Preview: IBM z/OS Version 2 Release 4

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At a glance

Enterprises are turning to digital transformation to address new business challenges, reach new markets, and deliver new value to clients. Addressing new business opportunities demands effective digital transformation through the orchestration of technologies ranging from cloud, analytics, cognitive computing, mobile, and the Internet of Things to enable new internal and external client experiences.

IBM$^{(R)}$'s approach is to unleash the rich application development talent that clients possess, by enabling new application development processes and optimizing their existing application investment in new and innovative ways, while providing the application-level resiliency and security that clients have come to expect from IBM Z$^{(R)}$.

Business success will be predicated on embracing agility, optimization, and resiliency:

- Agility in the adoption of new technologies in DevOps, microservices, and consumption models that are delivered as a service to accelerate their time to value
- Optimization through the ability to run computing workloads in the most efficient environment
- Resiliency to deliver continuity of business services through exploitation of functions such as encryption and high availability

These factors provide the ability to deliver results on demand and without interruption, which is critical to creating and maintaining a highly satisfying client experience.

IBM z/OS$^{(R)}$ V2.4 operating system intends to unleash innovation through an agile, optimized, and resilient platform that helps clients to build applications and services based on a highly scalable and secure infrastructure that delivers the performance and availability for on-premises or provisioned as-a-service workloads that enable businesses to digitally transform.

Overview

z/OS is designed to support clients with workload efficiency, scalability, improved analytics capabilities, and resiliency to deliver capabilities to enhance availability and performance as well as improved security and data protection.

In order to support the capabilities that provide agility, optimization, and resiliency, z/OS V2.4 intends to deliver the following:

- z/OS V2.4 is planning to introduce an exciting new capability, IBM z/OS Container Extensions, to help users execute Linux$^{(R)}$ on IBM Z Docker container in

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z/OS, alongside existing z/OS applications and data. This is intended to extend the strategic software stack on z/OS.

- z/OS Container Extensions are planned to enable application developers to develop and data centers to operate popular open source packages, Linux applications, IBM software, and third-party software together with z/OS applications and data-leveraging industry standard skills. Clients will be able to optimize developing and running their applications in their most efficient environment with faster time to value as business demands grow.

- IBM intends to deliver capability that will let businesses integrate z/OS more easily into their private and multicloud environments with improvements that are planned to deliver a more robust and highly available IBM Cloud™ Provisioning and Management for z/OS and cloud storage access for z/OS data.

- z/OS V2.4 is planned to continue to simplify and modernize the z/OS environment for a better user experience and improved productivity by reducing the level of IBM Z specific skills that are required to maintain z/OS, eliminating and automating various activities with z/OSMF.

- IBM intends to deliver a z/OS platform exploiting the consistent packaging and deployment format agreed upon with other leading z/OS platform software vendors. This planned delivery represents IBM's direction supporting an industry improvement in both the packaging and installation using a common capability. By improving and simplifying both the packaging and deployment of z/OS software, faster time to value may be realized by clients.

- IBM Open Data Analytics for z/OS is planned to provide enhancements to simplify data analysis by combining open source runtimes and libraries with analysis of z/OS data at its source, to reduce data movement and increase the value of insights gained from leveraging current data.

- These improvements are intended to further enhance the data analytics ecosystem in IBM Z and leverage industry standard skills and tools to quickly develop insights for improved time to value.

- z/OS V2.4 is planning to further enhance security and data protection on the system, with the intention to provide the new security features of OpenSSH 7.6p1, continuing to drive pervasive encryption by giving users the ability to encrypt data without application changes and simplify the task of compliance. In addition, z/OS V2.4 intends to enhance and provide new capability for better management of access and privileges in RACF(R).

- New support intends to increase the availability of applications that are using zFS file systems shared in a sysplex environment.

Key requirements

IBM z/OS V2.4 is planned to run on these IBM Z platforms:

- IBM z14™ Models M01-M05
- IBM z14 Model ZR1
- IBM z13(R)
- IBM z13s(R)
- IBM zEnterprise(R) EC12 (zEC12)
- IBM zEnterprise BC12 (zBC12)

If you will be running IBM z/OS V2.4 on IBM z/VM(R), the z/VM release must be z/VM 6.4, or later.

For a complete description of z/OS V2.4 hardware prerequisites, see *z/OS V2R4 Planning for Installation* (GA32-0890), when available, in IBM Knowledge Center.

Planned availability date

September 2019

Previews provide insight into IBM plans and direction. Availability, prices, ordering information, and terms and conditions will be provided when the product is announced.

Description

Preview of capabilities planned for IBM z/OS V2.4

Improving and simplifying application development

IBM z/OS Container Extensions

z/OS V2.4 is planning to introduce an exciting new capability to help clients deploy nearly any Linux on IBM Z Docker container in z/OS, alongside their existing z/OS applications and data, in an existing z/OS image. By leveraging the planned open source componentry, clients will gain access to a wide variety of existing Linux on IBM Z applications with a standard packaging approach that is consistent with the latest technology available.

z/OS Container Extensions are intended to be maintained by clients' existing z/OS operations staff reusing their existing z/OS environment with its high availability and security, and it is planned that an application developer with relatively little z/OS skill will be able to use standard Docker commands to manage their packages.

In addition to open source packages, IBM plans to have IBM software and third-party software available.

It is intended that clients can participate with their own Linux applications that can easily be packaged in Docker format and deployed in the same way as IBM, vendor, and open source packages.

z/OS Container Extensions are planned to enable application developers to develop and the data center to operate popular open source packages with z/OS applications and data. This helps to eliminate many of the impediments z/OS clients have today such that change management windows can be more easily synchronized and disaster recovery more easily orchestrated.

IBM has designed Container Extensions to run with IBM z14 servers.

Simplify and modernize the user experience to enhance productivity

z/OS V2.4 is planned to continue to simplify the z/OS environment by:

- Reducing the assembler skills that are required to maintain z/OS
- Eliminating and automating activities
- Adding new applications to ease the management of z/OS

Planned updates include:

z/OSMF and other simplification enhancements

The z/OS Management Facility (z/OSMF) intends to continue to drive browser-based user interface capability. Sysplex management, workflow improvements, and software management are all aimed at reducing complexity.

z/OSMF plans to deliver on sysplex management stage 2 with the enhanced sysplex management application. It plans to allow an authorized system programmer to not only get a detailed view of their system, but it also provides the capability to change the configuration (new for stage 2), such as eliminating a single point of failure by enabling duplexing or adding an alternate couple data set. Commands are planned to be aggregated for sysplex operations in one command log so that two or more colleagues can see what the other has done. It's intended that the application

will provide both graphical and table-based views of the data for both viewing and modification.

The workflow engine is planned to be improved with support for array variables, parallel step execution, and improved job management. Many of the added features intend to support product installation and upgrade, including the ability to generate a PDF of a workflow.

Finally, cloud provisioning and management plans to deliver a set of improved capabilities to handle provisioning of software in a sysplex, including a cluster of servers and their networking needs. Along with the enhancements to the workflow engine, Workflow Editor is also planned to be enhanced to support new workflow features. In addition to provisioning z/OS software using the z/OSMF user interface, plans are for IBM Cloud Private to be used to provision z/OS software with the click of a button.

Assembler exits remediation

JES2 is planned to be enhanced with a new infrastructure designed to allow customization of JES2 with less of a requirement to code assembler exits. The new planned approach will allow the specification of policies that take actions at various points in processing based on conditions being met. These policies are intended to be release-independent, which is planned to simplify upgrade to new releases. This release plans to introduce the infrastructure for policies with support for basic conditions and actions.

System Display and Search Facility (SDSF) enhancements

SDSF has been updated over the last several releases to nearly double the number of primary commands. In z/OS V2.4, a number of enhancements are planned that include support for JES2 Spool Encryption and JES2 Spool Throttling as well as efficiency improvements for data collection.

IBM Open Data Analytics for z/OS

IBM Open Data Analytics for z/OS, announced in Software Announcement 217-233, dated July 17, 2017, is planned to integrate key open source analytics technologies with advanced data access and abstraction services. The intent is for this solution to simplify data analysis. It is planned to combine open source runtimes and libraries with analysis of z/OS data at its source, to reduce data movement, and increase the value of insights gained from leveraging current data.

Since the original release, Open Data Analytics for z/OS has made several improvements. The latest Spark-related updates are planned to include workflows for Spark configurations and Spark 2.2.0.8 and later on z/OS to feature the option to schedule applications so that multiple applications can run concurrently without significant system tuning of memory and CPU configurations.

Other highlights planned to be included are usability enhancements, new open source packages, security enhancements, and performance improvements. New Mainframe Data Services functionality is planned to include new Virtual Table support, Real Time SMF data streaming, and performance enhancements with IBM Db2(R) Direct. Many new security enhancements for security are planned to be added, such as DRDA authentication support for encrypted passwords and create a global default user ID, password phrase authentication when connecting to the Data Services server using the JDBC driver, and user ID encoding supported between the driver and the Data Services server.

The Anaconda stack on z/OS is planned to be improved to add support for Apache Maven for better build automation and planned to be included along with support for XGBoost. XGBoost is highly preferred in the industry for its implementation of gradient boosted decision trees designed for speed and performance. These enhancements are intended to help strengthen the value of open source standards on z/OS, strengthen the security of Open Data Analytics for z/OS, and help leverage open source technologies on z/OS.

For the latest updates, see the IBM Open Data Analytics for z/OS topic in IBM Knowledge Center.

Enhanced security and data protection

Security standards

z/OS V2.4 is planned to include OpenSSH 7.6p1. With Open SSH 7.6p1, significant new features include:

- Support for new key exchange (KEX) algorithms, including:
  - diffie-hellman-group14-sha256
  - diffie-hellman-group16-sha512
  - diffie-hellman-group18-sha512
  - curve25519-sha256
- Support for new ssh-ed25519 and ssh-ed25519-cert-v01 key algorithms.
- Support for the new chacha20-ploy1305 cipher.
- Enhancements to the SMF Type 119 subtype 94 and 95 (ssh / sshd connection started) records will now include a section that identifies the IP addresses and ports for the connection.
- Elliptic-curve DSA (ECDSA) keys are now supported in key rings and in FIPS mode.
- Key ring keys will now use System SSL for signature creation and verification.
- A new ssh-proxyc command is added, which can be used by the ssh client to connect through SOCKS5 proxy servers.

Pervasive encryption

z/OS V2.4 plans to continue to drive pervasive encryption efforts within an enterprise with support for additional z/OS data set types, including PDSE, and to provide JES2 encryption of JES managed data sets on SPOOL. These planned enhancements are intended to give users the ability to encrypt data without application changes and simplify the task of compliance.

RACF enhancements

With z/OS V2.4, RACF intends to provide new capabilities to facilitate the use of encryption with ICSF as the key store for PassTicket keys in order to provide enhanced PassTicket keys security and protection against cyber attacks.

With z/OS V2.4, RACF is planned to be enhanced to enable clients to extend the "RACF schema" to store security-relevant information within the RACF database, where existing reporting tools and programming interfaces can be used to manage and retrieve the data.

RACF is also planned to be enhanced to be able to detect changes to a user's security environment, including change in privileges.

Enhancing availability, scalability, and performance

Dynamic activation of I/O configurations for stand-alone Coupling Facilities

Coupling Facilities (CFs) provide locking, caching, and list services between coupling-capable z/OS processors. They are a significant component of highly available Parallel Sysplex(R) configurations. Stand-alone CFs, which are, by definition, Coupling Facility images that reside on a server without a co-resident z/OS image, are now able to participate in dynamic I/O configuration changes that affect the stand-alone CF and no longer require the server to be restarted in order to activate such changes. In the past, a restart would have caused disruption for the Parallel Sysplex that is using the stand-alone CF, as the CF image contents had to be relocated to other CF images.

With this announcement, stand-alone CF servers can seamlessly make hardware-only dynamic I/O configuration changes on behalf of the CF partitions that reside there without requiring a disruptive reset. This capability both improves client workload availability and minimizes the risks associated with relocation of CF structures. This enhancement requires z14 GA2 firmware support for the stand-alone CF server, and it requires that an IML or POR action be performed on the stand-alone CF server after the z14 GA2 firmware is present in order to enable subsequent use of this support. This enhancement also requires z14 GA2 enhanced firmware support on the connected server where the driving HCD system resides, though there is no requirement for an enabling IML or POR action on any server other than the stand-alone CF server.

Note that stand-alone CFs generally do not have any external connectivity other than the coupling links used for Parallel Sysplex CF request traffic. This enhancement does not place any additional connectivity requirements on the stand-alone CF server.

Application transparency for unplanned outages affecting zFS file systems shared in a sysplex environment

New support is planned to allow applications running in a sysplex environment and sharing read-write mounted zFS file systems to no longer be affected by an unplanned outage. Today during an unplanned outage, applications that are accessing the zFS file systems will encounter I/O errors which many customers address by simply restarting the application. With this new support, it is intended that unplanned outages will be transparent to the application on other members of the sysplex and will no longer result in zFS file system I/O errors. This new support is planned to be available as a mount option and can be specified on individual mount statements to affected individual zFS file systems, can be specified globally to enable this support for all read-write mounted zFS file systems, or can be specified dynamically to change already mounted zFS file systems. Because this is sysplex-related support when sharing zFS file systems, this new option will be ignored for applications that use zFS file systems in a single system environment.

Migration facility for zFS file systems

The file system migration facility BPXWMIGF is planned to be enhanced to allow for the migration of data from one zFS file system to another zFS file system, without requiring the source file system to be unmounted. This new function is useful when migrating a zFS file system from one disk storage volume to another disk storage volume. Files that are in use by the application during the migration process are automatically and transparently moved to the target file system without affecting the application. Prior to this, BPXWMIGF supported application transparent migration of data from HFS file systems to zFS file systems only.

Integrating z/OS into your private and multicloud

IBM Cloud Provisioning and Management for z/OS

- It is planned that system programmers will be able to view memory consumed by software service instances that are provisioned by a specific tenant and set a cap for memory consumption. Using the z/OSMF Cloud Provisioning Resource Management task, when memory metering or capping for a tenant is enabled, workload manager (WLM) policy is intended to be updated with Tenant Resource Group, which provides memory cap setting for the tenant to WLM.
- Clustered composite templates are planned to enable you to leverage sysplex capability to provision a continuously available middleware environment. With a single provisioning action, it is planned that you can provision network-clustered instances of a specific middleware in a sysplex. When network resources such as DVIPA are provisioned for clustered composite template, it is also planned to dynamically update Sysplex Distributor configuration with new network resources. Similarly, a single deprovision action is planned to release all of the member instances that are associated with the clustered composite template instance. A new capability is planned to be introduced in Composite Template to support creating Cluster Composite template. It is intended that a system

programmer can create a clustered composite template from a single published template or from multiple published templates. The member templates of Cluster Composite template must all be of the same software type; that is, they provision a cluster of the same middleware. z/OS V2.4 is planned to deliver a clustered composite template that can be created in a cloud domain that has more than one z/OS system. Provisioning a clustered composite template is planned to result in each instance of the member templates being provisioned on a separate system in the cloud domain. Clustered composite templates have their own resource pools. z/OS resources for all of the member instances are planned to be obtained from the same resource pool when the clustered composite template is provisioned. The clustered composite template capability can be used by IBM Db2 and MQ middleware to support provisioning of Db2 sharing group or MQ queue sharing group in a parallel sysplex with predefined coupling facility resources.

- The Workflow Editor task is planned to be enhanced, as follows:

  – The Workflow Editor is planned to include a "toolbox" of IBM-supplied steps, which are designed for performing common tasks on z/OS, such as creating a data set or submitting a REST request. When you create a workflow definition, check the step toolbox to see whether any of the steps would be applicable to your needs. If so, it is intended that you can save time by importing an IBM-supplied step from the shared step library and modifying it, rather than creating your own step.

  – An array is planned to be a new type of variable that you can define for your workflow. Consider using an array variable when you need to map a list of values.

  – The workflow definition XML file, fragment files, and the variable input file are planned to allow an option to reside in sequential or partitioned data sets. Previously, they were required to be z/OS UNIX$^{(R)}$ files.

Cloud storage access for z/OS- transparent tiering

Data is at the heart of every business, and how that data gets stored and managed is critical. Cloud storage makes it possible to store practically limitless amounts of data, simply and cost effectively, and to access it from anywhere in the world using internet protocols. Data and its associated metadata are stored as discrete objects with a unique ID in a flat address space designed to be both scalable and flexible.

- Many z/OS clients are looking to adopt cloud storage in order to reduce the complexity of their data storage environments and to minimize total cost of ownership. Transparent cloud tiering for IBM DS8000$^{(R)}$ System Storage$^{(R)}$ is a feature developed in conjunction with z/OS and DFSMShsm that provides automated, policy-based, server-less movement of archive data directly to a cloud object storage solution using OpenStack Swift or S3-compatible interfaces. Instead of traditional tape volumes used before to migrate data, offloading the data movement from the host to the DS8000 enables DFSMShsm to bypass many tape-centric architectural limitations. It also removes the need for activities such as recycle, 16K block sizes, and serial access. DFSMShsm automatic migration supports transparent cloud tiering through SMS management class policy and continues to automatically recall a data set to primary storage when it is referenced without any parameter changes. Transparent cloud tiering requires no additional appliances as the existing Ethernet ports on the DS8000 servers are used. Migrate and recall of data to volumes in both simplex and copy services relationships, including two-site Metro Mirror, FlashCopy$^{(R)}$, and Global Mirror, are supported. And encryption is supported to provide security of data in flight. The solution is transparent to applications and end users and provides simplified data archiving operations on IBM Z.

- For details on additional z/OS exploitation of cloud storage with OAM's object support, see the OAM Cloud Storage statement of general direction in Software Announcement 218-472, dated November 13, 2018.

Effective systems management providing businesses proactive IT guidance and support

z/OS platform software installation improvements

As announced in Software Announcement 216-392, dated October 4, 2016, and Software Announcement 217-085, dated February 21, 2017, and follow-on announcements listed at the beginning of this section, IBM and other leading industry software vendors have been collaborating on a variety of installation-related improvements. IBM intends to help drive z/OS platform-wide improvements in installation and deployment, along with capabilities that are intended to enable IBM and other software vendors to use them. In turn, these improvements are intended to enable both experienced and less-experienced z/OS system programmers to manage the z/OS platform in a consistent and easier manner. IBM has delivered capabilities to enable software to be packaged and delivered in a new format designed to be installed with a new installer that is part of z/OS MF Software Management and to acquire packages from servers supported by software vendors. Many of the capabilities designed to meet these requirements are available in the z/OS Management Facility Software Management component starting in z/OS V2.2 with PTFs.

With the PTF for z/OS MF Software Management APAR PH02650 on z/OS V2.2 and z/OS V2.3, new capabilities are intended to enable you to launch workflows specified by IBM and other software vendors to help you perform configuration and customization steps during installation. Linking such workflows to deployment operations is designed to help make installation easier by providing a guided set of steps you can consistently perform for new deployments. Corresponding capabilities are available to enable software vendors to specify the workflows to be run. IBM plans to extend this support to deployment operations that do not use the primary z/OSMF host as the source or target of the deployment.

In addition, Software Management is planned to exploit new capability provided by the z/OSMF Workflow facility. A workflow is a software artifact that guides a user through a defined set of steps intended to make a task simpler to perform. This new Software Management function is designed to support lists of variables with assigned values. For instance, a software vendor may have a long list of data sets to be processed with subsequent scripts or programs in a workflow. Instead of using individual workflow variables for each of the entities, a variable array type could be used to make flexible and powerful configuration and customization workflows much easier for software vendors to develop.

IBM WebSphere$^{(R)}$ Application Server enhancements

IBM intends to have z/OS continue to deliver a WebSphere Application Server Liberty profile with z/OS for use by internal components such as z/OS MF, Knowledge Center for z/OS, and PKI Services. This component is planned to continue to contain one year's worth of rolling maintenance. New capabilities such as JSON Web Token support are planned to be delivered in this package, and depending on the exploiting components, the package will expose these new capabilities.

ISPF Upper Case English function

An ISPF Upper Case English function is planned to be added to z/OS V2.3 as a separately orderable feature for Japanese clients who have not yet ordered z/OS V2.3 and would like this function included. For Japanese clients who have already ordered z/OS V2.3, a web deliverable will be available so that it can be added to their existing system easily. See Software Announcement 219-126, dated February 26, 2019, for details.

Print enhancements: IBM Infoprint, Font Collection, Transforms

Plans are to enable dynamic configuration as the default behavior for IBM Infoprint Server. This change in default behavior will be mandatory and not reversible. This will fulfill the statement of direction previously issued for this change.

Some advantages of enabling dynamic configuration include:

- Authorized administrators can use the Infoprint Server ISPF panels or the Printer Inventory Definition Utility (PIDU) to view and change the dynamic attributes rather than editing the /etc./Printsrv/aopd.conf file.
- If you change an attribute in the system configuration definition, with a few exceptions, you do not need to stop and restart Infoprint Server for the change to take effect.
- You can configure Infoprint Server to start and stop individual daemons.
- You can benefit from new functions in Infoprint Server that require dynamic configuration. For example, you can use the MVS™ system logger function.

JES3 to JES2 conversion aids

With the 2017 announcement which stated in the future that JES2 will be the strategic job entry subsystem, there has been a renewed interest in clients converting from JES3 to JES2. Based on clients' concerns with converting, JES2 has been enhanced to include some key JES3 functions. These are in the area of JCL/JECL processing (support for //*ROUTE XEQ JECL), Network Job Entry (support for multiple jobs in an NJE job stream), and other functions such at the JES3 disk reader. These functions both aid in the conversion from JES3 to JES2, but also enhance the capabilities of JES2 for systems programmers.

Continuous delivery capabilities delivered for z/OS V2.3

The preceding capabilities planned for delivery with z/OS V2.4 are the culmination of continuous capability delivery since z/OS V2.3 GA and new functions that are unique to the z/OS V2.4 delivery. To learn what has been delivered through continuous delivery since the delivery of z/OS V2.3, see:

- Software Announcement 219-122, dated March 5, 2019(1Q 2019 z/OS V2.3 enhancements)
- Software Announcement 218-472, dated November 13, 2018(4Q 2018 z/OS V2.3 enhancements)
- Software Announcement 218-320, dated August 7, 2018(3Q 2018 z/OS V2.3 enhancements)
- Software Announcement 218-236, dated May 15, 2018(2Q 2018 z/OS V2.3 enhancements)
- Software Announcement 218-118, dated March 6, 2018(1Q 2018 z/OS V2.3 enhancements)
- Software Announcement 217-536, dated November 21, 2017(4Q 2017 z/OS V2.3 enhancements)
- Software Announcement 217-246, dated July 17, 2017(z/OS V2.3 GA)

Highlights of new capabilities delivered through continuous delivery since IBM z/OS V2.3 General Availability

Resiliency/security

Multiple enhancements have been made for security and protection of the z/OS system. The system common memory is protected from use by unauthorized users, along with instrumentation to detect and identify the location of user key common storage usage. Also, the use of MCS logon passphrases is available through the security policy profile specification, which enables an installation to provide a more consistent, secure system environment and aids in meeting their corporate/industry security requirements.

z/OS Communications Server enables an optimal processing environment with the OSA-Express6S with separation of the IPSec protected traffic from non-IPSec protected traffic. In addition, the Network Configuration Assistant is enhanced to support TCP/IP profile Alternate Configurations for flexibility and availability. NFS server is enhanced to support z/OS encrypted data.

OpenSSH performance is improved when using CPACF instructions for symmetric cipher and MAC algorithms without requiring ICSF.

Improved logging throughput is possible with the IBM HyperWrite data replication support.

RMF™ now reports IBM zHyperLink related performance measurements.

z/OSMF provides stronger focus on availability and flexibility with more functions being sysplex enabled, where the user can run and manage tasks on/from remote systems, such as workflows, ISPF, REST TSO, default settings, and single sign on across systems in a sysplex. This is valuable in enabling a resilient and highly available cloud provisioning environment.

DFSORT exploitation of System zHigh Performance FICON(R) (zHPF) A DFSORT enhancement (APAR PI99290) exploits zHPF for DFSORT sort work files. It may provide CPU and elapsed time improvements when zHPF is available and zHPF requirements are satisfied. No application changes are required.

Agility with development operations (DevOps), application development, and APIs

In support of DevOps/tooling, the cp (copy) utility of z/OS UNIX System Services can transport binaries across various environments to enable application development growth on z/OS. Clients can get a more complete picture of file usage by z/OS UNIX processes with the enhanced zlsof utility. Also, the web enablement toolkit has new enhancements to better handle JSON data streams for improved time to value for application developers. Additional enhancements include:

- Capability to generate true random numbers, which is especially valuable for OpenSSH users who can use sftp and ssh with no dependency on ICSF. This is applicable only to the IBM z14 family.
- Support for open/cross platform application development and workload with enhancements in code page support to facilitate migration from SMTPD to CSSMTP mail client
- Support for UTF-8 text conversion of z/OS data across platforms
- Font collection as a web deliverable
- Ability to manage data at an unprecedented scale with a new functionality, known as VSAMDB, that provides NoSQL applications with low-cost, high performing, transparent access to open standards-based data stored in z/OS files, along with indexing to alternate keys for faster queries and analytics, enabling affordable real-time analytics for business growth
- Transparent cloud tiering to extend the automatic migration function to support policy-driven migration to cloud object storage

IBM Cloud Provisioning and Management:

- Improved resource management with support for metering and capping CPU resources
- Ability to relocate dynamically provisioned instances
- Ability to share resources across templates for a tenant
- Simpler to create and manage templates
- Simplified security setup for provisioning middleware in dev/test environment for faster time to value
- Ability for cloud architects to include z/OS cloud provisioning in cross-platform cloud solutions with the new support of Swagger specification on z/OS for REST API

z/OSMF has further simplified and modernized the user experience to enhance productivity:

- z/OSMF has delivered usability enhancements (settings, customization), better serviceability (version control, Liberty upgrade, browser support, updated server, support for latest problem management systems), more robust data set and File Rest APIs, automation of tasks with workflows, and making workflows more consumable and sysplex enabled (work on remote systems).

- z/OSMF also has a new look and feel (user interface) that provides a customizable end-user experience and the ability to optimize the tasks performed.
- A new z/OS MF plug-in called the zERT Network Analyzer is now available to visually determine which z/OS TCP and Enterprise Extender traffic is or is not cryptographically protected.

Container Pricing:

Container Pricing for IBM Z provides flexible, simplified, and transparent software pricing for qualified solutions, allowing broader application deployment on Z at a competitive price.

Obtaining latest enhancements

When new function APARs are introduced in the IBM service stream for the entire z/OS platform, you can find them collected on the web in a convenient reference format. Review the latest enhancements from IBM at the New Function APARs for the z/OS Platform website to help you determine which of the latest functions you want to implement.

Additionally, a number of enhancements in z/OS V2.4 are planned to support hardware functions announced in Hardware Announcement 118-075, dated October 2, 2018(z14 GA2), and Hardware Announcement 118-018, dated April 10, 2018(z14 Model ZR1).

To be notified of future announcements, register at the Subscribe to IBM product announcement newsletter website.

Statement of general direction

JES2

z/OS V2.4 is planned to be the last release in which JES2 will support the z11 level for checkpoint data sets. z22 mode was introduced in z/OS V2.2. IBM recommends you migrate to z22 mode if you have not already done so.

Planned migration from JES3 to JES2

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.

z/OSMF ServerPac

IBM's first delivery of a ServerPac in z/OSMF Software Management portable software instance format is planned for CICS[(R)] Transaction Server and associated CICS products. Initially, IBM intends to allow you to choose to order ServerPac

for CICS and associated products in either the new z/OS MF portable software instance format or the existing CustomPac Dialog-based format. The z/OS MF portable software instance format is designed to be installed using z/OS MF Software Management. The requirements for using the CustomPac Dialog-based format remain unchanged, and this is the first of many offerings that are planned to be delivered in the PSI format. For both formats, IBM plans to continue to offer delivery via internet download or on DVD. This initial offering of an IBM ServerPac in a z/OS MF portable software instance represents the next step in IBM's collaboration with other leading z/OS platform software vendors to deliver a consistent package format intended to be used with z/OSMF software management as a common installer.

z/OS Migration Workflow

Starting in z/OS V2.4, IBM intends to no longer provide the *z/OS Migration* publication, GA32-0889, in its current format. Since z/OS V2.2, the preferred method for learning about migration actions has been the *z/OS Migration Workflow.* Discovering, performing, and verifying many migration actions through the z/OS MF Workflow function instead of a more traditional book format allows for a tailored and specific upgrade path associated with a particular system. Starting with the z/OS V2.4 release and later, IBM intends to continue to provide migration tasks in a z/OS MF Workflow, as well as a single exported file. By providing the z/OS V2.4 migration materials in both formats, users still can enjoy the advantages of a z/OSMF Workflow as well as being able to search, browse, and print in a more traditional format.

With the removal of the traditional *z/OS Migration* publication, GA32-0889, it is strongly recommended that you plan for your next upgrade by having z/OS MF ready to use in at least one location in your enterprise. Notice that the exported format of the z/OS migration materials that can be easily read or printed for those without any z/OS MF capabilities will not be tailored for any environment. When the z/OS workflow for migration is provided for z/OS V2.4, it is to be renamed the *z/OS Upgrade Workflow* to better identify that each z/OS release contains a higher level of functionality than the prior release. In general, the term *upgrade* will be used in place of *migration*. The *z/OS Upgrade Workflow* is planned to be provided using the git repository for IBM/IBM-Z-zOS, which today hosts the *z/OS Migration Workflows*.

Withdrawal of ISPF Workstation Agent (WSA)

z/OS V2.4 is planned to be the last release to support the ISPF Workstation Agent (WSA), also known as the ISPF Client/Server Component. WSA is an application that runs on your local workstation and maintains a connection between the workstation and the ISPF host. It is primarily used to transfer files between the workstation and the host. IBM recommends using more current file transfer solutions such as those provided by the Zowe Dataset Explorer, z/OS FTP, and similar file transfer mechanisms. These solutions have more capabilities, including the ability to provide secure communications.

Withdrawal of CMIP

z/OS V2.4 is planned to be the last release to support the VTAM[(R)] Common Management Information Protocol (CMIP). CMIP services is an API that enables a management application program to gather various types of SNA topology data from a CMIP application called the *topology agent* that runs within VTAM. IBM recommends using the SNA network monitoring network management interface (NMI) to monitor SNA Enterprise Extender and High Performance Routing data.

Transport Layer Security (TLS) V1.3 protocol support

IBM intends to add support for the TLS V1.3 protocol, as specified in RFC 8446, to z/OS Cryptographic Services' System SSL component and to the z/OS Communications Server's Application Transparent TLS (AT-TLS) function. This support is intended to make the latest and most secure TLS standard available to use by any z/OS System SSL application and any application that accesses System SSL through AT-TLS.

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BP Attachment for Announcement Letter 219-013

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Corrections

(Corrected on April 16, 2019)

Reorganized the Description section to move information about z/OS V2.3 continuous delivery to the end of the section.

(Corrected on March 5, 2019)

Added link to the 1Q 2019 z/OS V2.3 enhancements announcement and added descriptive titles for the other announcement links.