



Preview: IBM z/OS Version 2 Release 2 -- Fueling the new digital enterprise

Table of contents

2 Overview	5 Description
4 Key prerequisites	24 Statements of general direction
5 Planned availability date	26 AP distribution
	26 Corrections

At a glance

New market pressures are transforming the face of virtually every industry, requiring businesses to devise new ways to customize and personalize products and services to serve individual customers to reach the new demographic--a market of one. Businesses able to harness the power of cloud, analytics, and mobile computing to achieve this transformation while supporting outstanding qualities of service are more likely to succeed in this new marketplace. A smooth transition to this new business model requires a highly aligned platform infrastructure that provides agile information processing and analytics capabilities while protecting transactions and customer data.

Digital enterprises are also changing how companies access and leverage information from many sources by integrating content in new ways, to deliver additional value to their customers. The new economics will require you to quickly consume, manipulate, and deliver huge volumes of information, extracting business value while leveraging the capabilities of dynamic cloud services. The harvested content must be securely managed, processed, and delivered to mobile customers around the globe. Such a fundamental shift that leverages cloud, mobile, and analytics capabilities calls for a highly responsive and reliable foundation that can support new workloads without risking service levels.

IBM's z/OS^(R) V2.2 operating system and latest IBM^(R) z13 server deliver innovations designed to help you build the highly scalable next-generation infrastructure you need. Together, they offer the capacity, scale, availability, and throughput required to improve business performance, meet response time objectives, protect sensitive data and transactions, and minimize operational risk for an exceptional customer experience. New economic efficiencies allow the z13 with z/OS V2.2 to offer more throughput and capabilities with less impact to the IT budget.

This z/OS V2.2 Preview announcement describes many capabilities designed to support:

- Exceptional service levels with:
 - Simultaneous multithreading on zIIP specialty engines on z13 processors for higher overall throughput
 - Up to 141 configurable processors or up to 128 processors per LPAR on z13 processors when running in SMT mode
 - Improved autonomies for health-based workload routing in a Parallel Sysplex^(R) with new z/OS Workload Manager (WLM) and XCF functions to help improve availability
- Analytics enablement with information management, storage, and delivery capabilities:
 - Support for up to 4 TB of RAIM memory per LPAR to improve performance of IBM DB2^(R) and other data-intensive processing workloads

- Fabric I/O Priority, extending Workload Management into the SAN fabric to prioritize your most important workloads and help improve service levels
- 16 Gb FICON^(R) links to help reduce I/O latency
- A new IBM zHyperWrite capability that helps you achieve better DB2 log write performance when using Metro Mirror (PPRC) in a HyperSwap-managed environment
- A trusted and resilient system of record:
 - Faster data encryption to handle increased transaction volume with both a new Crypto Express5S cryptographic adapter and improved compressor-based, on-chip cryptography
 - Digitally signed SMF records designed to provide a trusted audit repository
 - Improvements to secure communications, additional support for ciphers, RACF^(R) enhancements, and more
- Capturing the potential of the mobile enterprise:
 - System SSL's new OCSP support is designed to help reduce risk and improve the security of mobile and other transactions by checking certificate revocation status over the network.
 - Mobile Workload Pricing programs help you reduce software costs during periods of peak mobile transaction workload processing.
 - The z/OS Connect software interface between mobile and backend systems is designed to help you easily integrate your z/OS systems into your mobile computing environment.

The z13 server with z/OS V2.2 enables a new tier of innovation that can catalyze your ability to reach new markets and capture new revenue opportunities.

Overview

Enterprises are embarking on a digital transformation in terms of how they access and synthesize data to more effectively compete in today's economy. Companies are changing the way they assimilate, process, and deliver information to workforces, customers, and business partners. To meet these needs, an enterprise must harvest huge volumes of data to extract and deliver meaningful business insight from raw data and perform "information gymnastics" to uncover and act on competitive advantages ahead of competitors. These insights can be used to guide everything from product pipelines to next best actions at points of sale.

Typically, the computing environment used for this processing comprises a scalable cloud infrastructure that must be accessible on demand, all the time to serve a global market. Mobile and social computing are the new norms for customer engagement, and their demands have created unprecedented requirements for availability, speed, and security.

Throughout the journey to these new digital enterprises, companies must also support exceptional qualities of service while using innovative mobile and social applications to mine data to surface new business opportunities. This demand for agility, framed against a backdrop of stringent business requirements, calls for a platform armed with autonomies to drive innovation while minimizing risk. z/OS V2.2 can help you take full advantage of this new transformational opportunity with a scalable, highly available, and trusted infrastructure.

Together, the IBM z/OS V2.2 operating system and latest z13 server deliver innovations designed to help you build the next-generation infrastructure you need to power your new workloads. They are positioned to help you improve business performance, meet response time requirements, protect sensitive data, and minimize operational risk while delivering an exceptional customer experience. z/OS V2.2 with the z13 server can provide efficiencies that drive more throughput and performance while reducing impact to your budget.

z/OS V2.2 coupled with z13 hardware innovations such as larger memory, new simultaneous multithreading chip design, enhanced vector processing with new

SIMD instructions, and enhanced cryptographic capabilities deliver an outstanding solution to support your computing needs.

Exceptional service levels for scalable environments and clouds

Planned z/OS enhancements are designed to leverage the new z13 chip multithreading design, vector processing, and huge amounts of memory to help with throughput, performance, and latency:

- Any company implementing a private cloud will appreciate the scale of z/OS with up to 141 configurable processors or up to 128 processors per LPAR on z13 when running in SMT mode, and support for up to 85 LPARs to accommodate huge, diverse workloads and cloud environments.
- Simultaneous multithreading (SMT) support for zIIP processors is expected to offer throughput improvements you can use to address the growing volume of zIIP-eligible work, such as Java-based IBM WebSphere^(R) Application Server and CICS^(R) Transaction Server Java-based transactions, in addition to XML parsing.
- Enhanced WLM and XCF infrastructure designed to adjust server health values and help optimize workload routing.
- Infrastructure as a Service (IaaS) REST-based z/OS interfaces that let you build and deploy services like cryptographic services, file management services, and z/OS batch services that can be used to build cross-platform, browser-based, client-facing applications.

Enable analytics with information management, storage, and delivery

Data serving is promoted to a new level with new I/O capabilities designed for throughput and autonomies, enhanced vector processing support, and memory scalability designed to improve performance:

- Analytics applications are enabled through enhancements such as large memory--up to 4 TB per z/OS image on z13--to unleash the power of large data in memory for processing big data.
- Enhancements to vector processing can be used for analytics acceleration, using new SIMD facilities.
- 16 Gb FICON support can reduce I/O latency.
- Fabric I/O Priority helps ensure that your most important work is processed first to help you meet critical service levels.
- A new zHyperWrite capability helps you achieve better DB2 log write performance when using Metro Mirror (PPRC) in a HyperSwap-managed environment.

Deliver a trusted and resilient system of record

With its legendary security and support for the most highly regulated industries, z/OS V2.2 helps you build public key infrastructure services, serves as your secured data vault, helps you meet regulatory requirements, and reduces operational risk:

- SMF record signing intended to make your SMF-based auditing data a highly trusted repository
- A new RACF read-only auditor capability for stronger separation of duties between security auditors and security administrators
- Increased protection against attacks with a variety of strengthened security capabilities in RACF and other system components
- Faster data encryption to handle increased transaction volume with the new Crypto Express5S cryptographic adapter and improved performance for on-chip cryptographic coprocessors; also, improved virtualization of the cryptographic adapter across up to 85 domains for improved economics

Capture the potential of the mobile enterprise

With new capabilities you can understand customer sentiment in real time, process information in your cloud, conduct transactions with a mobile device, and serve customers across the globe:

- Enhancements to communications can help you reduce the time to respond, even more critical in the new mobile landscape. For instance, the enhanced Communications Server support for RDMA over converged Ethernet (RoCE), which is designed to reduce communications latency and improve bandwidth for many workloads, is designed to offer improved economics by allowing as many as 31 z/OS images to share each adapter.
- z/OS uses fast Crypto Express5S functions to help you encrypt more transactions in the same period of time, ideal for mobile banking.
- z/OS V2.2 System SSL enhancements support the online certificate status protocol (OCSP) to help detect revoked certificates.
- Enhanced vector facilities and support for large memory make it possible to incorporate real-time analytics processing in transactions for retail, healthcare, financial, and other mobile applications.
- A new Mobile Workload Pricing strategy can help you address the cost of mobile workloads during peak processing periods.
- The WebSphere Liberty z/OS Connect function enables z/OS-based systems such as those built using CICS and IMS™ to easily participate in mobile computing environments.

Summary

Enterprises must synthesize knowledge from data by using advanced analytics to deliver information through hosted services and clouds to mobile clients, partners, and employees across the globe. Information protection and resiliency have become vital as you extend the reach of the z13 to this new marketplace. Powerful enhancements to z/OS V2.2 can help you achieve your business vision and accelerate your transformation. Unleash new possibilities: let z/OS V2.2 fuel your transformation to the Digital Enterprise.

The z13 processor, as announced in Hardware Announcement [AG15-0001](#), dated January 14, 2015, is supported by z/OS V1.13 (5694-A01) and z/OS Version 2. Continued tight integration between hardware and software technologies has become increasingly important to meeting the capacity and performance demands of mission-critical workloads. Accordingly, z/OS exploits many of the new functions and features of z13, including SMT support, large memory, SIMD, and more. Refer to the *z/OS support for z Systems serverstopic* in the [Description](#) section for details.

Key prerequisites

z/OS V2.2 is planned to run on these IBM z Systems servers:

- IBM z13
- IBM zEnterprise^(R) EC12 (zEC12)
- IBM zEnterprise BC12 (zBC12)
- IBM zEnterprise 196 (z196)¹
- IBM zEnterprise 114 (z114)¹
- IBM System z10^(R) (z10™ EC, z10 BC)¹

In addition, z/OS V2.2 is planned to support these and later IBM storage control units:

- 3990 Model 3 and 3990 Model 6
- 9393
- 2105

- 2107
- 2421, 2422, 2423, and 2424

For a complete description of z/OS V2.2 software prerequisites, refer to *z/OS V2R2 Planning for Installation*(GA22-7504), when available.

¹ These products are withdrawn from marketing.

Planned availability date

September 2015

Previews provide insight into IBM plans and direction, which are subject to change. Availability, prices, ordering information, and terms and conditions are provided upon product announcement.

Description

Availability

z/OS Workload Manager (WLM) provides routing recommendations for Parallel Sysplex workload balancers such as the Communications Server Sysplex Distributor based on a number of factors, including application server health. A new z/OS V2.2 WLM service will be designed to accept server health adjustments from other servers in a sysplex. Cross-system coupling facility (XCF) processing will be designed to provide server health adjustment factors to WLM based on how well servers are processing XCF messages, lowering or raising the health factors as circumstances warrant. This new function is expected to help workload balancers that use WLM services to route work to servers that are working well and away from those that are not, helping improve application and Parallel Sysplex availability. Also, z/OS Runtime Diagnostics (RTD) is planned to identify servers having health values that fall below the maximum (100), to help you identify server health issues that might be causing system problems.

In addition, z/OS V2.2 XCF is planned to be designed to improve resiliency by delaying, and, if necessary, rejecting messages sent to group members that are not effectively processing their signals. This support is intended to better isolate XCF groups so that problems with signal delivery for one group are less likely to impact signal delivery for other groups.

z/OS V2.2 JES2 will be designed to allow you to dynamically increase the JES2 checkpoint size in place if there is sufficient space to support expansion. This supplements other methods of increasing checkpoint space, such as using the checkpoint reconfiguration dialog to move the checkpoint or add another checkpoint device. Combined with the existing dynamic volume expansion capabilities of IBM System Storage^(R) DS8000^(R) family devices, this new function is planned to allow you to increase volume size and then expand a checkpoint data set when necessary, all without disrupting system operation.

z/OS V2.2 is planned to support the Multi-Target Peer-to-Peer Remote Copy (MT-PPRC) capability for IBM System Storage DS8000 series with a minimum MCL, announced in Hardware Announcement [AG14-0189](#), dated October 6, 2014, and Hardware Announcement [AG14-0190](#), dated October 6, 2014.

MT-PPRC is designed to provide the capability to have two PPRC relationships on a single primary volume. Supporting z/OS functions for using MT-PPRC with enhanced HyperSwap^(R) capabilities were previously announced as available for z/OS V2.1 and z/OS V1.13 with PTFs, but they are actually not yet available. Instead, they are now planned to be available later this year. These functions are designed to allow you to add another PPRC target volume to provide additional data protection to act as a backup if failing over to one copy is not possible. This support is designed to provide enhanced HyperSwap capabilities, allowing you to configure two HyperSwap

targets, a preferred and an alternate. During an unplanned HyperSwap event, HyperSwap will be designed to attempt to swap to a preferred target and swap to an alternate target if it cannot swap to the preferred copy. This function is planned to be available in the second quarter of 2015 on z/OS V1.13 and z/OS V2.1 with PTFs for use with IBM Tivoli^(R) Storage Productivity Center for Replication for System z^(R), V5.2 (5698-Z11). The enhanced HyperSwap support is also planned to be available for use with GDPS/Multitarget Metro Mirror in the first quarter of 2015. For more information, see Services Announcement [AS15-0009](#), dated February 24, 2015.

z/OS V2.2 DFSMS will be designed to provide new FlashCopy^(R) function by supporting up to 12 targets for incremental FlashCopy. Incremental FlashCopy can create copies of a number of volumes more quickly and effectively than repetitive, full-volume FlashCopy operations. This new function is intended to provide more flexibility and resilience for FlashCopy, and to help you better protect application availability and provide improved data protection across physical volume failure events. This function is also available for z/OS V1.13 and z/OS V2.1 with the PTFs for APARs OA45412 and PI22256, and requires an IBM DS8870 Storage Subsystem with the appropriate licensed microcode level.

z/OS V2.2 will be designed to allow LOGREC data sets to be deallocated without an IPL. In addition to its current processing, an updated SETLOGRC command will be intended to deallocate an in-use LOGREC data set and allow you to specify a new data set name. This is intended to allow you to discontinue the use of a particular LOGREC data set when switching to either a log stream or a different LOGREC data set.

z/OS V2.2 is planned to support new keywords for CFRM policy definition to allow you to specify which sites should be preferred when a structure is duplexed. This is intended to provide more control over the placement of duplexed structures; for example, you might want to specify that a structure only be duplexed within the same site or that it only be duplexed in a different site.

z/OS V2.2 will be designed to make two improvements to subsystem initialization (SSI) processing. First, the system will be designed to validate that an initialization routine specified in an IEFSSNxx parmlib member actually exists before attempting to start a subsystem. This is intended to help avoid IPLs required to recover from missing or incorrectly specified initialization routines. Second, new operands of the SETSSI command are planned to allow you to delete a subsystem when the only alternative would be to IPL.

z/OS V2.2 IBM Tivoli Directory Server (ITDS, LDAP) is planned to support a new transition mode for a sysplex owning LDAP server. This mode will be designed to allow other LDAP servers in a Parallel Sysplex to be shut down and restarted at a new compatibility level or with additional back ends without shutting down all LDAP services in the sysplex. This new function is intended to help you improve the availability of applications that require LDAP services.

z/OS V2.2 Predictive Failure Analysis (PFA) will be designed to monitor several ranges of private area virtual storage for multiple address spaces and to warn you when one or more of those address spaces exceeds criteria that can indicate eventual private area virtual storage exhaustion. This new function is designed to help you improve system availability by providing information you can use in advance of storage exhaustion, as long as the rate of storage consumption is not too rapid. Also, PFA is planned to provide support to allow you to specify address spaces that should be monitored for a number of checks, including the private area storage check.

z/OS V2.2 system logger is planned to provide support for preallocating offload data sets. This new function will be designed to allow you to specify that offload data sets be allocated ahead of time for selected log streams. Corresponding support is planned to allow you to specify preallocation using IXGCNFxx parmlib members, Logger policy, a programming interface, and operator commands. Also, new messages are planned. This new function is intended to help you avoid situations in which delays in log stream offload processing cause system problems and provide more time to react should data set allocation delays occur.

z/OS V2.2 SLIP processing is planned to be changed to allow you to specify an operator console command to be issued when the trap is matched. This new function is intended to provide a simple and flexible way to issue operator commands during problem diagnosis.

Scalability and performance

I/O priority is set throughout much of the system by the I/O supervisor (IOS) and z/OS Workload Manager (WLM) components and honored by the channel subsystem and IBM System Storage DS8000 series control units. z/OS V2.2 will be designed to provide additional prioritization data for the FICON fabric so that the highest priority write operations can be done first when the fabric becomes congested. This new function requires function planned for z13 processors. It is planned to be available with z/OS V2.2 at its general availability and available for z/OS V1.13 and z/OS V2.1 with the PTFs for APARs OA44529 and OA44431 when the function for z13 processors become generally available. This is intended to provide end-to-end prioritization according to WLM policy for write operations, in addition to existing support for channel and control unit prioritization for both read and write operations. For more information about the availability of this function, refer to Hardware Announcement [AG15-0001](#), dated January 14, 2015.

z/OS V2.2 is planned to provide support for the new vector extension facility (SIMD) instructions available on z13 servers. This new support, also planned to be available for z/OS V2.1 with the PTFs for APARs OA43803 and PI12412 in February 2015, is intended to help enable high-performance analytics processing and is planned to be exploited by z/OS XML System Services; IBM 31-bit SDK for z/OS, Java™ Technology Edition, Version 8 (5655-DGG); IBM 64-bit SDK for z/OS, Java Technology Edition, Version 8 (5655-DGH); Enterprise PL/I for z/OS, V4.5 (5655-W67); and Enterprise COBOL for z/OS, V5.2 (5655-W32) in February 2015. WebSphere Application Server for z/OS, V8.5 (5655-W65) workloads running with Java 8 are expected to benefit from SIMD exploitation. You can find more information about Java exploitation in Software Announcement [AP15-0010](#), dated January 14, 2015, and Software Announcement [AP15-0004](#), dated January 14, 2015, about PL/I exploitation in Software Announcement [AP15-0014](#), dated January 14, 2015, and about COBOL exploitation in Software Announcement [AP15-0025](#), dated January 14, 2015.

z/OS Global Mirror (XRC) will be designed to work with z/OS Workload Manager and IBM System Storage DS8000 with the z/OS Global Mirror feature to automatically throttle low-priority write operations when they would cause significant delays that might affect response time. The system will be designed to allow you to specify that appropriate delays be imposed for the write activity for different classes of work, based on their importance as defined in WLM service class definitions. This is intended to make it unnecessary to adjust write pacing settings and monitor data set residency, and improve the system's responsiveness to more important work during periods of high write activity. This function requires the appropriate licensed microcode level for IBM DS8870 Storage Subsystems and is also available for z/OS V1.13 and z/OS V2.1 with the PTFs for APARs OA41906, OA44004, and OA43453.

IBM zHyperWrite is a new technology that combines DS8000 and z/OS enhancements that deliver performance benefits for writing operations to DB2 logs in the Metro Mirror (PPRC) environment. This new technology can help reduce up to 43% of the DB2 log write time². zHyperWrite requires z/OS V2.1 with the PTF for APAR OA44973 or z/OS V2.2, either DB2 10 (5605-DB2) or DB2 11 (5615-DB2) with the PTF for PI25747, and an IBM DS8870 Storage System with a minimum microcode level. zHyperWrite also requires IBM GDPS^(R) or IBM Tivoli Storage Productivity Center for Replication HyperSwap technology. This facility is expected to provide improved DB2 transactional response time and log throughput improvements.

² Performance improvements are based on internal IBM laboratory tests. Your results will vary.

zEnterprise Data Compression (zEDC) for z/OS, running on z13, IBM zEnterprise EC12 (zEC12), and IBM zEnterprise BC12 (zBC12) servers with the zEDC Express adapter, is designed to support low-latency data compression and inflation functions. In addition to existing support for SMF and Extended Format BSAM and QSAM data,

z/OS V2.2 DFSMSdss and DFSMShsm are designed to exploit this capability for dumping and restoring data and when DFSMShsm uses DFSMSdss to move data. This is intended to provide efficient compression with lower CPU overheads than the processor-based and software-based compression methods already available. Together, these functions can help you save disk space, improve effective channel and network bandwidth without incurring significant CPU overhead, and improve the efficiency of cross-platform data exchange. These capabilities are also available on z/OS V2.1 with the PTF for APAR OA42243.

z/OS V2.2 Library Lookaside (LLA) will be designed to make it more likely that certain program objects, such as those compiled using COBOL Version 5 (5655-W32), can be cached by LLA in VLF. This is intended to help to improve performance for users of such program objects when they are contained within libraries managed by LLA. This support is also planned to be available for z/OS V1.13 and z/OS V2.1 with the PTF for APAR OA45127.

z/OS V2.2 XML System Services is planned to use the new vector (SIMD) instructions available on z13 processors. This function, also available on z/OS V2.1 with the PTF for APAR OA44545, is intended to help improve the performance for nonvalidating XML parsing for some documents.

z/OS V2.2 DFSMSdfp VSAM record-level sharing (RLS) processing will be designed to use a control area (CA) level lock rather than a data set level lock for operations that affect only a single CA. This is intended to reduce contention and improve performance for many frequently updated VSAM key-sequenced and variable-length relative record (KSDS and VRRDS) data sets.

z/OS V2.2 DFSORT is planned to provide support for high-performance FICON (zHPF), when available, for SORTIN, SORTOUT, and OUTFIL data sets. Taking advantage of the higher start rates and bandwidth available with zHPF is expected to provide significant performance benefits on systems where zHPF is available.

z/OS V2.2 JES2 will be designed to support a maximum of one million (1,000,000) active jobs, a substantial increase over the prior maximum of 400,000. This is intended to allow more jobs to be stored on the spool at a time, which, in turn, can allow you to run more work over shorter periods and increase spool retention time.

z/OS V2.2 is planned to support up to four subchannel sets on z13 servers. This helps relieve subchannel constraints, and can allow you to define larger I/O configurations that support multi-target Metro Mirror (PPRC) along with large numbers of PPRC secondaries and Parallel Access Volume (PAV) aliases. As with the prior support for up to three subchannel sets, you can define base devices, aliases, and secondaries in the first subchannel set (set zero), and define aliases and secondaries in subchannel sets one, two, and three. All four subchannel sets support FICON and zHPF protocols. This support is also available on z/OS V1.13 and z/OS V2.1 with the PTF for APAR OA43495.

A number of improvements are planned for z/OS V2.2 zFS, which will be designed to provide significant performance improvements for directory update processing. Also, the zFS kernel is planned to support 64-bit addressing (AMODE64), allowing you to use much larger data and object caches, and to support running zFS in the z/OS UNIX™ (OMVS) address space, which is expected to yield further performance gain for all workloads using zFS file systems.

z/OS V2.2 UNIX System Services will be designed to support a substantially increased number of threads. The current limit on the number of threads that can run in the kernel is approximately 32,000. The new expected limit is approximately 10 times the current limit. The actual limit for a particular system or set of applications will depend on the services used and the additional storage those services require.

z/OS V2.2 will be designed to support up to 4 TB of real memory in a single LPAR on z13 processors. This is intended to help support more workload per z/OS image and more memory-intensive applications. As an example, large amounts of memory in z/OS and in the coupling facility can be used to increase the size of DB2 local and group buffer pools, keeping larger amounts of data resident in memory and

achieving benefits in terms of CPU usage, I/O reduction, and improved response times.

Generation data groups (GDGs) are limited to 255 or fewer generations. z/OS V2.2 will be designed to support a new data set type, generation data group extended (GDGE), which is planned to allow you to specify that up to 999 generations be kept when the function is enabled in an IGGCATxx member of parmlib. This new support is intended to support a larger number to make it easier to manage data sets that are created frequently. For example, it will be possible to specify that all of the generations created every day for a full year be kept. Additionally, IDCAMS and DFSMSdfp processing are planned to be enhanced to allow you to specify that unexpired generation data sets be deleted automatically when retaining them would result in the inability to create a new generation.

Security

z/OS V2.2 will be designed to provide digital signatures for SMF records written to log streams. This function is intended to help you detect unauthorized alterations to recorded SMF data. This new function is planned to sign blocks of SMF records and chain the blocks' signatures. A planned signature verification function will be designed to help you determine whether SMF records or blocks of SMF records have been altered or removed. This is intended to provide a more trusted repository for the auditing records created by a number of z/OS system components, including RACF.

These RACF enhancements are planned for z/OS V2.2:

- The RACF AUDITOR attribute, when assigned to a user ID, allows a number of RACF commands to be used with options that change the events for which SMF records are written for auditing purposes. In z/OS V2.2, RACF will be designed to support a new attribute, ROAUDIT. This attribute, like the AUDITOR attribute, is intended to allow an auditor to list the contents of RACF profiles but not to change any RACF auditing options. This is intended to help you provide a better separation of duties between RACF administrators and RACF auditors.
- RACF will be designed to provide better protection for offline attacks against encrypted passwords by allowing you to use stronger encryption. Also, support is planned to allow you to accept additional special characters within passwords, define users allowed to use only password phrases, clean up a user's password history, and set an "expired" status for a user's password without changing it to a new value. This support is also available in z/OS V1.13 and z/OS V2.1 with the PTF for APAR OA43999. Additionally, z/OS V2.2 RACF is planned to not set default passwords when new users are defined, to remove the need for an exit (ICHDEX01) to use password encryption, and to allow the use of a password phrase with the RACLINK DEFINE command.
- The RACF remote sharing facility (RRSF) will be designed to allow you to change the MAIN system in a multisystem node dynamically. This new function is expected to make the overall process of changing MAIN systems much simpler.
- Also, RRSF will be designed to allow you to specify that inbound updates from specific systems be ignored. This function is intended to allow you to have RRSF propagate updates from production systems to test systems without allowing privileged users on test systems to obtain more privileges on production systems.
- Support is planned in the R_admin callable service and in the IRRXUTIL REXX language interface for a new function designed to return RRSF configuration and operational information.
- Certificates can be used for a number of different services. z/OS V2.2 will be designed to allow you to use more granular certificate administration, supporting narrowed spans of administrative control using new profiles in the RDATA LIB class.

z/OS V2.2 SAF and RACF are planned to provide two new functions for users of z/OS UNIX System Services. The first will be designed to allow a user with access to a new profile in the UNIXPRIV class to perform additional file system-related operations, such as listing files in a directory, without being authorized to alter the files. The second will be designed to allow security administrators to protect file

system directories with a new NOEXEC attribute intended to prevent programs from being run from files stored in those directories. These changes are both intended to help you improve z/OS UNIX security.

In z/OS V2.2, a number of new security health checks are planned. They will be designed to determine whether recommended controls over ICSF, z/OS UNIX System Services, and RACF remote sharing facility (RRSF) resources exist, and to determine whether recommended password controls and encryption techniques are in use. These checks will be intended to help you improve system security.

z/OS V2.2 is planned to provide two console security enhancements. First, the system will be designed to allow you to specify timeout values for MCS, SMCS, and HMCS consoles and to automatically log off users from those consoles when the timeout intervals are exceeded without any operator input. This can help you improve console security. Second, a new optional SAF profile will control whether the same user ID is allowed to log on to multiple consoles concurrently. This is intended to help improve usability.

As with other operator commands, the DFSMSdfp MODIFY CATALOG command can be protected using RACF profiles in the OPERCMDS class. In z/OS V2.2, a new optional OPERCMDS profile is planned to be used by the system to determine whether a specific user is authorized to issue MODIFY CATALOG commands that alter the behavior of the system or to issue only MODIFY CATALOG commands that display information about catalog processing. This is intended to provide more granular security and better operational flexibility.

z/OS V2.2 PKI Services is planned to provide support for:

- Requiring multiple administrators to approve the creation of new certificates. This optional multiple approver process is intended to help you prevent the creation of unauthorized certificates.
- Online certificate status protocol (OCSP) responses to be signed with the client-specified signing algorithm as documented by RFC 6277. This is intended to improve the interoperability of PKI Services and OCSP clients.
- Using the SHA-224 and SHA-256 with DSA encryption algorithms for signing certificates, CRLs, OCSP responses, and verify certificate requests.
- Callers running in 64-bit addressing mode.

z/OS V2.2 System SSL is planned to provide:

- Support for the online certificate status protocol (OCSP) to retrieve certificate revocation status and certificate revocation lists (CRLs) over HTTP. The OCSP support is planned to retrieve revocation status information for x.509 certificates as described by RFC 2560, and HTTP CRL support is intended to allow you to specify that System SSL should retrieve CRL information using HTTP as described by RFC 3280 and 5280. These functions are intended to supplement the existing LDAP CRL processing and help you ensure that valid certificates are used to complete SSL and TLS secure connections. z/OS V2.2 Communications Server is planned to support these functions for application-transparent transport layer security (AT-TLS), to enable their use for applications and middleware.
- Support for PKCS #12 certificate files. This support is designed to allow applications to specify a PKCS #12 file to be used for secure connections within an SSL environment. PKCS #12 certificate key store files can contain multiple certificate authority (CA) and end entity certificates, and more than one certificate chain. This is intended to provide better interoperability for applications that create PKCS #12 key store files, such as Java-based applications. This support is also available for z/OS V1.13 and z/OS V2.1 with the PTF for APAR OA45216.
- Support to take advantage of the secure key support available with Crypto Express4S (CEX4) and later cryptographic features available for zEnterprise EC12 (zEC12) and later processors when configured in EP11 mode, by supporting the use of secure DSA keys for signing data and for fixed Elliptic Curve Diffie-Hellman (ECDH) key exchanges.
- Support allowing SSL sessions to be reused across different TCP ports. Also, Communications Server is planned to provide FTP support to allow new data

connections to reuse associated SSL sessions for better compatibility and performance with certain FTP servers and clients. This enhancement, available for System SSL users and for both AT-TLS and native SSL users of FTP, is intended to provide both improved security and performance.

The z/OS V2.2 network authentication service (NAS) is planned to support the use of X.509 certificates for Kerberos-based authentication as described by RFC 4556. This is intended to help make it unnecessary for end users to manage strong passwords for some applications.

z/OS V2.2 BCPii will be designed to write new SMF Type 106 records for HWISET and HWICMD events. This enhancement is intended to allow you to audit operations such as updates to attribute values for CPC processor weights, image profiles, and activation profiles; and, for operations affecting a CPC or image such as image activations.

Additional advances in cryptography available on zEC12, zBC12, and z13 processors for z/OS V2.1 and z/OS V1.13 are available in the Cryptographic Support for z/OS V1R13 - z/OS V2R1 web deliverable, which you can download at

<http://www.ibm.com/systems/z/os/zos/downloads/>

These ICSF functions, planned for z/OS V2.2 ICSF, are already available in the Cryptographic Support for z/OS V1R13 - z/OS V2R1 web deliverable. They are intended to help banking and finance sector clients meet standards and provide better cryptographic security with designs intended to provide:

- Support for emerging standards for American Express, JCB, MasterCard, and Visa payment systems (EMVCo) in CCA-based callable services for key management, generation, transport, and derivation. This support requires minimum MCLs for Crypto Express3 and Crypto Express4S coprocessors.
- Enhanced support in the Remote Key Export callable service to allow you to specify the desired key-wrapping method to be used for key generation and transport. This support requires minimum MCLs for Crypto Express3 and Crypto Express4S coprocessors.
- Support for AES MAC enhancements to the Symmetric MAC Generate and Symmetric MAC Verify callable services, allowing for key lengths greater than 128 bits for XCBC-MAC processing.
- Support for a number of frequently used User Defined Extensions (UDX) callable services to CCA firmware, expected to help you reduce costs associated with UDX maintenance. This support, which requires minimum MCLs for Crypto Express3 and Crypto Express4S coprocessors, is designed to provide these new services:
 - Recover PIN From Offset, which can be used to calculate the encrypted customer-entered PIN from a PIN generating key, account information, and an IBM-PINO Offset.
 - Symmetric Key Export with Data, which can be used to generate an authentication parameter (AP) and return it encrypted using a supplied key.
 - Authentication Parameter Generate, which can be used to export a symmetric key, along with application-supplied data, encrypted using an RSA key.

More ICSF enhancements planned for z/OS V2.2 ICSF, and also available in the Cryptographic Support for z/OS V1R13 - z/OS V2R1 web deliverable, are designed to provide new functions for public sector customers, including industry standard APIs for IBM z Systems, and are intended to provide better interoperability with other platforms and help improve application portability and simplify system setup:

- Enhanced Enterprise PKCS #11 mode support designed to add secure key support for the Diffie-Hellman, Elliptic Curve Diffie-Hellman, RSA-PSS algorithms, and Secure DSA Domain Parameter Generation.
- Support for Enterprise PKCS #11 applications intended to allow them to change a key's compliance mode using the Set Attribute Value function.
- Support for ECC keys generated using Brainpool curves while executing in FIPS mode.

These enhancements require minimum levels of EP11 firmware and microcode level for the Crypto Express4S coprocessors.

Furthermore, z/OS V2.2 ICSF is planned to have these enhancements, also available with the Cryptographic Support for z/OS V1R13 - z/OS V2R1 web deliverable, which are designed to allow you to improve the performance of applications that call the One Way Hash and Random Number Generate services, help improve cryptographic processor configuration, provide a new, easier-to-use callable service to retrieve status information about the cryptographic environment, and update key records in Key Data Stores to contain usage information.

Further support planned for z/OS V2.2 ICSF has been introduced in PTFs:

- z/OS V2.1 ICSF, z/OS V1.13 ICSF, and the Cryptographic Support for z/OS V1R10 - z/OS V1R12 web deliverable with the PTFs for APAR OA45548 ICSF are designed to support exploitation of counter (CTR) mode for the AES-based encryption on z196 and later processors.
- z/OS V2.1 ICSF and the Cryptographic Support for z/OS V1R11 - z/OS V1R13 web deliverable and later, with the PTFs for APAR OA43816 ICSF are designed to support enhanced PKA key translation without the need to use a User Defined Extension (UDX). This support requires minimum MCLs for Crypto Express3 and Crypto Express4S coprocessors on z196 and later processors.
- z/OS V2.1 ICSF and the Cryptographic Support for z/OS V1R12 - z/OS V1R13 web deliverable and later with the PTFs for APAR OA44444 are designed to provide Common Cryptographic Architecture (CCA) support for new German Banking Industry-defined PIN processing functions. This support requires minimum MCLs for Crypto Express3 and Crypto Express4S coprocessors on z196 and later processors.

Additional advances in cryptography available on zEC12, zBC12, and z13 servers are planned. These new and enhanced functions are planned to be available for z/OS V2.2 ICSF, and also for z/OS V2.1 and z/OS V1.13 in the Enhanced Cryptographic Support for z/OS V1R13 - z/OS V2R1 web deliverable. When available, it can be downloaded at

<http://www.ibm.com/systems/z/os/zos/downloads/>

These new ICSF functions are intended to help banking and finance sector clients meet industry standards and provide better cryptographic security with designs intended to provide support for:

- VISA Format Preserving Encryption (VFPE) algorithms in CCA-based callable services. This support will rely on the Crypto Express5S coprocessors on z13 processors.
- Enhanced Random Number generation exploiting CPACF Deterministic Random Number Generate (DRNG) instruction, intended to be compliant with NIST standard SP 800-131A.
- Allowing you to disable the RNG Cache.

Another ICSF enhancement in Enhanced Cryptographic Support for z/OS V1R13 - z/OS V2R1 and planned for z/OS V2.2 ICSF is designed to support sharing cryptographic coprocessors across a maximum of 85 domains. This support requires minimum MCL levels for Crypto Express4S and Crypto Express5S coprocessors and is also planned to be available for Cryptographic Support for z/OS V1R10 - z/OS V1R12 web deliverable and later with the PTFs for APAR OA44910.

Finally, z/OS V2.2 ICSF and the Enhanced Cryptographic Support for z/OS V1R13 - z/OS V2R1 web deliverable are planned to include enhancements designed to allow for you to query reference date information for key tokens and key objects in a key data store (KDS); to mark records in a KDS as "archived," rendering them ineligible for use; to retrieve labels from a KDS that satisfy certain search criteria; to mark records in a KDS with start and end dates; and finally to provide methods to manage metadata and start and end dates associated with a KDS record, including the abilities to archive and recall keys. z/OS V2.2 RMF™ support is planned to help

you to analyze the performance of Crypto Express5S coprocessors operating in CCA and PKCS #11 modes. This support is also planned to be available at z13 general availability on z/OS V2.1 and z/OS V1.13 with the PTF for APAR OA43493. In addition, ICSF FPE and ECC/RSA digital signature activity information is planned to be included in SMF 70-2 records and in the RMF Postprocessor Crypto Activity report.

Simplification and usability

IBM continues to simplify z/OS administration and management, and to extend the reach of your existing skills. By improving administrative ease, z/OSMF can help your company gain quality and productivity improvements while reducing opportunities for error. z/OS V2.2 z/OSMF offers many enhancements.

Starting with z/OS V2.2, z/OSMF, previously a separate product, is planned to become a base element of z/OS, delivered with the operating system. This will remove the need to order z/OSMF separately. z/OS V2.2 z/OSMF is planned to include a number of new functions:

- An enhanced File and Data Set REST API, designed to allow you to edit and browse data sets and files and intended to support data sets and files up to 8 MB in size.
- Two enhancements for the workflow engine: First, a REST API is planned to allow exploiters to initiate, monitor, and terminate workflows. Second, support to allow one workflow to call another is planned. These new functions will be intended to make the workflow engine's functions easier to integrate seamlessly with other configuration applications and to allow workflows to become reusable building blocks.
- Support for the definition of systems and user-defined groups. These will be intended to allow you to drive actions across appropriate groups, in addition to driving actions for specific members of a group. Also, graphical display support is planned to make it easy to see the topology view.
- Configuration is planned to be simplified in a number of ways. Plug-in configuration is planned to make further use of the workflow engine to help guide and simplify plug-in enablement.
- The Jobs REST API is planned to allow you to retrieve the new step-level completion codes in JES2 environments.

z/OS V2.2 z/OSMF is also planned to include the functions available with z/OSMF V2.1 and the PTF for APAR PM98630:

- A new task to support external applications, allowing you to import them into z/OSMF in a way that makes them appear in the z/OSMF navigation tree. An external application that has been imported into z/OSMF, while not part of z/OSMF itself, is designed to be:
 - Presented in the z/OSMF user interface
 - Allowed to use certain z/OSMF services
 - Able to link to other z/OSMF applications
- Improvements to the workflow capability introduced in z/OSMF V2.1 to allow workflow authors additional flexibility, such as support for supplying defaults for a workflow, and allow end users to specify that some workflow steps be performed automatically when appropriate. This is designed to improve the usability of workflows.
- Support in the REST Jobs API to hold and release jobs, and to work with jobs using a secondary JES2 subsystem. These new capabilities provide more flexibility.
- Two new z/OSMF REST services designed to allow you to view lists of data sets and to view lists of z/OS UNIX files and directories. These new interfaces further extend the capabilities for developing web-based applications using data stored on z/OS.

- An enhanced workflow designed to help you configure z/OSMF plug-ins quickly and easily. This can help you complete the steps needed to take advantage of z/OSMF functions more quickly.

Additionally, a number of z/OSMF plug-in enhancements are planned for z/OS V2.2 that are already available on z/OSMF V2.1 with the PTF for APAR PM98630:

- In the Resource Monitoring application, the capability to retrieve and display recent historical performance information. In addition, new function is designed to allow you to export information displayed in the application to a file that can be imported by popular spreadsheet programs.
- The ability to add comments to WLM service definition actions. For example, you might use this to document the reason for changes to WLM policies for later review.
- In the Software Management application:
 - An easier way to add non-SMP/E-managed data sets to a software instance. This is designed to make it easier to associate many data sets that are not managed by SMP/E zones with a software instance.
 - A more convenient way to edit mount points for the z/OS UNIX System Services file system. This capability is designed to make it easier for you to manage z/OS UNIX file system mount points during deployment operations.
- In the ISPF task, support for using the Ctrl key on most PC keyboards as the Enter key. This makes it easier to use the ISPF task by providing better consistency with typical 3270 emulator keyboard layouts.

Other z/OSMF plug-in enhancements planned for z/OS V2.2 include:

- z/OS V2.2 Communications Server is planned to extend the function of the z/OSMF based IBM Configuration Assistant plug-in. It will be designed to support creating and storing new configuration profiles for TCP/IP stacks, with integrated help to guide novice users. This new function, which builds on existing capabilities for the policy agent, is intended to make it faster and easier to create and maintain TCP/IP configurations.
- Software management plug-in support to allow you to submit and manage the generated jobs from within z/OSMF and use SFTP within your enterprise for software deployment. These functions are also available with z/OSMF V2.1 (5610-A01) with the PTF for APAR PI20151.
- Incident Log plug-in support for using SFTP to send diagnostic data to software vendors who support it. This function is also available for z/OSMF V2.1 with the PTF for APAR PI20153. Also, z/OS V2.2 z/OSMF is planned to allow you to obtain an aggregated display of incidents across z/OSMF instances within your enterprise.
- The z/OS V2.2 z/OSMF Capacity Provisioning plug-in is planned to support the provisioning of capacity based on overall CPC-wide utilization.

Also, the z/OS V2.2 common event adapter (CEA) is planned to support new CEAPRMxx parmlib specifications to allow you to control the limits on the number of TSO/E address spaces available for the z/OSMF ISPF task and the number of concurrent TSO/E address spaces allowed for each ISPF task user. This is intended to help you manage the resources consumed by the web-based z/OSMF ISPF task interface.

z/OS V2.2 ISPF will be designed to support a number of new functions, including:

- A new option in the ISPF Configuration Utility panels that reads an active ISPF configuration table load module or a specified load module containing an ISPF configuration table and uses it to create a new keyword file containing the original specifications. The keyword file generated is intended to be used as input to the configuration utility, providing an easy way to recover a missing keyword source file. This function is also available for z/OS V2.1 with the PTF for APAR OA42680.
- Support for browsing data sets and members with more than 99,999,999 records. ISPF browse will be designed to support browsing data sets and

members with over 2 billion (2,000,000,000) records. This is intended to make it easier to manage large data sets.

z/OS V2.2 JES2 and SDSF will be designed to support a new way to track job step completion codes. A new machine-readable data set is planned to contain job tracking information, including the completion codes for each job step. SDSF will be designed to extract and display step-level completion codes for batch jobs, and the z/OSMF Jobs REST API is planned to allow you to retrieve step-level completion codes. Also, this function is planned to support new optional SMF Type 30 information. This is intended to make it easier to interpret job output quickly and to provide the capability for later analyses of job step level information.

z/OS V2.2 SMP/E will be designed to enhance ZONEMERGE command processing. A new CHECK operand for the ZONEMERGE command will be intended to create a report identifying conditions that would prevent a successful ZONEMERGE. Also, ZONEMERGE processing will be designed to both enforce and preserve conditional requisites while merging target and distribution zones. This new function is intended to help you merge SMP/E zones for different products in some cases in order to consolidate product sets and simplify overall software management.

JES3 has long supported capabilities for informal, ad hoc batch scheduling. In JES3, these facilities are called *deadline scheduling* and *dependent job control*. z/OS V2.2 JES2 will be designed to provide similar functions, with some additional capabilities. A new SCHEDULE JCL statement is planned; STARTBY and HOLDUNTIL keywords of SCHEDULE will be designed to make it easier for you to submit jobs intended for later execution without the need to log onto a system at the time you want the jobs to run.

Other keywords will be designed to allow you to specify ordering and dependency information for groups of jobs, supporting both serial and parallel execution. Corresponding operator command support is planned to allow job groups to be held, released, modified, canceled, and purged. Corresponding support is also planned for SDSF, which will be designed to provide information about job group status and the status of jobs in a job group, and WLM, which will be designed to support this function with enhancements to Batch Initiator Management. Together, these new capabilities are intended to supplement those of production job scheduling products such as Tivoli Workload Scheduler for z/OS, by helping you simplify the scheduling of batch jobs and job groups that are run only when necessary and need not be added to production job schedules.

z/OS V2.2 JES3 is planned to support the specification of output disposition (OUTDISP) parameter of the JCL OUTPUT statement. This is intended to help make it easier to manage output data sets.

z/OS V2.2 JES3 is planned to provide enhancements for symbol processing. This new function is designed to make JCL and system symbols available during job execution. For example, you can specify that symbols be used in instream data sets, such as SYSIN data sets, and that symbols be retrieved from the system using new programming services. This support is intended to make system, JCL, and JES symbols more usable and accessible and to make it easier to use identical copies of JCL in multiple environments.

The z/OS UNIX System Services bpxmtext command can be used to retrieve information about return codes from various messages, including z/OS UNIX, Language Environment[®], Communications Server, zFS, and TFS. In z/OS V2.2, support is planned to be added for NFS messages. This is intended to make it faster and easier to interpret return codes from NFS messages.

z/OS V2.2 Infoprint Server will be designed to support a new TSO/E command intended to allow authorized users to start and stop Infoprint Server PrintWay[™] extended mode printers. This new command is intended to support both interactive and batch environments, and to work with printers managed by an instance of Infoprint Server running in the same Parallel Sysplex.

The Infoprint Central component of z/OS V2.2 Infoprint Server will be designed to allow you to select TSO/E address space-related output data sets (those associated with TSUnnnnn job identifiers) and display them in JES2 environments.

z/OS V2.2 JES3 will be designed to use the z/OS Generic Tracker to help you identify uses of a number of JES3 JECL statements. This support will be intended to help you write JES-neutral JCL and also help those who want to migrate from JES3 to JES2.

z/OS V2.2 DFSMSdftp will be designed to improve the processing for DEVSUPxx parmlib members. The system is planned to:

- Allow a subset of them to be specified in a member used for a SET DEVSUP command.
- Allow you to specify more than one DEVSUPxx member in a single SET command.
- Continue processing keywords after a keyword error is detected during IPL.
- Display additional information about tape-related DEVSUPxx parameters with new support in the DEVSERV command. A new DEVSERV QLIB operand will be intended to display settings for TAPEAUTHDSN, TAPEAUTHF1, TAPEAUTHRC4, and TAPEAUTHRC8.

These changes are intended to improve usability.

z/OS V2.2 DFSMSdftp will be designed to eliminate abend code A13, reason code 18, by automatically selecting the correct volume during Open processing for multivolume tape data sets.

IBM Knowledge Center is IBM's strategic framework for providing Internet-based product documentation. z/OS V2.2 is planned to include IBM Knowledge Center for z/OS, which is designed to provide enhanced search technology similar to that used for Information Centers. It is also designed to allow you to create your own local repositories and tailor the content presented from them. Additionally, the Softcopy Librarian is planned to be enhanced to make it easier to manage and update content for IBM Knowledge Center for z/OS. You can download Softcopy Librarian at

<http://www.ibm.com/support/docview.wss?uid=swg27018846>

Systems management

z/OS V2.2 JES2 is planned to provide new function to eliminate the need to tune the checkpoint HOLD and DORMANCY times in a multiaccess spool (MAS) environment. The system will be designed to allow you to specify that it automatically react to changes within a MAS and adjust these values dynamically. This is intended to help simplify JES2 management and is expected to yield more consistent performance in a JES2 MAS environment.

z/OS V2.2 will be designed to support a number of enhancements for system symbols. The system will be intended to support symbols that are up to 16 characters in length, to allow you to assign values with lengths greater than their symbol names, to support values up to 44 characters long, and to support a larger symbol table intended to accommodate more symbols, or longer symbol names and values. In addition to providing improved usability for system symbols, this is intended to allow you to fully represent data set names and complete IPv4 and IPv6 addresses in system symbols.

In z/OS V2.2, IBM plans a number of enhancements related to System-Managed Storage (SMS).

- SMS will be designed to allow you to specify up to three symbols in an IGDSMSxx member of parmlib to be used within automatic class selection (ACS) routines. This is intended to make it easier for you to reuse ACS routines on different systems.
- Second, SMS will be designed to allow you to specify a new, optional data class attribute for data sets allocated using Guaranteed Space to indicate whether they

are eligible for space reduction. This is intended to help reduce allocation failures when the requested space is not available.

- The DISPLAY SMS,SG command will be designed to display the space usage statistics for the specified pool storage group. This is intended to make it easier to see when it might be necessary to change a storage group's space management settings or add volumes to a storage group.
- SMS will be designed to allow you to specify storage group space warning thresholds separately from the high allocation thresholds. This is intended to allow you to set a lower threshold for warning messages, which can provide more time to react to storage group space shortage conditions.
- DFSMSdfp is planned to support a new secondary space reduction specification for data classes. This will be intended to allow the system to extend data sets by less than their originally specified secondary space allocation amounts when doing so would avoid allocation of space on additional volumes. This function will be designed to provide support for SMS-managed nonstriped VSAM data sets and non-VSAM data sets, and is intended to help you improve disk space utilization.
- The DADSM preprocessing exit IGGPRE00 will be designed to allow you to modify SMS Space parameters. This is intended to improve the flexibility you have available in this exit.

z/OS V2.2 is planned to support a new health check for FICON dynamic routing. This function will require function planned for z13 processors and IBM System Storage DS8000 series devices with a minimum MCL. This health check will be designed to check all components of a dynamic routing fabric, the channel subsystem, and disk control units to make sure that dynamic routing requirements are met if dynamic routing has been enabled for one or more FICON switches. This support, also planned to be available for z/OS V1.13 and z/OS V2.1 with the PTF for APAR OA43308, is intended to help you identify misconfiguration errors that can result in data integrity exposures. For more information about the availability of this function, refer to Hardware Announcement [AG15-0001](#), dated January 14, 2015.

In z/OS V2.2, a number of catalog-related enhancements are planned. DFSMSdss will be designed to allow you to specify that a catalog be restored to any volume with like geometry. A new setting for parmlib member IGGCATxx will be designed to allow you to change the scratch default for generation data group (GDG) and generation data group extended (GDGE) base entries. Finally, a new health check will be designed to identify catalogs residing on volumes whose devices are defined as shared in the active IODF that might have their SHAREOPTIONS set incorrectly. These new functions are intended to provide additional recovery options, improve usability, and help you prevent catalog data integrity exposures.

z/OS V2.2 DFSMSHsm will be designed to support distributed dump processing across multiple LPARs for Fast Replication operations in a Parallel Sysplex. This function is intended to help you reduce elapsed time when processing large DB2 copy pools. Also, DFSMSHsm Fast Replication processing will be designed to support stacking multiple copy pools on a single tape and to allow you to specify that it use multitasking to process Fast Replication requests even when doing so would use more tapes. Additionally, Fast Replication processing will be designed to optionally write messages issued during the operation to a data set. These enhancements are expected to be particularly valuable in DB2 environments.

z/OS V2.2 DFSMSHsm is planned to extend its support for storage tiering. These extensions will be designed to support command-initiated transitions and data movement. They will be intended to allow you to specify that inactive data sets be moved between storage tiers, moved from one storage group to another, and moved from one volume to another volume within the same storage group. Transition processing will also be designed to support FlashCopy and Preserve Mirror, and to process open DB2, CICS, and zFS data sets. Additionally, command-initiated storage group migration is planned to use a new design intended to support concurrent data set migration to tape with good performance, which is expected to help improve migrating DB2 image copies to tape.

IBM System Storage Easy Tier[®] is now designed to allow software-defined policy information to be communicated to Easy Tier control units, to help them efficiently deploy storage. This is intended to help steer data placement within Easy Tier

volumes to meet application performance objectives. When used by exploiters, this is intended to help guide appropriate tier placement. This new function requires z/OS V1.13 or z/OS V2.1 with the PTF for APAR OA45236 and IBM DS8870 Storage Subsystem with a minimum microcode level.

z/OS V2.2 is planned to extend the z/OS Generic Tracker service (GTZTRACK) to provide a record of tracked events in new SMF Type 117 records. This will be intended to allow you to retrieve historical information about tracked events. Also, a REXX query interface is planned, intended to make it easier to retrieve tracking facility information.

z/OS V2.2 RMF will be designed to support a new Monitor III report, the Job USAGE report, to display information about address space resource consumption, including I/O-related, CPU-related, memory-related, and GRS-related information. The new Monitor III Job USAGE report is also planned to be added to the report list for the RMF Distributed Data Server, and similar information is planned to be returned by the RMF Distributed Data Server (DDS) in XML format when the USAGE report is requested.

z/OS V2.2 RMF is planned to provide RMF Monitor III support for the zEnterprise Data Compression (zEDC) and RDMA over Converged Ethernet (RoCE) features available on zEC12, zBC12, and z13 servers. This new support will be designed to allow you to specify that data be collected for PCIE-attached zEDC and RoCE features, generate a new RMF Monitor III PCIE Activity Report, and use the RMF Distributed Data Server programming interface to create a PCIE Activity Report in XML format.

z/OS V2.2 Capacity Provisioning Manager and the corresponding z/OSMF plug-in are planned to support the provisioning of capacity based on overall CPC-wide utilization. This new function will be designed to allow you to specify that when the sum of LPAR busy for all LPARs approaches a particular percentage of the capacity of the entire CPC, more capacity should be added automatically. Finally, capacity provisioning support for relinquishing capacity once overall CPC utilization has fallen to a specified value is planned. These new capacity provisioning functions will be intended to allow you to better automate provisioning and deprovisioning actions across a wider range of circumstances.

z/OS V2.2 Health Checker is planned to provide System REXX (SYSREXX) language support to allow health checks to store and retrieve persistent data, as is already supported for checks written using High Level Assembler. This new function is intended to make it easier to write health checks.

In z/OS V2.2, support for specifying limits on 24-bit, 31-bit, and 64-bit storage in a new parmlib member is planned. In addition, a new JCL keyword will be designed to allow you to specify individual limits for 24-bit, 31-bit, and 64-bit storage. These new enhancements are intended to allow many installations to discontinue the use of the IEFUSI SMF exit and to help avoid certain kinds of storage-related abends.

z/OS V2.2 ISPF is planned to provide a new option you can use to completely disable the use of ISPF Edit Pack. This function will be designed to allow you to help control CPU utilization for ISPF users by preventing the overhead of software compression and inflation for data sets used in conjunction with ISPF and ISPF services, and assure that newly created and unpacked data sets processed by ISPF can be easily processed by other programs.

The z/OS V2.2 common event adapter (CEA) is planned to support new CEAPRMxx parmlib specifications to allow you to control the limits on the number of TSO/E address spaces available for the z/OSMF ISPF task and the number of concurrent TSO/E address spaces allowed for each ISPF task user. This is intended to help you manage the resources consumed by the web-based z/OSMF ISPF task interface.

A number of z/OS V2.2 DFSMSdfp open, close, and end of volume (OCE) processing exits are planned to be designed to support dynamic exits. This is intended to allow you to replace the statically bound exits with dynamic exits and to allow you to implement or change these exits without an IPL.

z/OS V2.2 DFSMSdftp will be designed to add job identifiers, such as Jnnnnnnn, to SMF Type 14 and Type 15 (non-VSAM data set activity) records, to make it easier to use them for chargeback and capacity planning.

z/OS V2.2 IBM Tivoli Directory Server (ITDS, LDAP) will be designed to allow you to specify that a number of additional events be recorded in the LDAP activity log and in SMF Type 83 records. This data is intended to help you diagnose problems with LDAP servers, help you detect denial of service attacks, and help improve auditability for LDAP-related activities.

z/OS V2.2 will be designed to provide additional information when the system is IPLed using an alternate nucleus, by adding the IPL device number and volume serial number to an operator message. Also, Program Event Recording (PER) SLIP trap processing is planned to be enhanced to capture the contents of the Breaking Event Address Register (BEAR). This is intended to help speed diagnosis when the BEAR data is relevant for a problem.

z/OS V2.2 Server Timer Protocol (STP) is planned to issue additional z/OS console messages to notify you of events that can affect sysplex timing. This is intended to allow automation actions to be driven from these events.

z/OS V2.2 Infoprint Server will be designed to support converting its daemons to started tasks in sysplex (monoplex) and Parallel Sysplex environments. This is intended to make it easier for you to automate startup and recovery actions for these functions using existing z/OS facilities and common system message-based automation tools, and to simplify operations procedures for managing Infoprint Server.

Networking

z/OS V2.2 Communications Server is planned to support the new virtualization capability planned for the RDMA over Converged Ethernet (RoCE Express) features on z13 processors. This new support will be designed to allow you to fully utilize the ports in the RoCE adapter and to share adapters across up to 31 z/OS images on a z13 processor. Also, z/OS V2.2 Communications Server is planned to support selecting between TCP/IP and RoCE transport layer protocols automatically based on traffic characteristics, and to support MTU sizes up to 4K for RoCE adapters. The virtualization is planned to be available on z/OS V2.1 with the PTF for APARs OA44576 and PI12223 and the corresponding RMF support with the PTF for OA44524. Finally, z/OS V2.2 Communications Server is planned to provide a tool designed to monitor TCP workload patterns and show the percentage of TCP traffic that could benefit from the enablement of Shared Memory Communications over RDMA. This monitoring tool is also planned to be available on z/OS V1.13 with the PTF for PI27252 and z/OS V2.1 with the PTF for APAR PI29165.

z/OS V2.2 Communications Server is planned to support a number of capabilities intended to make z/OS V2.2 Communications Server meet the requirements of the United States National Institute of Standards and Technology (NIST) Special Publication SP800-131A, with:

- Updates to the z/OS UNIX System Services based Sendmail client and server, with support for TLSv1.2, SHA-2 hashes, and encryption key strengths of 112 bits or more. This capability is also available on z/OS V2.1 with PTF UI13138 for APAR PM96896.
- Updates to the SNMP Agent, the z/OS UNIX System Services SNMP command, and the SNMP manager API to support the Advanced Encryption Standard (AES) 128-bit cipher algorithm. This capability is also available on z/OS V2.1 with PTF UI13140 for APAR PM96901.
- An updated Digital Certificate Access Server (DCAS), with support for TLSv1.1 and TLSv1.2, including a new set of TLSv1.1 and TLSv1.2 2-byte ciphers. This capability is also available on z/OS V2.1 with PTF UI13139 for APAR PM96898.
- Support for centralized policy agent clients to communicate with policy agent servers using both TLSv1.1 and TLSv1.2, including support for a new set of TLSv1.1 and TLSv1.2 2-byte ciphers. This capability is also available on z/OS V2.1 with PTF UI13120 for APAR PM96891.

z/OS V2.2 System SSL and Communications Server are planned to be enhanced. System SSL will be designed to allow SSL sessions to be reused across different TCP ports, and FTP will be designed to allow new data connections to reuse associated SSL sessions for better compatibility and performance with certain FTP servers and clients. This enhancement, available for System SSL users and for both AT-TLS and native SSL users of FTP, is intended to provide both improved security and performance.

z/OS V2.2 Communications Server is planned to help simplify security configuration for IPSec. This new design will no longer require applications that send and receive IPSec-protected traffic to be granted access to various resources in the RACF CSFSERV class when that class is defined.

z/OS V2.2 Communications Server is planned to enable the TCP/IP stack and strategic device drivers, including OSA-Express QDIO, HiperSockets™, and RoCE, to run in 64-bit addressing mode (AMODE 64). These enhancements are intended to provide scalability and performance improvements, and to provide virtual storage constraint relief by significantly reducing ECSA use.

z/OS V2.2 Communications Server is planned to increase the maximum number of application-instance dynamic virtual IP addresses (DVIPAs) for a single TCP/IP stack from 1,024 to 4,096. This is intended to improve scalability within a Parallel Sysplex, particularly when the sysplex is operating with a smaller number of systems than usual, as might be the case during planned outages for one or more LPARs.

z/OS V2.2 Communications Server is planned to improve scalability for Enterprise Extender connections. This enhancement is intended to support nodes with a very large number of Enterprise Extender connections.

z/OS V2.2 Communications Server is planned to help improve load balancing on systems where system resolver cache has been implemented to allow system-wide round-robin reordering of the IP address lists associated with each cached hostname.

z/OS V2.2 Communications Server is planned to enhance its support for VIPAROUTE to automatically set the appropriate maximum segment size for each IPv4 route. This new support is expected to simplify VIPAROUTE configuration and help improve VIPAROUTE performance by eliminating packet fragmentation issues that can arise for some routes.

z/OS V2.2 Communications Server is planned to provide new autonomic features that provide for smarter self-monitoring and tuning of the TCP/IP stack, with a focus on performance-related functions such as dynamic right sizing (DRS) and delayed acknowledgements (DELAYACKs).

z/OS V2.2 Communications Server is planned to enhance the CICS Sockets Listener interface. This support will be designed to provide CICS with additional information about local and remote session partners, which is intended to be used by facilities such as the CICS Explorer^(R) or Session Monitor to provide transaction tracking capabilities. This support requires IBM CICS Transaction Server for z/OS, V4.2 (5655-S97) or CICS Transaction Server for z/OS, V5.1 (5655-Y04).

z/OS Communications Server provides a Trace Resolver function to provide a variety of diagnostic information that can be used by application programmers and network administrators. In z/OS V2.2, z/OS Communications Server is planned to provide a new component trace (CTRACE) option that will be designed to capture the same information recorded by the Trace Resolver in CTRACE records, and to view formatted trace data using IPCS. This new function will also be designed to allow you to dynamically enable and disable tracing without an application restart.

Application development

z/OS V2.2 XL C/C++ is planned to provide support for the new z13 processor, with ARCH(11) and TUNE(11) parameters designed to take advantage of the new instructions to better optimize your generated code. XL C/C++ will also be designed

to support the single instruction, multiple data (SIMD) instructions provided with the z13 vector extension facility and corresponding vector programming language extensions, and the IBM MASS (Mathematical Accelerator Subsystem) and ATLAS (Automatically Tuned Linear Algebra Software) libraries. The MASS library is intended for accelerated execution of elementary mathematical functions that serves as a higher-performance alternative to the standard math library that is part of the z/OS XL C/C++ Runtime. The ATLAS library is designed to provide linear algebra function support for BLAS (Basic Linear Algebra Subprograms) and LAPACK (Linear Algebra PACKage) functions routinely used in Business Analytics and Optimization solutions. These two libraries provide a powerful framework for development of new Business Analytics workloads, porting math-intensive workloads from other platforms, and accelerating Business Analytics workloads on z13.

Additionally, z/OS V2.2 XL C/C++ is planned to deliver a number of usability and performance enhancements:

- Inline assembler statements support will be designed to allow you to insert assembler statements inlined with XL C and XL C++ code. This support will be designed to not require Metal C compilation and to allow you to easily use specialized instructions with your C and C++ objects.
- Runtime architecture blocks will be designed to allow you to use a single source file with sections designed to take advantage of various hardware architecture levels and select the appropriate path to be run at execution time. This function will be designed to allow a single executable to have optimized paths for various hardware levels to help deliver improved performance.

The functions above are planned to be available in February 2015 for z/OS V2.1 XL C/C++ with a web deliverable planned to be added to the z/OS download site, at

<http://www.ibm.com/systems/z/os/zos/tools/downloads/index.html>

z/OS V2.2 XL C/C++ is also planned to deliver automatic conversion of code to take advantage of the vector facility, to allow more efficient use of the hardware, and to parallelize code for better performing applications. z/OS V2.2 dbx is also planned to provide support for debugging C/C++ programs on z/OS UNIX that use the SIMD instructions.

z/OS V2.2 is planned to introduce a new z/OS Client Web Enablement Toolkit, designed to enable applications written in C/C++, COBOL, PL/I, and High Level Assembler to participate more easily as a client in a RESTful web application programming model. The toolkit is planned to provide a z/OS JSON parser able to process text coming from any source, to build new JSON text, or add to existing JSON text; and, an HTTP/HTTPS protocol enabler that uses interfaces similar to other industry-standard APIs. These components are also planned to be available for z/OS V2.1. The PTF for OA46575 is planned to include the z/OS JSON Parser and be made available in the first quarter of 2015. The PTF for OA46622 is planned to provide the z/OS HTTP enabler and to be closed by the z/OS V2.2 general availability date.

z/OS V2.2 Infoprint Server is planned to provide new function in IP PrintWay extended mode that you can use to add personalized text to emailed notes that include print output. This is intended to allow you to insert customized text (such as "Dear Ms. Doe,") at the beginning of generated notes that accompany attachments.

z/OS V2.2 Unicode services will be designed to provide conversion support between Hong Kong Supplementary Character Set (HKSCS) 2008 and Unicode. This support, also available on z/OS V2.1 with the PTFs for APARs OA43021 and OA44045, will be intended to allow you to take advantage of applications using the HKSCS 2008 standard. Additionally, z/OS V2.2 Unicode services will be designed to extend its support for user-defined conversion tables to the full UTF-32 range. This support will allow you to define your own character conversion tables for the full Unicode range.

z/OS V2.2 Unicode collation service is planned to support the European Ordering Rules (EOR / EN 13710 standard) and its German tailoring defined by the European Committee for Standardization (CEN). This standard provides for common character ordering and is used by the European Union, the European Free Trade Association,

and parts of Eastern Europe. It provides for consistent ordering for Latin, Greek, and Cyrillic alphabets and a number of special characters. This support is intended to make it easier to sort data encoded in Unicode in a consistent way across all three alphabets.

z/OS V2.2 DFSORT is planned to support two new date functions. A WEEKNUM function will be designed to convert input dates to numbers representing corresponding weeks of the year. An AGE function will be designed to calculate the time between a given date and the current date. These functions will be intended to provide additional flexibility in creating reports and to help improve the usability of reports generated with these new functions.

z/OS V1.13 introduced support for user-defined line commands for ISPF Edit and View. In z/OS V2.2, this support is extended to allow you to pass predefined line commands to the Edit and View interface services (EDIF and VIIF) and to allow you to specify a set of line commands in a new global line command table.

z/OS V2.2 is planned to include OpenSSH 6.4p1. This is the same level of OpenSSH included in IBM Ported Tools V1.3.0 (5655-M23), announced in Software Announcement [AP15-0009](#), dated January 14, 2015. OpenSSH is intended to provide encryption for remote login and file transfer. Also, IBM plans to provide future enhancements to the OpenSSH function included in z/OS (see the [Statements of general direction](#) section).

In z/OS V2.2, IBM HTTP Server Powered by Apache is planned to replace IBM HTTP Server powered by Domino^(R). IBM HTTP Server powered by Apache is based on the IBM HTTP Server powered by Apache that is part of WebSphere Application Server and is at a higher level than the IBM HTTP Server 8.5.5 powered by Apache that was previously available as part of IBM Ported Tools (5655-M23).

The z/OS V2.2 Program Management Binder is planned to support a new dynamically linked library (DLL) for C/C++ language AMODE 64 callers of binder services.

z/OS V2.2 NFS will be designed to support being called from clients in 64-bit addressing mode (AMODE 64). This is intended to help support the placement of z/OS UNIX System Services data areas above the 2 GB bar and to reduce the overheads required to switch into and out of AMODE 64.

z/OS V2.2 CIM is planned to include Version 2.2 of the Standards Based Linux™ Instrumentation for Manageability (SBLIM) CIM client for Java, which is designed to be a JSR48-compliant implementation.

A number of small enhancements are planned for z/OS V2.2 System REXX (SYSREXX), including support for commands designed to allow you to:

- Cancel requests
- Terminate TSO=YES address spaces
- Initiate TSO=NO requests
- Stop the AXR address space

Also, support is planned to allow you to specify the maximum number of TSO=YES address spaces and the maximum time allowed for REXX execs in AXRnn parmlib members, and for issuing console messages requiring a response (WTORs) from execs and receive the operator responses.

z/OS support for z Systems

The z13 processor, as announced in Hardware Announcement [AG15-0001](#), dated January 14, 2015, is supported by z/OS V1.13 (5694-A01) and z/OS Version 2. Continued tight integration between hardware and software technologies has become increasingly important to meeting the capacity and performance demands of mission-critical workloads. Accordingly, z/OS exploits many of the new functions and features of z13, including:

- z13 provides SMT support for certain specialty engines. z/OS V2.2 is planned to support the use of SMT for zIIP processors. The use of SMT can provide significantly more throughput. To support this new function, z/OS is planned to provide:
 - IPL-time controls to enable SMT and set the SMT mode
 - Post-IPL controls to dynamically switch the SMT mode
 - SMF Type 30 record fields with a normalized value for CPU time spent on a processor running in SMT mode
 - SMF Type 70 records with new SMT-related fields
 - Parallel Sysplex services (XES) use of SMT mode for workloads using zIIPs to help improve physical processor utilization for synchronous requests
 - Hardware Instrumentation Services (HIS) updates to provide measurement data in SMT mode
 - New RMF metrics to help you with capacity planning and performance analysis

This support is also available for z/OS V2.1 with the PTFs for OA43366, OA43622, OA44101, OA44439, and OA44624.

Note: To find the complete set of PTF requirements for z13 processors, IBM recommends you use the appropriate FIXCAT category and the SMP/E REPORT MISSINGFIX command.

- z/OS V2.2 will be designed to support up to 141-way multiprocessing (SMP) in a single LPAR on IBM z13 systems, or up to 128 physical processors (256 logical processors) per LPAR in SMT mode. This support is also available for z/OS V2.1 with the PTFs for OA43366, OA43622, OA44101, and OA44439. z/OS V1.13 supports up to 100 processors configured in a single LPAR in non-SMT mode. z/OS supports combinations of general-purpose processors (CPs), zIIPs, and zAAPs on systems that support them.
- z/OS V2.2 is planned to support up to four subchannel sets on z13 servers. This helps relieve subchannel constraints and can allow you to define larger I/O configurations that support multi-target Metro Mirror (PPRC) along with large numbers of PPRC secondaries and Parallel Access Volume (PAV) aliases. As with the prior support for up to three subchannel sets, you can define base devices, aliases, and secondaries in the first subchannel set (subchannel set zero), and define only aliases and secondaries in subchannel sets one, two, and three. All four subchannel sets support FICON and zHPF protocols. This support is also available on z/OS V1.13 and z/OS V2.1 with the PTF for APAR OA43495.
- z/OS V2.2 is planned to provide support for the new vector extension facility (SIMD) instructions available on z13 servers. This new support, also planned to be available for z/OS V2.1 with the PTFs for APARs OA43803 and PI12412, is intended to help enable high-performance analytics processing and is planned to be exploited by z/OS XML System Services; IBM 31-bit SDK for z/OS, Java Technology Edition, Version 8 (5655-DGG); IBM 64-bit SDK for z/OS, Java Technology Edition, Version 8 (5655-DGH); Enterprise PL/I for z/OS, V4.5 (5655-W67); and Enterprise COBOL for z/OS, V5.2 (5655-W32). These functions are planned to be available in February 2015.
- WebSphere Application Server for z/OS Liberty Profile V8.5.5.5 (5655-W65) applications using the Liberty profile and running with Java 8 are expected to benefit from SIMD exploitation. You can find more information about Java exploitation in Software Announcement [AP15-0010](#), dated January 14, 2015, and Software Announcement [AP15-0004](#), dated January 14, 2015, about PL/I exploitation in Software Announcement [AP15-0014](#), dated January 14, 2015, and about COBOL exploitation in Software Announcement [AP15-0025](#), dated January 14, 2015.
- z/OS V2.2 XL C/C++ is planned to provide support for the new z13 processor, with new ARCH(11) and TUNE(11) parameters designed to take advantage of the new instructions and better optimize the generated code. XL C/C++ will be designed to support single instruction, multiple data (SIMD) registers and enhanced string processing built-in functions. This is expected to help you improve the performance of C/C++ code running on z13 processors. This function is also planned to be available in February 2015 for z/OS V2.1 XL C/C++ with a web deliverable from the z/OS download site

<http://www.ibm.com/systems/z/os/zos/tools/downloads/index.html>

- z/OS V2.2 will be designed to support up to 4 TB of real memory in a single LPAR on z13 processors. This is intended to help support more workload per z/OS image and more memory-intensive applications.

Statements of general direction

z/OS V2.1 is planned to provide support for up to 4 TB of real memory in a single LPAR on z13 processors. This support will be intended to help support more workload per z/OS image and more memory-intensive applications.

IBM plans to add OpenSSH to z/OS and enhance it by providing Kerberos support, which is designed to enable single sign-on from Microsoft™ Windows™ domains, and also to leverage the capabilities of IBM zEnterprise Data Compression (zEDC). These capabilities are also planned to be made available in the version of OpenSSH that is part of IBM Ported Tools for z/OS.

Secure z/OS Software Delivery: IBM plans to remove support for unsecured FTP connections used for z/OS software and service delivery 1Q2016. At that time, it is planned that new z/OS software (products and service) direct-to-host downloads will require the use of FTPS (File Transfer Protocol, supporting the Transport Layer Security (TLS) and Secure Sockets Layer (SSL) cryptographic protocols) or HTTPS (Hypertext Transfer Protocol Secure, supporting the TLS and SSL cryptographic protocols). If you plan to use FTPS or HTTPS, IBM recommends that you visit the Connectivity Test website to verify your system setup well in advance. No change is required to use Download Director with encryption to download packages to a workstation and transfer them to z/OS later; however, you can also verify Download Director with the Connectivity Test. The Connectivity Test can be found at

https://www14.software.ibm.com/webapp/iwm/web/preLogin.do?lang=en_US&source=cbct

z/OS V2.2 is planned to be the last release to support the HCD LDAP backend for use with the IBM Tivoli Directory Server for z/OS (LDAP).

z/OS V2.2 is planned to be the last release to support the DRXRC log stream option for system logger. IBM recommends you use other available mirroring options with IBM z/OS Global Mirror (zGM), also known as Extended Remote Copy (XRC), or GDPS instead.

z/OS V2.2 is planned to be the last release to include the RMF XP support for Microsoft Windows Server.

z/OS V2.2 is planned to provide support for the new vector extension facility (SIMD) instructions available on z13 servers. This new support, also planned to be available for z/OS V2.1 with the PTFs for APARs OA43803 and PI12412 in February 2015, is intended to help enable high-performance analytics processing and is planned to be exploited by z/OS XML System Services; IBM 31-bit SDK for z/OS, Java Technology Edition, Version 8 (5655-DGG); IBM 64-bit SDK for z/OS, Java Technology Edition, Version 8 (5655-DGH); Enterprise PL/I for z/OS, V4.5 (5655-W67); and Enterprise COBOL for z/OS, V5.2 (5655-W32) in February 2015. IBM intends to exploit the 64-bit SDK for z/OS, Java Technology Edition, Version 8 in IBM WebSphere Liberty Profile for z/OS, and in the full profile of WebSphere Application Server for z/OS, which is also expected to benefit from SIMD exploitation. For more information, refer to Software Announcement [AP15-0009](#), dated January 14, 2015.

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of any future features or functionality described for our products remain at our sole discretion.

Reference information

Hardware Announcement [AG15-0001](#), dated January 14, 2015(IBM z13)

Software Announcement [AP07-0339](#), dated December 11, 2007(IBM Enterprise COBOL for z/OS V4.1)

Software Announcement [AP09-0234](#), dated August 25, 2009(IBM Enterprise COBOL for z/OS V4.2)

Software Announcement [AP11-0329](#), dated September 27, 2011(IBM Enterprise PL/I for z/OS V4.2 delivers performance improvements and usability enhancements)

Software Announcement [AP15-0009](#), dated January 14, 2015(IBM Ported Tools for z/OS Version 1.3.0)

Software Announcement [AP07-0041](#), dated March 6, 2007(IBM DB2 V9.1 for z/OS)

Software Announcement [AP10-0355](#), dated October 19, 2010(IBM DB2 10 for z/OS)

Customized offerings

Product deliverables are shipped only via CBPDO, ServerPac, and SystemPac.

CBPDO and ServerPac are offered for Internet delivery, where ShopzSeries product ordering is available. Internet delivery of ServerPac may help improve automation and software delivery time. For more details on Internet delivery, refer to the ShopzSeries help information at

http://www-304.ibm.com/software/shopzseries/ShopzSeries_public.wss

You choose the delivery method when you order the software. IBM recommends Internet delivery. In addition to Internet and DVD, the supported tape delivery options for CBPDO, ServerPac, and SystemPac, include:

- 3590
- 3592

Most products can be ordered in ServerPac and SystemPac the month following their availability on CBPDO. z/OS can be ordered via all three offerings at general availability. Production of software product orders will begin on the planned general availability date.

- CBPDO shipments will begin one week after general availability.
- ServerPac shipments will begin four weeks after general availability
- SystemPac shipments will begin four weeks after inclusion in SystemPac due to additional customization and data input verification.

Statement of good security practices

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additional operational procedures, and may require other systems, products, or services to be most effective. IBM does not warrant that systems and products are immune from the malicious or illegal conduct of any party.

AP distribution

Country/Region	Announced
AP IOT	
ASEAN *	Yes
India/South Asia **	Yes
Australia	Yes
Hong Kong	Yes
Macao	Yes
New Zealand	Yes
People's Republic of China	Yes
South Korea	Yes
Taiwan	Yes
Japan IOT	
Japan	Yes

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<http://www.ibm.com/planetwide/>

Corrections

(Corrected on March 3, 2015)

In the Description section, the HyperSwap availability was revised.