and hardware exploitation capabilities, including exploitation of the latest IBM z15. It is the integration of IBM advanced XL optimization technologies with the LLVM open source Clang infrastructure that gives the IBM Open XL C/C++ V2.4.1 web deliverable more current language standards support, ease in migrating apps from distributed platforms, and z/Architecture exploitation capabilities.
    - The IBM Open XL C/C++ V2.4.1 compiler supports EBCDIC and ASCII execution character sets, and generates AMODE 64 code, making it ideal for z/OS UNIX users porting applications from distributed platforms.
    - The IBM Open XL C/C++ V2.4.1 web download is a no-charge add-on feature for clients that have enabled the IBM z/OS XL C/C++ compiler (an optionally priced feature) on z/OS V2.4.
        - It coexists with, and does not replace, the base IBM z/OS XL C/C++ V2.4 compiler. Both the IBM z/OS XL C/C++ V2.4 and IBM Open XL C/C++ V2.4.1 compilers are both designed to be used independently and are also serviced and supported independently.
    - The IBM Open XL C/C++ V2.4.1 web deliverable will be available on December 13, 2019, from the z/OS Downloads website.

z/OS V2.5 – Hybrid Cloud

z/OS has the capabilities that any operating system would require to be a server in a hybrid cloud model.

- A Robust networking component with the ability to manage networks efficiently and securely
- A highly secure environment which supports multi-factor authentication, granular security access checks and tamper proof auditing
- Industry leading cryptographic technology including even quantum safe algorithms
- Access to Cloud Object stores
- Ability to rapidly and repeatedly provision software
- Ability to run Linux workloads on z/OS
- A highly available environment which allows you to build high availability sites where an application has access to multiple system instances, running on multiple physical machines, sharing a consistent set of application data, with replicated physical data that can be recovered at long physical distances.

Requirements

z/OS requirements

- z/OS accepts requirements through Request for Enhancements (RFE)
  - Any customer can open a requirement on any part of the operating system at this URL
    https://www.ibm.com/developerworks/rfe/

- You can also search and vote on RFE's at that location
  - You need an IBM ID
  - Go to the search tab
  - Brand: Servers and System Software, z Software, z/OS

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

धन्यवाद
Hindi

多 謝
Traditional Chinese

ขอบคุณ
Thai

Спасибо
Russian

Danke
German

Bedankt
Nederlands

Thank You
English

Obrigado
Brazilian Portuguese

شكراً
Arabic

Gracias!
Spanish

多谢
Simplified Chinese

Dziękuję
Polish

நன்றி
Tamil

ありがとうございました
Japanese

Merci
French

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Continuous delivery

- z/OS embraces continuous delivery through new function APARs

- Get weekly emails when APARs close with MyNotification: 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

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IBM's Statements of Direction

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

Note: *The statements of direction in this presentation have been edited for brevity.*

IBM's Statements of Direction

March 2021 - As previously announced, for clients that use JES3, z/OS V2.5 is the last release for which IBM plans to include the JES3 feature. Clients should be making plans to migrate to JES2 or an alternative.

March 2021 - In the future, IBM intends to extend zERT to support policy-based rules that describe different levels of cryptographic protection along with optional actions to take when TCP connections match those rules. Since z/OS V2.3, zERT has provided a detailed view of the cryptographic protection attributes used on connections that terminate on the z/OS TCP/IP stack. The zERT policy-based enforcement feature would enable immediate notification through messages, auditing through SMF records, and even automatic connection termination when questionable or unacceptable cryptographic protection is used. IBM plans to enable z/OS network security administrators to create and manage zERT enforcement rules and actions through the z/OSMF Network Configuration Assistant and the z/OS Communications Server policy agent.

March 2021 - For decades, IBM has offered two asynchronous replication strategies, IBM z/OS Global Mirror, also known as extended remote copy, or XRC, and DS8000 Global Mirror. IBM plans to support and maintain z/OS Global Mirror on z/OS with its current function only, and z/OS V2.5 will be the last release to provide such support. This withdrawal aligns with what was previously announced in Hardware Announcement 920-001, dated January 07, 2020 which indicated the DS8900F family would be the last platform to support z/OS Global Mirror. New functions to support asynchronous replication technology are intended to be developed only for DS8000 Global Mirror, and it is intended that no new z/OS Global Mirror functions will be provided with DS8900F and z/OS.

IBM's Statements of Direction

March 2021 - IBM intends to enhance pervasive encryption through RACF support for the use of an encrypted VSAM data set as its data base in specific configurations.

March 2021 - With the rapidly growing need to derive AI insights from data in critical business workloads, IBM is planning to optimize z/OS by introducing highly performing AI functionality targeted for clients' critical business workloads. These enhancements are planned to be delivered iteratively and are intended to enable IBM Z as a highly competitive AI inferencing platform. Areas of focus would include:

– Native z/OS solutions providing AI capabilities that would be tightly integrated with z/OS workloads
– Utilizing z/OS Container Extensions that broadly expand the AI libraries and tools ecosystem, including, but not limited to, technologies such as TensorFlow and ONNX
– Optimizations that would be focused on ensuring AI libraries and runtimes can utilize the latest IBM Z hardware capabilities
– Guidance and content that would be focused on accelerating the path to adoption of AI technology

These capabilities are planned to further strengthen z/OS position as the premier platform for enterprise computing.

IBM's Statements of Direction

<u>March 2021</u> - On April 30, 2021, IBM is planning to remove support for Transport Layer Security (TLS) 1.0 and TLS 1.1 from the IBM software download servers. The affected servers are used for downloading files for the following z/OS software offerings:
- PTFs and HOLDDATA ordered using the SMP/E RECEIVE ORDER command
- PTFs ordered using Shopz
- PTFs ordered using ServiceLink
- Products in ServerPac and CBPDO offerings ordered using Shopz
- Products in CustomPac offerings

If clients currently download files for any of the listed offerings directly to their z/OS system using the HTTPS protocol, they will not be affected. However, if the FTPS protocol is used to download any of the listed offerings directly to their z/OS system, they might be affected and should take action now to ensure that the capability to download software products and fixes is not impacted.

More specifically, on April 30, 2021, the IBM software download servers will require download operations to connect to the server using TLS 1.2 or higher. Connection attempts using TLS 1.0 or TLS 1.1 will no longer be accepted. The SMP/E HTTPS client used for download operations will automatically use TLS 1.2 when connecting to the server. However, the z/OS Communications Server FTP client program will use TLS 1.2 only if configured to implement TLS using AT-TLS. Therefore, if clients currently use FTP as the download protocol, they must do one of the following to ensure that they can continue to download from the IBM software download servers:
- Use HTTPS instead as the download protocol. IBM recommends clients consider using HTTPS instead of FTPS, as this method often alleviates network, proxy, and firewall issues in an enterprise typical of using FTPS, and it is currently in use by many clients.
- Verify that the FTP client program is configured to implement TLS using AT-TLS (the TLSMECHANISM statement in FTP.DATA indicates ATTLS).

To learn more about using the HTTPS download protocol and how to indicate which download protocol SMP/E will use, see the [Preparing for secure Internet delivery](#) web page.

For information on configuring an IBM z/OS Communications Server FTP client, see the [TLSMECHANISM (FTP client and server) statement](#) webpage.

IBM's Statements of Direction

March 2021 - To ensure that clients can install Shopz-orderable software in the future, it is recommended that clients take steps to prepare their driving system for z/OSMF-based installations. For an overview of ServerPac with z/OSMF Software Management and the steps to follow, see the [ServerPac Installation using z/OSMF content solution](#) website. Here, clients can find a sample portable software instance that can be used to verify that their z/OS driving system is operational for installing a CICS, IMS, Db2, or z/OS ServerPac.

Care is advised when clients plan to install z/OS V2.5, because the delivery choices are expected to change in Shopz in January 2022. At the general availability of z/OS V2.5, except for z/OS V2.4, and prior to January 2022, IBM intends to make all IBM z/OS software on Shopz orderable as a ServerPac, and installable as a portable software instance or by using the CustomPac dialog. It is not intended that z/OS V2.4 ServerPac will be offered as a portable software instance. Prior to January 2022, all other software (CICS, IMS, Db2, z/OS V2.5, and licensed programs) are planned to be offered as ServerPac orders deliverable through z/OSMF or the CustomPac dialog.

In January 2022, the CustomPac dialog delivery option is planned to be removed for all software, including CICS, IMS, Db2, z/OS V2.5, and all licensed programs. Thereafter, it is planned that all software that is orderable as a ServerPac must be installed with z/OSMF Software Management.

Although it is planned that z/OSMF will become a driving system requirement, it would be a requirement only for the system in a client's enterprise from which software installation activities are performed. However, clients might find that using z/OSMF throughout their enterprise offers tremendous benefits. If clients cannot meet the z/OSMF driving system requirements for ServerPac, the Customized Offerings Driver (5751-COD) is available on Shopz. It provides a z/OS system with z/OSMF, which will be activated at z/OS V2.5 availability.

IBM's Statements of Direction

September 2020 - Today, SMC for both SMC-R and SMC-D is limited to communications for hosts attached to a common IP subnet. SMCv2 defines SMC over multiple IP subnets. The SMCv2 multiple IP subnet support extends SMC capability to additional application workloads that were previously ineligible for SMC. z/OS V2.4 delivers SMCv2 multiple IP subnet capability for SMC-D (SMC-Dv2). See details in the [Description](#) section. IBM plans to make SMCv2 multiple IP subnet capability available for SMC-R exploiting "routable RoCE" (RoCEv2) in a future z/OS deliverable. IBM is working with Linux distribution partners to provide SMCv2 support for Linux on IBM Z and IBM LinuxONE.

June 2020 – The release after z/OS V2.4 is intended to be the last release to support the ability to share RACF databases between z/VM and z/OS systems. While databases may remain compatible, sharing between operating systems is discouraged due to the distinct security and administration requirements of different platforms. A future z/OS release will be updated to detect whether a database is flagged as a z/VM database and reject its use if so marked. Sharing of databases between z/OS systems is not affected by this statement.

June 2020 – z/OS DFSMSdss and DFSMShsm plan to provide full volume dump support for transparent cloud tiering. This capability will enable 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 while performing this offload, an initial full volume FlashCopy can be performed which can then be dumped to the object store. Because all of the I/O for the FlashCopy is also completed within the DS8000, this will provide a point-in-time full volume dump to TS7700, with none of the data passing through the z/OS host. DFSMShsm also plans to integrate this capability into the FRBACKUP / FRRECOV functions, utilized by Db2 BACKUP / RESTORE SYSTEM.

IBM's Statements of Direction

June 2020 – IBM intends to provide clients with capabilities that will help accelerate their transformation to greater portability and agility in a hybrid cloud environment by delivering containers and Kubernetes orchestration support for existing and new IBM z/OS applications and workloads.

This move towards greater portability and agility will be supported by taking advantage of architecture-independent standards and technology for container-based development and deployment on z/OS. As this container-based technology is deployed on core systems of record, it will ensure the isolation of environments and other users from the effects of other containers.

By providing a container runtime for z/OS, and the orchestration of those containers, users can:

- Increase speed from development to deployment of z/OS-based applications

- Increase predictability and repeatability across the application lifecycle for z/OS applications

- Enhance practices across z/OS development, testing, and operations through a wide ecosystem of open-source application container-based tools

These proposed capabilities for z/OS will reinforce and further strengthen the IBM focus on hybrid cloud to unlock business value and drive growth for clients. This can be achieved by providing technology that incorporates the client's core mission-critical applications and workloads across their z/OS middleware into a container-based cloud-native strategy.

May 2019 – IBM intends to leverage Kubernetes clustering in the future for the orchestration and management of z/OS Container Extensions with compatible cloud platforms.

IBM's Statements of Direction

Superseded – In Software Announcement 217-246, dated July 17, 2017, IBM announced that JES2 is the strategic Job Entry Subsystem (JES) for the z/OS Operating System and that JES3 would continue to be supported and maintained. To date, IBM has made significant investment in JES2 by delivering unique functions such as email support in JCL, spool migration and merge, and dynamic checkpoint expansion and tuning to make management easier. In z/OS V2.4, IBM plans to deliver in JES2 Spool Encryption and a new user exit alternative based on defining policies that allow exit programs to be implemented in a parameterized rule-based approach. To help JES3 to JES2 migration efforts, JES2 has added functionality, including dependent job control, deadline scheduling, 8-character job classes, and interpreting JES3 JECL control statements. For z/OS V2.4, additional function to aid in migrations is planned, including Disk Reader capability and enhanced JES3 JECL support in JES2 (ROUTE XEQ). Today, as a result of our strategic investment and ongoing commitment to JES2, as well as continuing to enhance JES3 to JES2 migration aids, IBM is announcing that the release following z/OS V2.4 is planned to be the last release of z/OS that will include JES3 as a feature.

If you are one of the clients who remains on JES3, IBM encourages you to start planning your migration. For questions, contact jes3q@us.ibm.com.

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