



z/OS V1.11 - Smart, adaptive, trusted, efficient

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At a glance

Pressures on the global economy create business risks requiring increased focus on improving time-to-market, reducing costs, and optimizing profit. You need a dynamic infrastructure that can respond quickly to change while reducing cost and driving profit. This latest release of the operating system delivers technology and virtualization to help deliver improved performance, availability, security, and efficiency, simplified administration, reduced risk, improved service, and enhanced flexibility -- all of which can ultimately help reduce costs and drive profit.

Improvements for z/OS® V1.11 include:

- **Failure avoidance:** Predictive failure analysis is designed to help provide early warning about system trends that can cause system or application impacts, in many cases before they impact your business. The output from predictive failure analyses can be used for reporting and logging or to drive responsive automation intended to prevent serious problems.
- **Simplified management:** A new z/OS Management Facility (5655-S28), updates to z/OS health checks, new migration health checks, new autonomics for defining and managing I/O, simplified application of network security, as well as other operational improvements help simplify systems management, improve administrator, operator, and developer productivity, and ultimately provide less opportunity for error.
- **Responsive networking:** New z/OS Communications Server designs are intended to improve networking in a Parallel Sysplex®, enable more efficient workload distribution, and help improve the quality of the load balancing in multitiered z/OS server and application environments.
- **Trusted system:** z/OS V1.11 continues to enhance its security features and to expand them to larger enterprise-wide roles. The ability to implement centralized authentication, create a comprehensive audit and risk management plan, configure secure networks, and centrally manage digital certificate lifecycle can not only help reduce the risk from fraud and security breaches, but also help meet industry compliance guidelines.
- **Accountability:** Superior measurement and data collection and reporting capabilities are updated and can be used for comprehensive risk management, auditing, and compliance plans. For example, a new identity propagation function can allow z/OS subsystems (like CICS® TS V4.1) to associate distributed identities to RACF® for improved cross-platform interoperability and accounting capabilities.
- **Storage scalability:** An additional data set type is now supported on extended address volumes (EAVs), which can be as large as 223 GB. This helps to relieve

storage constraints as well as simplify storage management by providing the ability to manage fewer, large volumes as opposed to many small volumes.

- Improved resource optimization and economics: z/OS has expanded specialty engine usage. z/OS is updated to enable z/OS CIM (Common Information Model) server processing to run on the System z® Integrated Information Processor (zIIP). In addition, z/OS V1.11, together with IBM® DB2® for z/OS Version 8 or DB2 9 DB2 utilities, is updated to enable part of sort utility processing to run on a zIIP. Also, z/OS V1.11 is enhanced with a new function that can enable System z Application Assist Processor (zAAP) eligible workloads to run on System z Integrated Information Processors (zIIPS). This can enable you to run zIIP- and zAAP-eligible workloads on the zIIP (additional restrictions apply).
- Platform synergies: Support for IBM System Storage™ DS8000™ solid state drives, DS8000 High Performance FICON® multitrack function, FICON Dynamic Channel Path Management (DCM), updated IBM System z10 HiperDispatch, and IBM System z10 instruction prefetch heuristics can help improve end-to-end application, transaction, and batch performance.
- z/OS release-to-release performance improvement: For the past several releases z/OS has provided a release-to-release performance improvement by systematically reducing or eliminating constraints and inefficiencies within the base operating system. Imagine going to a new release of the z/OS operating system and not needing more system resource! Performance improvements are measured under IBM laboratory conditions and use IBM Large System Performance Reference (LSPR) workloads.

For ordering, contact your IBM representative, an IBM Business Partner, or IBM Americas Call Centers at 800-IBM-CALL (Reference: LE001).

Overview

Pressures on the global economy create business risks requiring increased focus on improving time-to-market, reducing costs, and optimizing profit. Yet, the expectations of customers and employees have never been higher, requiring a personalized and responsive environment. You need technologies that are smart, adaptive, trusted, and efficient. You need a dynamic infrastructure that can respond quickly to change while reducing cost and driving profit.

Now more than ever System z and z/OS are the right choice for your infrastructure and workload needs. You have neither the time nor the resource to spend on throwaway solutions, rip and replace systems, or yet another technology trend. The epitome of investment protection, z/OS goes to great lengths to keep applications and data available, system resources secure, server utilization high, and programming environments adaptable while maintaining compatibility for existing applications.

As you look to uncover savings in your IT budget, consider the benefits of consolidating data and deploying Business Intelligence (BI) solutions on z/OS. Database silos can lead to multiple copies of disparate data which in turn can lead to increased cost and complexity of backup and recovery, network traffic, storage requirements, database administration and management, and server workload management, as well as the risk associated with distributed privacy, security, and accounting policies. Furthermore, it is logical that the server that is "best of breed" for real-time transaction processing can be ideal for providing real-time data for BI and data warehousing in support of strategic decision-making. Now, the value of z/OS can be maximized even more with the introduction of the IBM System z Solution Edition Series -- solutions which provide competitive pricing for a range of workloads for z/OS. As part of this series, the edition for Data Warehousing leverages the many strengths of System z to deliver a dynamic warehousing environment capable of scaling single tables to 30 terabytes in size to support your enterprise. Avoid the expenses related to dispersed data and simplify your business with z/OS.

Investment protection, solution longevity, and a trusted foundation for Business Intelligence solutions are just some of the reasons why customers choose z/OS. This latest release of the operating system expands on its foundation and delivers

advanced technology and virtualization to help deliver improved performance, availability, security, and efficiency, simplified administration, reduced risk, improved service, and enhanced flexibility, all of which can ultimately help you reduce costs and drive profit.

Resilient and adaptive, Parallel Sysplex is many clustering solutions in one. It is used for scalability, availability, software migrations, and disaster recovery and can be considered the first cloud computing environment ever. While other platforms are just beginning to grasp the cloud concept, Parallel Sysplex has been providing a dynamic environment where resources and workloads can seamlessly move to where they are needed. For z/OS V1.11, updates to Parallel Sysplex include improved scalability, performance, recovery management, coupling link recovery, and GDPS® resiliency. GDPS takes cloud beyond the confines of a single site. Sophisticated automation seamlessly manages z/OS, z/VM®, Linux® for System z, multiple storage technologies (both ECKD™ and fixed block), and tape resources for your enterprise -- putting disaster recovery back into your hands and under your control. For more information on GDPS, see Marketing Announcement [309-002](#), dated February 24, 2009.

Resilient, adaptable, and smart technologies are at the core of z/OS and IBM is proud to introduce innovations such as predictive failure capabilities and sophisticated multitiered application network routing, designed to support some of the highest levels of system and application availability. Beyond error checking, first failure data capture, and recovery routines, predictive failure analysis means your z/OS system is designed to learn heuristically from its own environment and able to anticipate and report on potential system issues (however rare) before they are an impact to your business. Network communications for multitiered applications is streamlined by allowing the Sysplex Distributor to route requests to z/OS targets based on availability, performance, and capacity metrics for multiple application tiers in each z/OS target, thereby helping you improve availability and performance.

IBM introduces a new product designed to simplify management and administration of a z/OS system. The z/OS Management Facility (5655-S28) is the "new face of z/OS" and it will enable system programmers to more easily manage and administer a mainframe system by simplifying day-to-day operations and administration of a z/OS system. This initial release can help facilitate the task of managing the various sources of data related to software incidents for new and less-skilled as well as experienced system programmers and administrators. Also added to the initial release of the z/OS Management Facility is the Configuration Assistant for z/OS Communications Server, which provides assistance in configuring TCP/IP networking policies and can help dramatically reduce the amount of time required to create network configuration files. The z/OS Management Facility is an unpriced product for z/OS; for more information see Software Announcement [209-241](#), dated August 18, 2009.

Trusted for decades, z/OS continues to expand to larger enterprise-wide roles. z/OS Security Server (RACF, enhanced for z/OS V1.11) can provide centralized authentication (with IBM Tivoli® Directory Server for z/OS) and coupled with its mature logging and reporting capabilities (via SMF) provide an amazing record of user and system resource accesses that can help you build a comprehensive audit and risk management plan. Centralized certificate lifecycle management (via z/OS PKI Services and enhanced with z/OS V1.11) can help you take the cost of digital certificates out of the hands of third-party vendors and apply it back to your bottom line. Trace distributed users as they enter the z/OS system with a new identity propagation function, which can allow z/OS subsystems to associate distributed identities to RACF and to use RACF accounting capabilities.

z/OS security is also leveraged by IBM disk and tape subsystems. Enterprise disk and tape encryption key management is centralized and streamlined with IBM Tivoli Key Lifecycle Manager (5698-B35), a new unpriced product that leverages world-class z/OS security, management, and reporting capabilities. In addition to drive-level encryption and centralized key management support, the latest IBM System Storage DS8000 introduces solid state drives expected to provide better performance for certain kinds of high-use data, with SMS and SMF support designed to help you manage data placement and take the best advantage of this new feature. Refer to Hardware Announcement [109-120](#), dated February 10, 2009.

This latest release of z/OS further leverages DS8000 storage capacity by allowing an additional data set type to exploit extended address volumes (EAVs).

Performance for your major workloads is improved a number of ways. New compiler options in XL C/C++ allow your existing C/C++ applications to take advantage of IBM System z10 instructions for run time prefetch performance improvements without application rewrite. Large page support in both Java™ and Language Environment® means applications using JVM and XL C/C++ (in AMODE64) can benefit from this improvement in memory management. CICS Transaction Server (CICS TS) V4.1 is updated to leverage z/OS XML System Services on z/OS V1.9 and higher, which provides not only improved performance of CICS-based SOAP XML message parsing, but improved economics due to z/OS XML workload eligibility for the System z Integrated Information Processor (zIIP) and System z Application Assist Processor (zAAP). For more information on CICS Transaction Server V4.1, see Software Announcement [209-135](#), dated April 28, 2009.

Price performance, or economics, is improved with new specialty engine exploitation as well. z/OS is updated to enable z/OS CIM (Common Information Model) server processing to run on the zIIP. This means CIM client applications that use the CIM server on z/OS for system management, such as the System z Capacity Provisioning Manager and parts of the z/OS Management Facility, can benefit. Applications that are Java-based are also already eligible to execute on the zAAP. In addition, z/OS V1.11, together with IBM DB2 for z/OS Version 8 or DB2 9 DB2 utilities, is updated to enable part of sort utility processing to run on a zIIP. Also, z/OS V1.11 is enhanced with a new function that can enable zAAP-eligible workloads to run on zIIPs. This can enable you to run zIIP- and zAAP-eligible workloads on the zIIP. Additional restrictions apply. See the [Optimization and management capabilities](#) capabilities section.

Though many know of System z hardware technology dividends, few know that z/OS in and of itself had its own form of technology dividend. For the past several releases, z/OS has provided a modest release-to-release performance improvement by systematically reducing or eliminating constraints and inefficiencies within the base operating system. Imagine going to a new release of the z/OS operating system and not needing more system resource! Add the 10% technology dividend announced for the System z10 servers and you have a significant amount of computing power at no additional cost.

The smart, adaptive technologies of z/OS can provide a secure, resilient, and dynamic infrastructure that integrates business needs and IT capabilities. Work smarter with z/OS.

Key prerequisites

z/OS V1.11 runs on these IBM System z servers:

- z10 EC
- z10 BC
- z9™ EC
- z9 BC
- z990
- z890
- z900
- z800

For a complete description of z/OS V1.11 hardware prerequisites, refer to *z/OS V1R11 Planning for Installation* (GA22-7504).

Planned availability date

September 25, 2009

Description

Ease of use

Platform simplification that does not sacrifice z/OS strengths

Increasingly complex information technology (IT) systems seem to be the normal trend for data centers. New IT systems might lead to tremendous leaps in productivity and new service and product offerings, but their complexity might be a source of IT failure. IBM is proactively addressing these concerns and has embarked on a long-term commitment to simplify the z/OS platform. The past several releases of z/OS delivered improvements in the areas of simplifying diagnosis and problem determination, network and security management, and overall z/OS I/O configuration, sysplex, and storage operations. These improvements are designed to help simplify systems management; to improve application programmer, system programmer, and operator productivity; and to provide less opportunity for the introduction of human errors.

Updates for z/OS V1.11 include the following:

- IBM introduces the z/OS Management Facility, designed to enable system programmers to more easily manage and administer z/OS mainframe systems by simplifying day-to-day operations and administration.
- New z/OS Communications Server function simplifies the deployment of network policies. For example, now applying network security for IPsec, IDS, and AT-TLS is made easier with step-by-step tasks complete with setting up RACF security to defining other policy-relations.
- New health checks are designed to help check the health of active systems. Use IBM-provided checks to implement the latest IBM hints, tips, and best practices, or you can write your own checks to address application-specific needs. The output from these checks can be useful for proactively resolving problems before they occur and could be used as additional documentation for your own audit and compliance needs.
- Migration health checks are designed to reduce the effort required to migrate to new levels of z/OS from prior levels.
- Improvements to Message Flood Automation are designed to make it easier to implement, helping you improve availability by preventing runaway message traffic from causing system and application impacts.
- Additional ease-of-use enhancements are available for Allocation, z/OS UNIX® System Services, IBM Configuration Assistant for z/OS Communications Server, DFSMS™, NFS, DFSMSrmm™, DFSMSHsm™, and Group Capacity Limits reporting.

The goal for z/OS platform simplification is to eliminate, automate, and simplify tasks without sacrificing z/OS strengths, to deliver a z/OS management facility with integrated task guidance, and to embrace IBM's converged systems management strategy.

Details on the ease-of-use and platform-simplification enhancements for z/OS V1.11:

- The IBM z/OS Management Facility V1.11 (5655-S28) is a new product for z/OS that provides support for a modern, Web-browser-based management console for z/OS. The z/OS Management Facility is intended to enable system programmers to more easily manage and administer a mainframe system by simplifying day-to-day operations and administration of a z/OS system. More than just a graphical user interface, the z/OS Management Facility is intelligent, with designs toward addressing the needs of a diversified skilled workforce and maximizing

their productivity. Automated tasks help reduce the learning curve and improve productivity. In addition, embedded active user assistance (such as wizards) guides users through tasks and helps provide simplified operations.

The initial release is planned to provide a problem data management capability and TCP/IP policy-based network configuration. Existing user interfaces such as ISPF, operator commands, and others will be supported and will coexist with the z/OS Management Facility.

The z/OS Management Facility helps with System z resource optimization as well. A large portion of the z/OS Management Facility application is written in Java, and therefore is eligible for the System z Application Assist Processor (zAAP). In addition, portions of z/OS Management Facility workload are planned to be eligible for IBM System z Integrated Information Processor (zIIP) as well. Some functions in z/OS Management Facility use the Common Information Model (CIM) set of industry standards to communicate with z/OS subsystems and starting with z/OS V1.11, the z/OS CIM server processing is eligible to run on the zIIP.

For more information on the z/OS Management Facility, see Software Announcement [209-241](#), dated August 18, 2009.

- z/OS Communications Server includes the following ease-of-use enhancements:
 - The IBM Configuration Assistant for z/OS Communications Server is enhanced to:
 - Provide a simplified dialog for definition of AT-TLS and IPsec policies.
 - Provide expanded support for setting up z/OS Communications Server policy infrastructure.
 - Provide new AT-TLS policy options in support of new AT-TLS functions, such as support for TLS V1.1.
 - In z/OS V1.11, the Advanced Communications Function/Trace Analysis Program (ACF/TAP) is made a part of z/OS Communications Server element. ACF/TAP provides functions to format trace information, including VTAM® buffer traces and VTAM internal traces. ACF/TAP also continues to be included in ACF System Support Program (ACF/SSP). This change in ACF/TAP packaging is intended to help you reduce cost and ordering complexity if you do not use the Advanced Communications Function/Network Control Program (ACF/NCP).
 - In z/OS V1.11, z/OS Communications Server designs simplify management of the networking policy infrastructure by:
 - Improving the z/OS UNIX syslogd daemon to make it more efficient and to provide automatic archive functions.
 - Providing a new ISPF-based syslogd browser you can use to browse and search files in the z/OS UNIX syslog daemon (syslogd) file system and archive data sets.
 - Enhancing monitoring of policy-related components by having the Policy Agent start, monitor, and stop dependent functions, such as the IKE daemon and NSS daemon.
- The following IBM Health Checker for z/OS enhancements are added:
 - AutoIPL health checks: AutoIPL support is designed to automatically take a standalone dump, or IPL, or both when the system is about to enter a number of nonrestartable disabled wait states. Two new checks are designed to report on your AutoIPL policy specification:
 - One check will make sure that you have an AutoIPL policy established as a best practice whenever running on hardware that can support AutoIPL, when not in a GDPS configuration.
 - The second check will validate the devices specified in the DIAGxx for SADMP and MVS™ AutoIPL policies. Devices will be checked to make sure they are available, are DASD, and are not defined as secondary devices in Metro Mirror (PPRC) pairs.

These checks are intended to help you validate your AutoIPL configurations.

- In this release, the Catalog component of DFSMS will implement a health check to detect IMBED and REPLICATE attributes for catalogs. No supported release

of z/OS supports using the IMBED and REPLICATE attributes when defining new data sets or catalogs. In fact, using these attributes can waste DASD space and often degrades performance. IBM recommends not using the IMBED and REPLICATE attributes. This health check will notify you about any user and master catalogs in your environment having IMBED or REPLICATE attributes. For more information see the section of this announcement which states IBM's future direction.

- The static resource manager health check detects entries listed in the static resource manager list, which is kept in CSECT IEAVTRML of load module IGC0001C. Static resource managers are called every time any task or address space terminates, but they are rarely applicable to very many of them. Because task and address space termination can happen thousands or even millions of times per day on each of your systems, unnecessary calls to static resource managers can consume significant CPU time. This check will help you identify obsolete entries in IEAVTRML for IBM products, and any other entries you should be aware of in case they can be eliminated on your systems. This can help you reduce unnecessary resource consumption by static resource managers.
- DAE health check: Dump Analysis and Elimination (DAE) is designed to suppress duplicate dumps and to help prevent the system from using unneeded resources by capturing diagnostic data repeatedly for the same problems. Two new health checks are designed to report on your DAE configuration. The first will detect whether DAE is active and your settings match those recommended by IBM. The second will detect whether the DAE data set is being shared in a Parallel Sysplex environment. These new checks are intended to help prevent unnecessary system programmer time and system resources from being spent on duplicate dumps.
- SDSF using SAF health check: Using an external security manager such as RACF for SDSF, via the System Authorization Facility (SAF), offers several advantages over using ISFPARMS-based security, including the ability to change security profiles dynamically, a single repository for security information, auditability, and more-granular protection. In addition, SAF-based security is the only way to protect certain functions, including WebSphere® MQ's use of queues and all JES3 SDSF functions. IBM recommends the use of SAF-based security for all SDSF functions. This check is designed to determine whether the SDSF class is active, and is available for z/OS V1.9 with PTF UK39818 and z/OS V1.10 with PTF UK39819.
- A new health check is added to determine whether the sysplex failure management (SFM) component of XCF is able to use new Base Control Program internal interface (BCPii) services to improve sysplex recovery. For more information about the new function, see the [Availability](#) section.
- Two new migration checks are introduced for zFS. The first is designed to notify you when multfile system aggregates are in use. IBM plans to withdraw support for multfile system aggregates as stated in Software Announcement [205-034](#), dated February 15, 2005. When this support is withdrawn, only zFS compatibility mode aggregates will be supported. (A zFS compatibility mode aggregate has a single file system per data set.) The second is designed to verify that zFS is running at sysplex_admin_level=2 on z/OS V1.9 and z/OS V1.10 systems, which is required for all members of a sysplex before a zFS V1.11 system can be brought up within the sysplex.

Both checks are available for z/OS V1.9 and z/OS V1.10 with the PTFs for APAR OA27198.

- A new migration health check helps you identify any existing IPsec filter rules that do not comply with RFC4301. If such rules are identified, they also provide guidance about the migration procedures and options available to update those filter rules so that they comply with RFC4301. Note that z/OS V1.11 is planned to be the last z/OS release for which RFC4301 compliance is optional. For more information, see the section of this announcement which states IBM's future direction.
- Another migration health check has been added to help you determine whether you are using the BIND9 DNS server. IBM has indicated that support of DNS server functions on z/OS will be removed in a future z/OS release.

- DFSMSrmm migration checks can be used to verify that a supported vital records selection option is in use, to identify if the new GDG options must be used, and to verify if any dropped REXX™ stem variables are being used. This support was made available for UA45968 on z/OS V1.9 and UA45967 on z/OS V1.10 in March 2009.
- The Server Time Protocol (STP) feature is designed to allow multiple servers and coupling facilities to maintain time synchronization with each other, without requiring a Sysplex Timer® (also called an External Time Reference or ETR). A new migration health check is designed to notify you when an ETR is in use and the system supports STP, but STP is not being used. STP is recommended because Sysplex Timers (9037-002) have been withdrawn from marketing.
- A health check has been added to z/OS V1.8 and V1.9 with PTF UA47096 and on V1.10 with PTF UA47095. The migration health check is designed to notify you if you are still using the Integrated Security Services (ISS) LDAP server, which is not present in z/OS V1.11. IBM recommends you use IBM Tivoli Directory Server (IBM TDS, LDAP) for z/OS, which is included as a base element of z/OS, instead.
- The z/OS root file system (also called the version root) typically grows from release to release. To help verify that there is sufficient free space on a volume for a subsequent release z/OS root file system, a new migration health check will be available for z/OS V1.9 through z/OS V1.11 via PTFs for APARs OA28684 and OA28631.
- The Message Flood Automation message processing, introduced with z/OS V1.9, is designed to be part of internal message processing and eliminate its use of the IEAVMXIT and system command exits. These changes eliminate the customization and exit integration steps required to use Message Flood Automation and allow Message Flood Automation to take action against all messages, including those sent through specific Message Processing Facility (MPF) exits. Making it easier to use Message Flood Automation is intended to make z/OS systems more available by responding to a wider array of system and workload errors.
- Improved STP system management with new z/OS messaging: This new function is designed to generate z/OS messages when various hardware events that affect the External Time Sources configured for an STP-only timing network occur. This can help improve problem determination and correction times. Previously, the messages were generated only on the Hardware Management Console (HMC).
- In z/OS V1.11, RMF™ introduces new Overview reports and support in the RMF Spreadsheet Reporter. The Spreadsheet Reporter provides a fast way to display postprocessor data graphically using the Microsoft® Excel spreadsheet application. These new extensions completely replace the postprocessor PLOTS control statement, which provided a character-based graphic view of system performance indicators. Also, the RMF postprocessor can now create reports in XML format, in addition to text. The XML format can allow you to process the reports using XML-based programming and to use style sheets to format and display RMF reports in a Web browser or using the RMF Spreadsheet Reporter. In addition, a new Monitor II report allows you to get information about the current settings of the system resources manager (SRM) parameters specified in the active IEAOPTxx parmlib member and about which member is active.
- Currently the IDCAMS DELETE command can be used to delete multiple entries by using a wildcard character as part of the entry name. In z/OS V1.11, IDCAMS is designed to provide more-selective criteria on the DELETE command. A new MASK keyword is intended to allow you to specify data set name selection criteria using a mask entry-name, or key filter, with the new keyword.
- SDSF added support for JES3 in z/OS V1.10. In z/OS V1.11, new SDSF function is designed to:
 - Provide JES3 support for the system log (syslog), job class, JESplex (members), spool volumes, and display and modification of output descriptors. The system log display function is planned to be supported by the end of 2009 with the PTF for JES3 APAR OA29534 and will require that the system log be created using z/OS V1.11 JES3.
 - Remove the requirement for the HASPINDEX data set in JES2 environments. This is designed to allow you to remove the HASPINDEX data set once all sharing systems are running z/OS V1.11 JES2.

- TSO/E and z/OS Communications Server support a new option that enhances the LOGON RECONNECT function of TSO/E when using TN3270 connections. A new LOGONHERE parameter in parmlib member IKJTSoxx controls whether the RECONNECT option can be used to reestablish a TSO/E session unconditionally. Without this support, an attempt to reconnect is rejected if the system detects that the user ID is already in use, either on the same workstation or a different one. This new feature helps preserve work that might be in progress under TSO/E sessions and avoid operator intervention.
- These ease-of-use enhancements are added for ISPF:
 - An extension to the ISPF Editor COMPARE command that allows the name of a data set containing SuperC process statements and allocated to the SYSIN DD to be specified as part of the command syntax. An additional option on the command allows you to specify that a popup panel be displayed so that a full-length data set name can be specified for a data set containing the SuperC process statements for the COMPARE.
 - A new option, Prefix Dsname Level, on the Data Set List Utility entry panel which, when specified, allows the Dsname level to be specified with or without quotes. When the quotes are omitted, the TSO prefix (if running with PREFIX ON) will be prefixed as the first qualifier of the Dsname level. When the option is not selected, the behavior of the entry panel remains unchanged. By default, the option is not selected.
 - Support for setting and displaying the EATTR data set attribute, which is used to specify whether a data set might have extended addressing attributes and, for data sets placed on extended address volumes (EAVs), whether they can reside wholly or partly in extended addressing space (EAS) on the volume.
 - Two new ISPF Editor line commands, HX and HXX, to display individual records and a range of records in a data set in hexadecimal.
 - Support for a panel source statement input exit that enables dynamic modification of an ISPF panel when it is displayed. The exit is passed each panel source record as it is read by ISPF and is able to change, insert, or delete panel source records.
 - Support for extended member statistics that allows ISPF to store more than 65,535 lines. More space is taken up in the PDS directory for each member reset if this option is chosen.
 - A configuration option to include an additional qualifier in the names of data sets created by utilities such as the SuperC and Search-For.
 - Enhancements to the z/OS UNIX Directory List Utility, with support for new functions to display and update various attributes for files and directories, including the owning user and group, file format and tag information, and user and auditor auditing options, and a new function to display additional information about the file system for a file or directory.
 - HCD support for displaying, setting, and modifying HCD profiles using ISPF panels. This is intended to help you maintain HCD profiles more quickly and easily.
- Resource Recovery Services (RRS) includes ISPF panels you can use to browse the RRS log stream data. In z/OS V1.11, a new selection on the Global Options panel is designed to allow you to specify whether the timestamps displayed on other panels are in local time or GMT. This is intended to make the dialog more usable.
- In z/OS V1.11, the Program Management Binder adds support for a new IEWPARMS DD statement, to be used to specify a data set (which can be an inline, or SYSIN, data set) that includes parameters to be passed to the binder. The binder is designed to process these parameters in addition to any parameters specified a different way (for example, by using the PARM keyword of the JCL EXEC statement). This support is intended to allow options to be added to those passed by an existing program without requiring program changes, and to allow more than 100 characters of parameter data to be specified. Also, it is expected to help simplify debugging for programmers developing applications that call the binder API.
- In z/OS V1.11, z/OS UNIX System Services shell commands oedit and obrowse are changed to use ISPF Edit and Browse. This makes editing and browsing z/OS UNIX files work consistently in both environments and adds support for ASCII data when these commands are used from the shell.

- z/OS V1.11 is designed to refresh the volume table of contents (VTOC) information related to volume size following a dynamic volume expansion in an IBM System Storage DS8000. This new function allows you to use new space on volumes immediately without the need for manually refreshing the VTOC.
- In z/OS V1.11, the z/OS NFS Client optionally issues console messages in Japanese, in addition to the existing support for English. This function uses the infrastructure changes made for the console message globalization support implemented for the NFS Server in z/OS V1.10.
- In z/OS V1.11, these DFSMSrmm ease-of-use enhancements are added:
 - A new design intended to simplify DFSMSrmm vital record specifications (VRS) handling that allows location definitions to be changed after a VRS has been defined.
 - Increased flexibility in the DFSMSrmm ISPF dialog for specifying volume type, storage group name, and creation date and time when adding new volumes, and improved navigation from data set information to the actual policies used for the data set.
 - Improved DFSMSrmm TSO command line parsing with consistent syntax across the various subcommands (such as ADDVOLUME, CHANGEVOLUME, GETVOLUME) and parmlib options.
 - A new capability in the EDGINERS utility, to support reading and cross-verification of some tape label information with the DFSMSrmm control data set.
 - New DFSMSrmm parmlib options intended to provide flexibility in how tape generation data sets are managed for cyclic retention and help avoid the need for a usermod for duplicate generation retention.
 - An enhanced sample volume not in library installation exit, CBRUXVNL, to include additional checks and customization designed to determine whether a volume is a tape and whether it is system managed. Also, exit customization is enhanced to make it easy for installations where there are no external nonlibrary drives. These customization options are designed to require little or no assembler language knowledge for this sample exit, which is installed and active by default.
 - Support for multiple installation exit routines for each of the DFSMSrmm installation exits by exploiting the z/OS Dynamic Exit Facility for all exits. Before, the installation exits created for use with DFSMSrmm were enabled for dynamic change, and were easily refreshed without impacting tape processing. However, they did not support multiple routines for each exit, so users had to merge code from multiple sources into a single exit routine. The MVS Dynamic Exits Facility provides a way to enable multiple exit routines for each DFSMSrmm installation exit.

Scalability and performance

Scalability and performance through increased efficiency and innovative technologies

IT is woven into almost everything we do. The demands on IT solutions are greater than ever, often requiring the delivery of more speed, services, or capabilities in less time or with fewer resources. But the industry has begun to hit fundamental physical limits for chip design. Large-magnitude CPU speed increases with each generation of chip are a thing of the past and capacity increases will increasingly come from higher n-way and more multi-threading, as well as synergies across the server and storage platforms. z/OS and its subsystems provide for scalability not only based on faster chip speeds, but also via efficient single-image n-way processor growth, highly scalable sysplex clustering for horizontal growth, and scalable storage and data management as well. This holistic and balanced approach to scalability and performance means your System z environment is capable of handling the growth of your user base, applications, business processes, and data processing needs.

Updates for z/OS V1.11 include the following:

- IBM System Storage DS8000 (DS8000) introduced extended address volumes (EAVs), which for the initial release can be as large as 223 GB. z/OS V1.11 adds support for an additional data set type and new functionality for supporting data

sets in EAVs. Overall, this helps to relieve storage constraints as well as simplify storage management by providing the ability to manage fewer, large volumes as opposed to many small volumes.

- Storage performance is improved with support for solid state drives (SSDs, also called flash memory) on DS8000. Because it eliminates disk latency, SSD-based storage can provide a substantial improvement in storage response times compared to HDD for certain high-use data. z/OS V1.11 has function that can help identify which data sets would benefit the most from SSDs and help direct allocation for appropriate data sets to SSDs.
- Storage performance can also be improved with z/OS V1.11 support for the new High Performance FICON multitrack function of the DS8000. Because it supports more than one track's worth of data in a single transfer, applications with large data transfers might benefit from this function.
- In order to reduce the skills and time required to configure I/O topology, IBM introduces Dynamic Channel Path Management (DCM) for FICON channels. Originally designed to dynamically manage ESCON® channels, DCM is extended in z/OS V1.11 to support FICON channels.
- To help improve server performance through reduced memory latency, the IBM System z10 introduced new prefetch instructions. The z/OS V1.11 XL C/C++ compiler heuristically exploits this prefetch capability for performance improvements for XL C/C++ applications running on IBM System z10 servers.
- Memory management improvements have been made for AMODE 64 XL C/C++ Language Environment applications that exploit large (1 MB) pages. This is in addition to the current exploitation by the 64-bit SDK for z/OS, Java Technology Edition, V6 (5655-R32).
- To help improve server performance for large-scale z/OS systems, IBM System z10 introduced HiperDispatch. For z/OS V1.11, HiperDispatch design is changed to help improve system performance for large LPARs with a large number of zIIPs defined.
- The z/OS Communications Server adds new function to Sysplex Distributor. Sysplex Distributor can now use new and improved WLM interfaces for more efficient workload distribution in a sysplex. Sysplex Distributor also adds support for improved load balancing in a multitiered z/OS server environment. Finally, Sysplex Distributor extends load balancing beyond z/OS to provide workload balancing capabilities for IBM WebSphere DataPower® Appliances.
- New z/OS Communications Server designs provide networking performance improvements for name resolution, TCP-based bulk transfers over high-latency networks, and Enterprise Extender workloads that use IPsec.
- Virtual Storage Constraint Relief removes constraints within the base z/OS operating system and can allow more work to be processed on a single z/OS system. In z/OS V1.11, VSCR improvements were made for STAR mode sysplex-wide GRS query requests, XML code page support, and TCP/IP sockets processing. In addition, new SMF fields can record additional information about an address space's use of virtual, real, and auxiliary storage above 2 GB and can help with capacity planning, performance management, and accounting.

Details on the scalability and performance enhancements for z/OS V1.11:

- In z/OS V1.11, support is added to several components to help ease storage constraints by allowing extended format sequential data sets to be placed in the extended addressing space on extended address volumes (EAVs) in addition to VSAM data sets, for which support was introduced in z/OS V1.10. These new designs provide:
 - Support for a new data set level attribute and JCL keyword, EATTR, which allows you to control the migration of non-VSAM data sets to EAS by making it possible to specify whether data sets can be located in EAS. This attribute is supported for both VSAM and non-VSAM data sets.
 - Support by the Direct Access Device Storage Manager (DADSM) component of DFSMS for single extents to span track- and cylinder-managed space for data sets with extended attributes. This makes it possible for a single-extent data set to begin in track-managed space and end in cylinder-managed space on an EAV and allows a single-extent data set to occupy an entire volume.

- Support in ISPF for displaying and setting the EATTR attribute for data sets that can reside on extended address volumes (EAVs).
- Language Environment XL C/C++ Run-Time Library support for processing extended format sequential data sets that have extended attributes, including those data sets that reside in the extended addressing space.
- RACF support for discrete profiles for non-VSAM data sets that have extended attributes, including those data sets that reside in the extended addressing space, in addition to the support available now for VSAM data sets.
- AMASPZAP support for SYSIN and SYSPRINT data sets that have extended attributes, including those that reside in EAS.
- SVC dump support for dump data sets that reside in the extended addressing space, including SYSMDUMPs and transaction dumps. Also, IPCS, SNAP, and ABDUMP services support is added for the placement of dump data sets having extended attributes, including those that reside in EAS.
- z/OS Communications Server FTP support for reading from and writing to extended format sequential data sets in the extended addressing space (EAS) of an extended address volume (EAV).
- Program Management Binder support for input and SYSPRINT data sets having extended attributes, including those that reside in EAS.
- TSO/E support for data sets that have extended attributes, including those that reside in EAS, in the ALLOCATE, TRANSMIT, RECEIVE, SUBMIT, RACONVRT, and LISTDSI commands.
- JES2 support for External Writers and SPOOL Offload to use output data sets having extended attributes, including those data sets that reside in the extended addressing space.

This support can help ease space constraints by allowing you to move additional data to larger volumes and help simplify storage management by allowing you to store your data on fewer volumes.

- Dynamic Channel Path Management (DCM) is introduced for FICON channels in z/OS V1.11. Once all systems on a server are running z/OS V1.11, you will be able to use HCD to specify channels and control units that are to be managed by DCM. FICON DCM function can be enabled and disabled using an IECIOSxx member of parmlib and a SETIOS command. When active, it is designed to manage the channels used to connect to control units dynamically. This is intended to provide consistent I/O response times while reducing the time and skill required to configure the I/O fabric. This function requires the PTF for APAR OA28321.
- In z/OS V1.11, Allocation design is changed to significantly reduce the amount of storage required by the Eligible Device Table (EDT) for many I/O configurations. This new function provides common area virtual storage constraint relief, both for the EDT itself and for the use of Dynamic Activation for I/O configuration changes.
- In z/OS V1.11, DFSMS supports solid state drives (SSDs) on DS8000. This new DS8000 feature introduces a powerful new technology to IBM enterprise storage by using solid state flash memory arrays in place of hard disk drives (HDDs). Because it eliminates disk latency, SSD-based storage can provide a substantial improvement in storage response times compared to HDD for high-use data that is written infrequently and processed randomly. Also, new support allows you to define SMS policies for the allocation of new data sets on volumes backed by SSD technology and to gather usage information using SMF that is designed to help you manage data placement and take the best advantage of these new features. This function is made available on z/OS V1.8, z/OS V1.9, and z/OS V1.10 with the PTFs for APAR OA25559. For more information about the new DS8000 features, refer to Hardware Announcement [109-120](#), dated February 10, 2009.
- High Performance FICON for System z (zHPF) enhancements -- z/OS V1.11 uses the new zHPF multitrack function of the IBM System Storage DS8000 series to support more than one track's worth of data in a single transfer. This capability is planned to be rolled out over time. Initially applications using Media Manager for I/O with large data transfers are expected to benefit, such as those using zFS, HFS, PDSE, and striped Extended Format data sets. This function is also available on z/OS V1.9 and z/OS V1.10 with the PTFs for APARs OA26084 and OA29017. zHPF with multitrack operations is available in the DS8000 series Licensed Machine Code (LMC) level 5.4.3.xx (bundle version 64.3.xx.xx) or later.

- Faster XL C/C++ applications! Additional System z10 hardware exploitation has been implemented in the z/OS V1.11 XL C/C++ compiler through the addition of the PREFETCH option. This option enables heuristics to automatically generate System z10 prefetch data instructions as appropriate. This can help reduce the effects of memory latency by beginning to fetch data before it is needed. Additional optimization and tuning improvements have been made for the compiler including inlining of additional destructors to avoid overhead of function calls. These changes can improve the performance of generated code without the need for changes to the source code. A performance improvement of over 8% was observed using code generated using the z/OS V1.11 XL C/C++ compiler with high optimization when compared to code generated using the z/OS V1.10 XL.

This is based on internal IBM lab measurements using the ILP32, XPLINK, ARCH(8), TUNE(8), HGPR, O3, HOT, and IPA(LEVEL(2)) with PDF compiler options. Performance results for specific applications will vary; some factors affecting performance are the source code and the compiler options specified.

- New function is made for AMODE 64 XL C/C++ Language Environment applications to enable them to exploit large (1 MB) pages, in addition to the current exploitation in the 64-bit SDK for z/OS, Java Technology Edition, V6 (5655-R32). Language Environment is designed to allow AMODE 64 applications to request large page-backed memory objects using the __moservices() interface. Appropriate use of large (1 MB) pages can help reduce memory management overhead and increase translation lookaside buffer (TLB) hit ratios for exploiting programs.
- In z/OS 1.11, JES2 introduces a new checkpoint level, Z11. Once the \$ACTIVATE command is used to set this new level, the maximum number of jobs is increased to 400,000 jobs and the maximum number of output groups to 1,000,000 output groups. Also, the BERT limit is increased to 1,000,000 and the maximum number of checkpoint versions is increased to 50.
- z/OS V1.11 continues to implement designs intended to improve cache and memory management; this is expected to be true for the foreseeable future. The time it takes to retrieve data from memory, while progressively shorter in the absolute sense on newer server models, has become progressively longer when measured in processor cycle time increments. In other words, though memory access is much faster than it used to be, processors spend more cycles waiting for it than they ever did. HiperDispatch helps address the system's management of cache. In z/OS V1.10, HiperDispatch was directed toward improving cache management in multiprocessing LPARs. For z/OS V1.11 HiperDispatch design improves the performance for large-scale z/OS systems that include zIIP processors. These changes can improve system performance for LPARs with a large number of zIIPs.
- In z/OS V1.11, when IEFBR14 is used with DD statements to delete a data set that has been migrated by DFSMSHsm, Allocation is now designed to pass the delete request to DFSMSHsm under most circumstances so the data set can be deleted without first recalling it. This can take significantly less time and consume fewer system resources than waiting for the data set to be recalled before being deleted, thereby helping speed batch processing.
- In z/OS V1.11, a new RRS design is intended to improve performance by removing the RM.DATA log stream compression processing that ran every 30 seconds. This compression was formerly done to remove duplicate entries that RRS will now ignore. Also, RRS will begin to use the coupling facility for RM.DATA earlier during initialization, which is intended to speed access to the log stream and reduce serialization contention.
- The NFS Version 4 protocol provides the ability for an NFS Server to temporarily delegate management of a file's resources to an NFS Client. With this release, an NFS Client will be able to request NFS V4 delegation authority for MVS datasets from the z/OS NFS Server. Prior to this release, delegation operations were not supported. The intent of file delegation is to improve performance by eliminating communications with the NFS Server. Performance improvements are expected to vary greatly depending on the NFS requests issued and the data being transferred. This function is planned to be made available with the PTF for APAR OA29863 in 2009.
- SMF Type 30 record enhancements: A number of service unit count fields in the Performance section of SMF Type 30 records are incremented as an address space

runs. To contain these counts for very long-running address spaces that can consume a larger number of service units than the original fields can represent, new larger fields are added to SMF Type 30 records. These new fields can be used in place of the original fields to gather information about the service units consumed by long-running address spaces. Also, new fields have been added to the Storage and Paging section of SMF Type 30 records to better track the use of storage above 2 GB. These new fields include information about an address space's use of virtual, real, and auxiliary storage above 2 GB. These changes to SMF Type 30 records are intended to help with capacity planning, performance planning, and accounting.

- A new XES design provides algorithmic enhancements for Coupling Facility subchannel operation completion, recovery, and notification processing, and improves efficiency for processing a large number of Coupling Facility subchannels. Coupling Facility subchannel information provided by console DISPLAY commands is changed to accommodate a large number of Coupling Facility subchannels. This new function supports larger CF and CF link configurations that require more concurrent I/O capability.
- In z/OS V1.11, zFS design has been changed to allow you to specify that file system processing for read/write file systems shared on specified systems within a sysplex use new techniques for dynamic zFS ownership, communications, and caching to reduce communication overheads. This is intended to help improve performance for these file systems within a sysplex. Further function is planned to be made available in the first half of 2010 with the PTF for APAR OA29619; it will allow you to specify the use of these new techniques on a per-filesystem basis within a sysplex. This is intended to help ease exploitation and provide an alternative method for using these new techniques for individual file systems.
- In z/OS V1.11, GRS design provides storage constraint relief for GRS GQSCAN and ISGQUERY star-mode global ENQ processing. Work buffers used by parallel requests are moved to 64-bit pools in the GRS address space. This will increase the amount of data that can be processed by concurrent system-wide GQSCAN and ISGQUERY requests.
- In z/OS V1.11, support is added for data tables contained in load modules and program objects to be placed above 2 GB. A new ADDR64 parameter on the LOAD macro supports loading load modules and program objects containing only data tables above the bar. This function helps relieve virtual storage constraints by allowing data tables to be loaded above the bar.
- z/OS XML System Services provides virtual storage constraint relief in z/OS V1.11 by moving XML code page dependent tables above the bar.
- In z/OS V1.11, IBM Tivoli Directory Server for z/OS exploits Work Load Manager (WLM) functions. This enhancement is designed to allow performance goals to be set for work running in IBM Tivoli Directory Server for z/OS and to take advantage of WLM's health notification service. This support is also designed to allow classification of particular IP addresses or distinguished names (DNs) into exception enclaves so their system resource consumption can be throttled. Use of the health notification service helps prevent work from being directed to malfunctioning servers when their response time is very short.
- If you have a large number of RACF users who log on to various applications many times every day, the recording of logon statistics can cause considerable RACF database I/O activity. In z/OS V1.11, RACF allows you to specify that logon statistics be recorded only once per day for certain applications. This limits the I/O and serialization activity for the RACF database and can help improve RACF performance.
- A new asynchronous (asyncio) form of the accept_and_recv socket API allows z/OS applications and middleware to process short-lived client TCP connections more efficiently by combining the functionality of multiple socket calls into one. This support helps improve performance for TCP server applications that exploit the new API.
- z/OS Communications Server designs are intended to improve performance and reduce CPU cost in several ways:
 - Performance of inbound streaming workload over long-distance networks with large bandwidth and high latency can be improved by dynamically tuning the TCP window size.

- Performance of Sysplex Distributor is designed to be enhanced by a new Sysplex Distributor connection routing accelerator function.
- Performance of Enterprise Extender is designed to be enhanced in selected environments by implementing a new version of the Adaptive Rate-Based (ARB) algorithm and by reducing the number of unproductive path switches.
- Performance of Enterprise Extender traffic when secured with IPsec is designed to use less CPU and to better utilize zIIP processors for IPsec if available.
- A TCP/IP control block related to sockets communication is moved from 31-bit common storage (ECSA) to 64-bit common storage. This change is intended to provide 31-bit virtual storage constraint relief for z/OS systems with a high number of open TCP/IP sockets.
- z/OS Communications Server enhances the resolver function by introducing system-wide caching of domain name server (DNS) responses. The resolver cache is enabled by default and shared across the entire z/OS system image. This new function is expected to provide significant performance improvements for z/OS workloads that perform repetitive resolver queries, such as Web services workloads. These performance improvements are expected to be realized without the need to set up, monitor, and administer a name server for caching purposes on your system.
- z/OS Communications Server Sysplex Distributor has enhanced its optimized local support in environments where multiple tiers of z/OS applications need load balancing. When using WLM-based recommendations, this optimization allows Sysplex Distributor to compute a composite WLM weight for each system that includes the capacity, performance, and health characteristics of both the tier 1 server applications and the tier 2 server applications. This new function is designed to improve the quality of the load balancing decisions made by Sysplex Distributor in a multitiered z/OS server environment.
- z/OS Communications Server Sysplex Distributor is enhanced to provide workload balancing capabilities for IBM WebSphere DataPower appliances. DataPower appliances are often deployed as a front-end processing tier to z/OS applications, allowing for transparent Web services enablement of z/OS applications or for accelerated and more efficient handling of Web services security protocols, XML schema validation, and numerous additional functions. In many of these environments, multiple DataPower instances are deployed in a cluster to allow for higher availability and scalability, requiring an external, network-based load balancer to load balance incoming requests across the DataPower appliance instances. When the DataPower tier completes its handling of a request it typically then routes a request to a tier 2 application that is hosted within the z/OS environment, such as CICS TS, IMS™ TM, or WebSphere. These tier 2 requests might also require load balancing, especially when the applications are deployed in a z/OS Sysplex environment. Sysplex Distributor can already be used to load balance the tier 2 requests into the z/OS Sysplex. With this enhancement it is now possible to use Sysplex Distributor to load balance requests to both the DataPower and z/OS tiers, eliminating the need for deploying an external network-based load balancer for the DataPower tier. This enhancement works in conjunction with new support planned in the IBM WebSphere DataPower appliances.
- z/OS V1.11 Communications Server is designed to help improve performance for workloads with demanding latency requirements (such as interactive workloads, including SAP using DB2 connect) when configuring an OSA-Express3 to operate in optimized latency mode (OLM). This is intended to help improve performance for applications that have a critical requirement to minimize response times for inbound and outbound data when servicing a remote client.
- Scalability and performance of the DFSMSrmm TSO command line interface and API are improved by enabling API callers to request multiple resources returned in a single API call, reducing the overhead of API and command processing, setting REXX variables to null instead of blank, and reducing the numbers of REXX stem variables set with the count of entries returned.
- The performance of VSAM System Managed Buffer (SMB) Direct Optimized Access Bias can be impacted by too few index buffers being allocated when opening a data set that is small at first but grows as it is processed. In z/OS V1.11, the

system's use of the SMBVSP parameter is enhanced to make the amount specified apply to both data and index buffer space.

- In z/OS V1.10, OAM implemented 2 GB Object Support to enable applications to store objects up to 2000 MB (2097152000 bytes) in size using DB2 on direct access storage. In z/OS V1.11, OAM extends that support to the tape tier of the OAM storage hierarchy. This provides full support for objects up to 2000 MB in size on both DASD and tape, reduces the need to separate large binary strings into multiple objects, and simplifies the application interface by eliminating the need to materialize entire objects before storing them.
- The TCP transport layer in z/OS Communications Server TCP/IP is now designed to detect and transparently react to selected common sockets programming errors that can cause severe application performance problems. This new function is intended to help improve application availability and performance.
- z/OS Communications Server has added a QDIO accelerator function. The accelerator provides accelerated forwarding at the Data Link Control (DLC) layer for IP packets being routed between any combination of QDIO and HiperSockets™ network interfaces. The QDIO accelerator function is expected to improve performance when IP packets are routed through z/OS using any of the supported network interfaces.
- Device Allocation is changed in z/OS V1.11 to improve its tape load balancing algorithm. This new support is designed to consider the number of devices in each tape library, and how many are online, when allocating tape devices within libraries. For example, a library with 256 online devices would usually be preferred over a library with 16 devices. You will be able to specify whether this new algorithm is used by using the new SYSTEM parameter for the ALLOCxx parmlib member. This new design is intended to provide better balancing of tape library requests across the system.
- The Infoprint® Central functions of Infoprint Server have been enhanced in z/OS V1.11 to process additional SYSOUT data sets using transaction job names and job numbers to better support APPC and z/OS UNIX transactions. Infoprint Central is now designed to process all transaction job names and job numbers. Prior to this enhancement, it would display job names and numbers only for transactions created by Infoprint processes (such as Print-Interface).

Application integration

Leverage your data and assets and extend highly reliable systems.

System z and z/OS are ideally suited to perform as the data serving and SOA hub of the enterprise. The platform's classic strengths of availability, security, reliability, scalability, and management have made the mainframe the de facto standard for data serving and OLTP. It is only logical to extend z/OS to Business Intelligence and Data Warehousing solutions as well, where large amounts of reports can be generated in a timely manner using source data -- all with a simplified reconciliation and restatement process. It is also logical to extend existing applications that support established business processes.

Like other operating systems, z/OS provides support for current application enablement technologies, such as Java, Perl, PHP, XML, Unicode, HTML, HTTP, SOAP, and other Web services in addition to XL C/C++ and other application development tools. What sets z/OS apart is the ability to operate both new and existing applications within the same system, and in close proximity to your corporate data residing on z/OS. It can cost five times as much to write new core applications than to extend existing ones. Extending core systems with WebSphere Application Server, CICS TS, IMS, and z/OS application developments technologies can reduce deployment and maintenance costs for applications deployed on the z/OS platform. Application integration improvements for z/OS V1.11 include:

- System REXX functionality is improved and expanded to make writing z/OS system-level and automation applications much easier.
- New METAL C functions make it easier to integrate C code with assembler code, to help facilitate reuse of existing assembler assets.
- New, more efficient, XL C/C++ debugging capabilities, additional Unicode support for ease of porting applications to z/OS, and enhanced support for numerous IEEE,

ISO/IEC, and GNU Compiler Collection standards. Also added is a new heuristic prefetch capability, designed to provide further performance improvements for XL C/C++ applications.

- The z/OS Communications Server adds a new mail client for sending mail from z/OS. Designed to allow secure connections to mail servers, provide simplified setup and operation, and use less resources than the existing mail gateway server, the new mail client can help you make enterprise-wide collaboration more efficient.
- PKI Services Web pages provide ways to request certificates and perform certificate administration tasks from z/OS PKI Services. For z/OS V1.11 the Web pages are now provided in Java in addition to REXX CGI to make it easier to integrate PKI Services with existing Web-based applications.

Application development items are to be used by programmers to write z/OS-based applications. These items either make application development easier or add capabilities for new and extended applications on z/OS. Details on the application development enhancements for z/OS V1.11 include:

- In z/OS V1.11, these new functions are added for System REXX:
 - REXXLIB Concatenation: In addition to execs stored in the SYS1.SAXREXEC data set, System REXX will search a new REXXLIB concatenation for execs to be run.
 - In addition to AXR00, parmlib members with other two-character suffixes are supported and can be specified in IEASYSxx members. Also, multiple AXRxx members can be specified.
 - System REXX is designed to acquire JES affinity for AXRnn address spaces once the primary JES subsystem starts. Every TSO=YES AXREXX invocation has a JES job ID and job log associated with it. This allows the job log to be browsed or parsed by REXX code. Also, additional capabilities related to JES spool can be leveraged by REXX code running under System REXX, including the ability to write JCL to an internal reader, retrieve output, and use the TSO/E TRANSMIT, RECEIVE, and SEND commands.
 - Support for z/OS UNIX callable services (syscalls) for TSO=YES AXREXX requests allows you to take full advantage of the available syscall commands.
 - Support is provided for two new built-in functions: AXRINFO returns the name of the subsystem under which the exec is running (JES2, JES3, or MSTR), and AXRWAIT provides a wait function within a REXX exec.
 - Support is also provided for the TSO/E STORAGE function in read-only mode.

These functions are also available with UA47439 on z/OS V1.9 and UA47440 on z/OS V1.10 with the PTFs for APAR OA26802.

- In z/OS V1.11, a new z/OS Communications Server mail client for sending mail from z/OS is added. The new mail client supports the existing user interface for sending mail from z/OS that was defined by the old SMTP/NJE mail gateway server, and many new mail enhancements such as secure connections, the ESMTP protocol, and IPv6 connections. The new z/OS Communications Server mail client supports sending mail only; it does not support receiving mail from the Internet. This support is designed to secure connections to mail servers, provide simplified setup and operation, use less resource than the existing SMTP/NJE mail gateway server when sending mail from z/OS, and support existing applications that write mail messages via the JES spool interface.
- The SYSOUT API (SAPI) allows application programs to process JES SYSOUT data sets in a manner similar to a printer. The Extended Status SSI allows application programs to obtain information about jobs and SYSOUT in the JES queue. In z/OS V1.11, both SAPI and the Extended Status SSI are enhanced for both JES2 and JES3 to support filtering based on transaction name, job ID, and owner, to provide better support for APPC and z/OS UNIX transactions. On JES2, the extended status and SAPI SSI enhancements are available once all members of the JESPLEX are running z/OS 1.11 JES2 and a \$ACTIVATE LEVEL=Z11 command has been issued. On JES3, the new SAPI function will be supported with the PTF for APAR OA29534, which is planned to be available by the end of 2009.
- In z/OS V1.11, DFSMSdfp™ processing is changed to indicate end-of-file (EOF) during the allocation of data sets on DASD that are not SMS-managed and have either sequential or an undefined data set organization. This makes this

processing for both SMS-managed and non-SMS-managed data sets consistent, to make it unnecessary to open data sets solely to indicate EOF, and to help prevent programs from reading old data when a data set is read immediately after being allocated.

- PKI Web pages: In z/OS V1.11, the PKI Services Web pages that are provided to help request certificates and perform certificate administration tasks are enhanced. The Web pages are now provided in Java in addition to REXX CGI. This change is intended to make it easier to integrate PKI Services Web pages with other Web-based applications you might have by allowing you to define them in XML files with XML schemas and then customize them using modifiable Java Server Pages (JSP) files.
- SDSF REXX functions have been improved in z/OS V1.11. Support has been added for multiple actions per request by allowing a list of row tokens to be provided on the ISFACT command, and for multiple system commands to be specified on a new ISFSLASH command. A new isfreset() function will allow you to specify that all SDSF special variables be dropped. SDSF is now designed to return SAF authorization failure messages in ULOG special variables. Also, COLSHELP improvements and a new REXXHELP index are provided. These new functions are intended to improve performance and make it easier to use SDSF REXX functions.
- In z/OS V1.11, NFS supports using symbolic links in NFS Version 4 file system mount path names. This is intended to provide improved interoperability with NFS V4 Protocol Clients.
- In z/OS V1.11, Language Environment is enhanced to allow AMODE 64 applications to use the Preinitialization routine (CELQPIPI) to specify that they will do their own storage management using GETSTORE and FREESTORE, and have their own message service routines (MSGRTN). This function is already available for AMODE 31 applications using CEEPIPI. Also, Language Environment provides additional IEEE decimal floating-point (DFP) support for XL C/C++ applications.
- In z/OS V1.11, the dbx debugger provides support that allows you to specify whether to load debug information as it is needed by dbx rather than when the program to be debugged is loaded. This support is enabled by using the DBGLD utility to produce .mdbg files. This is designed to help improve dbx performance during startup and during the evaluation of variables.
- New function is added for METAL C, including the addition of the strtod(), strtold(), and strtold() functions, enhancement of the sprintf() and sscanf() family functions in the runtime library with additional format specifiers that will allow the use of floating-point numbers, and the creation of a static library that users can bind with directly instead of using the system vector. Also, support is added for the extern and all keywords to the Metal C PROLOG and EPILOG® compiler options. This allows you to specify whether a particular PROLOG/EPILOG applies to external functions only or to both internal (static) and external functions within the source file, and is intended to make it easier to integrate C code with assembler code.
- In z/OS V1.11, XL C/C++ enhancements designed to make debugging XL C/C++ code easier include:
 - Captured Source: You can now specify that source code information be imbedded in a debug side file for future debugging. This makes it possible to step through the program even when the original source code is not available at debugging time, as might occur on a production system when the source code resides on a different system used for development.
 - CDADBGLD utility: This new debug utility is the MVS batch equivalent of the dbgld command and can be used in batch mode without using z/OS UNIX System Services. Performance of the debugger, especially at start time, is designed for significant improvement if the CDADBGLD utility is executed before execution of the debugger.
- In z/OS V1.11 XL C/C++, functionality to address customer requirements includes Unicode Literal support, which adds support for the char16_t and char32_t types through the use of typedefs in C and as native types in C++. This makes it easier to port code exploiting these types to z/OS. New compiler options include:
 - MAKEDEP, which replaces the makedepend utility and is used to analyze source files and to determine source dependencies
 - RTCHECK, to perform a certain type of runtime checking that can help debug C and C++ programs

- SHOWMACROS, to display macro definitions for debugging complex macro expansions in application programs
- SKIPSRC, for excluding source statements from the listing to improve readability of the compiler listings
- REPORT, for creating listing files of sections of code that have been optimized in both IPA compile and link phases, to help with understanding compiler optimizations and tuning code for better performance
- PREFETCH, to insert prefetch instructions automatically where there are opportunities to improve code performance.
- New support provides additional GRS ENQ contention notifications using the Event Notification Facility (ENF). GRS ENF 51 enhancements now allow listeners to be notified about unsatisfied conditional requests (those made for unavailable resources). Also, in addition to event qualifiers, ENF has been enhanced to provide a new FLTRBLK keyword for listeners, which can be used to help filter out ENF notifications for subcategories of events that are not of interest to the listener. In z/OS V1.11, GRS provides an ENF filter block and mapping macro for ENF 51 notifications.
- In z/OS V1.11, new support is added for Language Environment that is intended to make it easier to write programs that can be ported between operating systems such as z/OS and z/VSE™. These additions are: a CEEGLOB assembler macro, RMODE and AMODE support in the CEEENTRY assembler macro, a new FTCHINFO keyword on the CEEFETCH assembler macro that allows applications to load both Language Environment and non-Language Environment modules, and SERVICE keyword support in the CEEPPA assembler macro.
- In z/OS V1.11, additional locale support is added to Language Environment for Serbia, including support for its new currency code.
- CIM Client for Java Version 2 support is provided for the new CIM Operations over HTTP specification version 1.2 from DMTF (not version 1.3 as stated in Software Announcement [209-029](#), dated February 24, 2009).
- z/OS V1.11 XL C/C++ supports parts of the ISO/IEC TR 19768:2007, Technical Report on C++ Library Extensions. The XL C/C++ compiler also supports parts of the ISO/IEC JTC1/SC22/WG21 draft of a new C++ language standard, commonly referred to as C++0x. Features supported include Extended Friend Declarations, Extern Template, and Name Lookup in Template Base Class. Support of standards by the XL C/C++ compiler is intended to make it easier to port C++ code from other platforms to z/OS.
- z/OS Communications Server FTP support is added for transferring files to and from z/OS UNIX System Services named pipes. z/OS applications that support reading from named pipes can process data transferred into a named pipe while FTP is still writing data into that pipe. Likewise, FTP can initiate transfer of data written to a named pipe while an application is still writing to that pipe. This support can help reduce overall latency when transferring data to and from z/OS systems in combination with pre- or postprocessing by other z/OS applications or subsystems.
- The Common Information Model (CIM) is a standard data model developed by a consortium of major hardware and software vendors (including IBM) called the Distributed Management Task Force (DMTF) as part of the Web Based Enterprise Management (WBEM) initiative. WBEM includes a set of standards and technologies that provide management solutions for a distributed network environment. Interoperability is a major focus of WBEM, and using WBEM technologies can help you develop a single set of management applications for a diverse set of resources. With support for the CIM server on systems running z/OS, your applications can gain access to z/OS resources using an extensible, industry-standard model. In z/OS V1.11, an upgrade to CIM is added to support the latest version available at the time of development for the OpenPegasus CIM Server and DMTF CIM Schema. This includes support of the CIM Operations over HTTP specification version 1.2 from the DMTF (not version 1.3 as stated in Software Announcement [209-029](#), dated February 24, 2009). At the time of development, this was the most current level of the CIM/WBEM specifications for the DMTF and CIM Server Implementation from The Open Group.
- z/OS V1.11 is updated so z/OS CIM server processing is eligible to run on the System z Integrated Information Processor (zIIP). This means CIM client applications that use the CIM server for basic information interchange on z/

OS resources -- such as information from RMF, WLM, DFSMS, and BCP -- or applications that use it for more sophisticated z/OS cross-platform system management -- such as the System z Capacity Provisioning Manager, the z/OS Management Facility problem determination capability -- can benefit. Java-based CIM client applications on z/OS are already eligible to execute on the System z Application Assist Processor (zAAP).

- New z/OS Unicode services support is added for the new conversion table between CCSID 1390/1399 and Unicode for JIS X0213. This support is added for the 2002 version of the 1390/1399 CCSIDs, which contain JIS X0213 characters. The JIS X0213 standard promoted by the Japanese government conforms with the family registration law for names of people that has been established by the Ministry of Justice and the Kanji glyph style standard specified by the Ministry of Education, Culture, Sports, Science and Technology.
- In z/OS V1.11, z/OS Communications Server adds support for a new programming interface designed to allow applications to determine the MTU (maximum transmission unit) for an IPv4 TCP/IP network interface. This new support is in addition to similar existing support for IPv6, and can help improve cross-platform portability for sockets applications.
- z/OS Communications Server is changed to deprecate support for IPv6 Type 0 Routing Headers. This is designed to comply with IPv6 RFC5095, Deprecation of Type 0 Routing Headers in IPv6.
- In z/OS V1.11 XL C/C++, the XL C/C++ compiler adds additional support for source code compatibility with the GNU Compiler Collection (GCC), including C support for the statement expression construct to allow programmers to use loops, switches, and local variables within an expression, and C and C++ support for the zero-extent array construct as a header for a variable-length object. These features make it easier to port C/C++ code using these constructs on other platforms to z/OS XL C/C++.

Security

Trusted for generations to be your secure data vault, z/OS can now be your source for secure authentication, audit, and networking.

Now more than ever you have to protect your business from threats large and small, from external and even internal sources. Having strong platform security is a core attribute and one of the basic values of the z/OS platform. z/OS and System z together are the ideal security hub for the enterprise. IBM's commitment to z/OS system integrity coupled with the latest security and cryptographic enhancements can help your business protect users, applications, the network, transactions, and data. In addition, z/OS security features can help you to meet regulatory reporting needs with confidence. These include encryption solutions to help secure data from theft or compromise, access control management, and extensive auditing features -- with the simplicity of centralized management. Together, System z and z/OS security are one of the many reasons why the world's top banks and retailers rely on the IBM mainframe to help secure sensitive business transactions.

Security improvements added for z/OS V1.11 include the following:

- Encrypt sensitive data with DS8000 drive-level encryption and manage the keys with IBM Tivoli Key Lifecycle Manager (TKLM) for z/OS.
- IBM Tivoli Directory Server for z/OS (IBM TDS, LDAP) for z/OS provides new function that is intended to simplify migration of LDAP server workloads to z/OS. Many security-related applications use LDAP, and migrating them to z/OS and integrating them with RACF can ultimately help unify disparate, disconnected processes for identity and access management.
- RACF administration is simplified with the availability of more RACF function and capability via IBM TDS.
- A new identity propagation function in z/OS V1.11 is designed to allow authorized programs, such as subsystems, to associate distributed identities from trusted systems with RACF user IDs for improved cross-platform accountability. New fields in SMF Type 80 records have been defined to include related information about user authentication. CICS Transaction Server for z/OS V4.1 will be the first exploiter of this new function.

- Get additional peace of mind knowing you can manage keys and retrieve encrypted data. A new key generation and archival function enables users to generate and recover private keys directly from PKI Services.
- There are many options for encrypting your data and transactions. ICSF makes it easier to decide which cryptographic algorithm to use with a new Query Algorithms function.
- New SSL functions and standards are integrated in z/OS and can be applied to z/OS applications transparently by Application Transparent - Transport Layer Security.
- WebSphere Application Server for z/OS V7 and IBM Tivoli Key Lifecycle Manager (TKLM) both add SMF audit records which can help your business comply with corporate standards and government regulations. In addition, SMF records for RACF can be loaded into XML format for use and analysis.
- z/OS audit capabilities are leveraged by IBM software. WebSphere Application Server for z/OS V7 and IBM Tivoli Key Lifecycle Manager (TKLM) for z/OS both add SMF audit records which is intended to help your business comply with corporate standards and government regulations.
- As the number of applications, particularly Web-based applications, increases, your vulnerability to attack can go up. z/OS Communications Server supports some of the latest security standards and RFCs, new SSL function and updates to Application Transparent-TLS, and many simplification enhancements to its sophisticated centralized policy-based networking processes.

z/OS security capabilities are designed to adopt new security standards, simplify security management, and extend z/OS security capabilities across the enterprise. Details on security enhancements for z/OS V1.11:

- Drive-level encryption and advanced key management support: New DS8000 features allow the DS8000 to encrypt sensitive data in place. Drive-level encryption is designed to have no performance impact, to be transparent to the application and to the server, and to help minimize the costs associated with encrypting data at rest with a solution that is simple to deploy and simple to maintain. Support for the DS8000 is available on z/OS V1.8, V1.9, and V1.10 with the PTF for APAR OA27393 and included in z/OS V1.11. The IBM Tivoli Key Lifecycle Manager (TKLM) which manages the encryption functions for the DS8000 is supported on z/OS V1.9, V1.10, and V1.11. For more information about the new DS8000 features, refer to Hardware Announcement [109-120](#), dated February 10, 2009.
- z/OS identity propagation provides a way for z/OS transactional subsystems to associate users' distributed identities with RACF user IDs under z/OS Security Server (RACF) control while maintaining the users' original identity information for auditing. This can improve cross-platform interoperability and provide value for both host-centric and heterogeneous application environments. CICS Transaction Server for z/OS V4.1 will be the first exploiter of this new function. For more information, see Software Announcement 209-135 [209-135](#), dated April 28, 2009.
- z/OS Communications Server Application Transparent SSL/TLS support (AT-TLS) is updated to support System SSL functions that have been added since z/OS V1.7, including support for:
 - TLS V1.1.
 - Validating certificates in a way that meets the requirements of RFC3280.
 - Negotiation and use of a truncated HMAC.
 - Negotiation and use of a maximum SSL fragment size.
 - Negotiation and use of handshake server name indication.
 - Setting the CRL LDAP server access security level.
 - Specifying an operational mode for System SSL designed to meet FIPS 140-2 requirements. This support combines the simplicity of using AT-TLS with the ability to use the latest System SSL capabilities.
- National Institute of Standards and Technology (NIST) is the U.S. federal technology agency that works with industry to develop and apply technology, measurements, and standards. One of the standards published by NIST is the Federal Information Processing Standard Security Requirements for Cryptographic

Modules referred to as FIPS 140-2. In z/OS V1.11, System SSL provides a mode of operation designed to meet the NIST FIPS 140-2 Level 1 criteria. This mode restricts a System SSL application to using FIPS-approved algorithms, key sizes, and TLS protocols.

- RACF, the Program Management Binder, and Program Management loader add generalized functions that enable program objects to be digitally signed and verified. These functions allow you to sign and verify applications you have written, enable software vendors to sign their applications, and allow the system to verify signatures of these program objects. This includes Program Management Binder support for including digital signatures in program objects, and loader support to verify program object signatures before using them when you specify that signatures are to be verified. This provides another capability that can help you ensure that change control processes and procedures are enforced.
- In z/OS V1.11, IBM Tivoli Directory Server for z/OS (LDAP) enhances the SDBM backend to allow administration of RACF general resource profiles in a manner similar to that currently used to manage RACF User, Group, and Connect profiles. The new RACF R_admin callable service is designed to allow general resource profile data to be extracted from the RACF database with good performance, and the SDBM backend of the IBM Tivoli Directory Server for z/OS server is extended to manage RACF Resource profiles. This new function allows the use of LDAP operations to create, modify, delete, and display discrete and generic RACF Resource profiles and access lists. In addition, it allows setting RACF options that pertain to classes through an SDBM modify command. Enhancements are also made to provide LDAP change log entries for updates made to RACF general resource profiles using the RACF TSO/E commands.
- RACF provides a REXX interface to the extract functions of the R_admin (IRRSEQ00) callable service. User, group, connection, general resource, and SETROPTS information can be returned to a REXX program in the form of compound variables within a stem that is provided by the caller.
- IBM Tivoli Directory Server (LDAP) for z/OS provides enhanced replication function equivalent to that currently provided by the IBM Tivoli Directory Server for distributed platforms. This includes replication of subtrees of the Directory Information Tree (DIT) to a specific server, a multitiered topology referred to as cascading replication, assignment of server role (master or replica) by a subtree, filtered replication, support of gateway replication, schema replication, enhanced conflict resolution, extended operations, and command line utilities. These enhanced replication functions are intended to allow easier migration of LDAP server workloads to z/OS.
- A new RACF option allows you to specify that the system automatically create OMVS segments with unique UIDs or GIDs when users who do not have OMVS segments first attempt to use z/OS UNIX System Services. This new function saves the newly assigned UIDs and GIDs in the OMVS segments of the user and group profiles.
- In z/OS V1.11, NFS supports these new and enhanced functions:
 - NFS supports both System Authorization Facility-based (SAF-based) and non-SAF-based authentication. In z/OS V1.11, NFS design has been improved to eliminate the need to issue the *mvslogin* and *mvslogout* NFS client utility commands for RPCSEC_GSS requests directed to the z/OS NFS Server when SAF is used.
 - The RPCSEC_GSS framework is intended to provide strong authentication with cryptographic protection and a means for the Servers to validate the identities being claimed by Client users, eliminating the need for additional calls from z/OS NFS Server to RACF services. This function is intended to be exploited by client users and applications initiating RPCSEC_GSS workloads.
 - The NFS V4 protocol facilitates the usage of multiple security mechanisms and the ability to administer the server name space with the deployment of different security policies. It provides support for NFS Clients to negotiate security with the server for a given file object using the SECINFO operation of the protocol. In z/OS V1.11, the NFS client is designed to support this negotiation. This is intended to help improve interoperability with NFS Servers, and complements the server-side support for security negotiation with SECINFO available on supported releases of z/OS.

- In z/OS V1.11, RACF RACDCERT and PKI Services enhancements are added. RACDCERT services are updated to extend the current multibyte character support. The RACDCERT support is intended to allow installation, retrieval, and authentication functions on certificates to specify multibyte characters outside code page 1047, allowing characters used in additional languages to be used in the Subject Distinguished Name. PKI Services is designed to support the SHA256 with RSA encryption signature algorithm. This enhanced support is intended to allow SHA256 in the signature algorithm to be used for signing certificates, for certificate and authority revocation lists (CRLs/ARLs), and for OCSP responses.
- In z/OS V1.11, new designs for key generation and key archival/recovery capabilities are introduced for PKI Services. This new support is intended to give certificate requesters the option to generate public/private key pairs themselves as they can today or to have PKI Services generate key pairs. This new design also enables a requester to recover its private key if it was generated by PKI Services.
- The components discussed here provide network accessibility to z/OS security services, leveraging the core security and crypto components of the platform in an enterprise-wide role, thereby amplifying the value of the z/OS core infrastructure. Components such as z/OS PKI services have been maturing to the point where significant value and savings can be realized, helping improve overall TCO and cement z/OS as a core part of IT in these enterprises.
 - In z/OS V1.11, the design for the Network Authentication Service of the Integrated Security Services element is changed by updating its interaction with TCP/IP resolver settings. The objective of this new support is to eliminate the need for system administrators to provide the location of the TCP/IP Resolver configuration file to Kerberos.
 - In z/OS V1.11, the Network Authentication Service **keytab** command is enhanced. A new **merge** operand is added to allow you to specify that another key table be imported and merged into the target key table. The source key table can contain keys that were generated automatically. This is intended to make it easier to merge two key tables and allow easier consolidation of key distribution centers (KDCs).
 - z/OS Communications Server enhances network security services (NSS) to further enable XML appliance security as a logical extension of z/OS security. Two new services are added: a certificate service that provides certificate management operations, and a private key service that allows retrieval of private keys from the SAF keyrings and performs RSA signature creation and RSA decryption using ICSF-protected keys. These new services enhance z/OS centralized management of security for XML appliances.
 - In z/OS V1.11, System SSL is updated to support the Transport Layer Security (TLS) V1.1 protocol as defined in RFC4346. This support is intended to allow System SSL applications to exploit the protocol as well as ensuring continued interoperability with other SSL implementations that support TLS V1.1.
 - In z/OS V1.11, System SSL is updated with support for TLS Extensions (RFC4366). TLS Extensions are designed to provide additional functionality for the Transport Layer Security (TLS) protocols by allowing TLS clients and servers to exchange supplementary information during the TLS Handshake. Support is provided for the Server Name Indication, Maximum Fragment Length Negotiation, and Truncated HMAC extensions.
 - In z/OS V1.11, System SSL is updated to support X.509 v3 certificates and X.509 v2 Certificate Revocation Lists (CRLs) at the RFC3280 level.
 - The U.S. government has defined a new protection profile for IPv6 that takes advantage of the AES symmetric encryption algorithm. ICSF provides two new services that support the AES-based AES-XCBC-MAC-96 and AES-XCBC-PRF-128 algorithms. This is intended to meet the government standard.
 - In z/OS V1.11, support allows the SMB server process to run under a user ID that has access to the BPX.SUPERUSER profile in the RACF Facility class. This eliminates the current requirement for the SMB server user ID to have UID(0).
 - In z/OS V1.11, the SMB Server is designed to dynamically recognize changes to the SMB client's security permissions.
 - The SMB server is enhanced to support the Microsoft Windows® Vista Business and Windows Vista Enterprise operating systems running as SMB clients.

- IPsec enhancements: New designs are added to enhance the IPsec command, Network Management Interface (NMI), and SMF records. This new function is intended to improve the interoperability and usability of z/OS Communications Server IPsec.
- WebSphere Application Server V7 introduced an audit infrastructure designed to enable audit records to be created for security-related events. Similarly, the Tivoli Key Lifecycle Manager (TKLM), 5698-B35, provides SMF audit records on z/OS. The RACF SMF Unload Utility is updated to support both the SMF type 83 subtype 5 records written by WebSphere Application Server and the type 83 subtype 6 records written by TKLM. The RACF SMF Unload Utility function is also available on z/OS V1.8, V1.9, and V1.10 with the PTF for APAR OA26653.
- ICSF provides services for major credit card vendors, such as VISA and MasterCard, to generate and verify the verification values. The verification values are used in the process of validating the authenticity of the cards. In z/OS V1.11, the VISA Card Verification Value (CVV) Service Generate (CSNBCSG) and VISA CVV Service Verify (CSNBCSV) callable services are extended to support 14-digit Diners Club primary account numbers (PANs). Support for additional 15-digit, 17-digit, and 18-digit PANs is included for future applications.
- ICSF introduces a Key Store Policy, providing a set of policy controls designed to allow you to specify further limits on application control of key material and provide a central point of control. The new set of policy controls includes Key Token Authorization, Key Label, and Duplicate Key Label Checking, Granular Key Label Access, and Symmetric Key Label Export Control. This new set of policy controls extends ICSF's use of the z/OS Security Server (RACF) and provides additional policy-based protection for key material stored in the CKDS and PKDS data sets.
- ICSF provides a new ICSF Query Algorithms service that returns a summary of available cryptographic algorithms, providing information applications and middleware can use to help determine whether to use system services or provide their own cryptographic implementations.
- The Advanced Encryption Standard (AES) is a National Institute of Standards and Technology specification for the encryption of electronic data. It is the accepted means of encrypting digital information, including financial, telecommunications, and government data. AES is the symmetric algorithm of choice, often recommended in z/OS V1.11, instead of the Data Encryption Standard (DES) and Triple DES for the encryption and decryption of data. ICSF supports the AES encryption algorithm with secure (encrypted) keys of 128, 192, and 256 bits.
- The z/OS V1.11 SMB Server design has been changed to accept NTLMv2 authentication tokens in addition to passwords. This is intended to make interoperation with Windows Vista clients easier.

The Cryptographic Support for z/OS V1.9 through z/OS V1.11 Web deliverable is planned to be made available November 20, 2009. To obtain this Web deliverable, when available, visit

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

This Web deliverable is planned to support z/OS V1.9, z/OS V1.10, and z/OS V1.11, and include these new functions:

Extended PKCS11 Support:

With the focus on data security, cryptographic services must be continuously available. New ICSF designs that use integration between hardware and software components are intended to help improve the availability of z/OS host applications. A software cryptographic engine function embedded in ICSF can be used so that no optional cryptographic coprocessors will be required for PKCS11 processing. Additional algorithms planned to be supported are DSA, DH, EC, AES GCM, BLOWFISH, and RC4.

Elliptical Curve Cryptography (ECC) Support:

ICSF plans support intended to comply with RFC4869 Suite B Cryptographic Suites for IPsec and the following new clear key algorithms: Galois/Counter Mode encryption for AES (GCM), Elliptic Curve Diffie-Hellman key derivation (ECDH),

Elliptic Curve Digital Signature Algorithm (ECDSA), and HMAC. This support is also designed to comply with NIST requirements to support a FIPS-140-2 mode of operation for IPsec.

Availability

Resilience that helps reduce risk from outages

There is more to availability than just the server being up -- the application and the data must be available with good performance as well. For the System z platform this means hardware, connectivity, operating system, subsystem, database, and application availability too. z/OS, System z servers, and storage subsystems working together can provide outstanding availability:

- System z servers are designed to reduce planned and unplanned outages through the use of self-healing capabilities, redundant componentry, dynamic sparing, and the ability for concurrent upgrades and microcode changes. For example, the System z10 server provides additional microcode driver enhancements, and dynamic segment sparing for memory as well as a fixed Hardware System Area (HSA). Also, new features in the IBM System Storage DS8000 enable Metro Mirror (PPRC) support for FlashCopy® for improved storage availability.
- With every release, z/OS continues to refine its error checking, fault tolerance, isolation, error recovery, and diagnostic capabilities. z/OS V1.11 availability enhancements include designs for improved diagnostic data processing, advances in Mean Time To Recovery, and many serviceability improvements.
- z/OS takes availability management to the next level by introducing predictive failure analysis. Beyond error checking, first failure data capture, and recovery routines, predictive failure analysis means your z/OS system heuristically learns from its own environment and is able to anticipate and report on potential system issues (however rare) before they are an impact to your business.
- Parallel Sysplex clustering is used for scalability, availability, software migrations, and disaster recovery and might even be considered the first cloud computing environment ever. For z/OS V1.11, Parallel Sysplex technology is enhanced with improved recovery management, improved networking performance, and workload management. This new function is expected to help improve sysplex availability by allowing sysplex failure management (SFM) to avoid delays in initiating sysplex recovery processing, reset failed systems remotely, and avoid operator intervention in many cases.

Details on availability improvements added for z/OS V1.11:

- Support for IBM Remote Pair FlashCopy, also known as Preserve Mirror. This new function, supported by new DS8000 features, is designed to allow you to perform Flashcopy operations where Metro Mirror primary volumes are the destination while preserving the duplex state of the volumes. This can help you improve storage availability and achieve more consistent recovery point objectives (RPO) by removing this reason for interrupting Metro Mirror duplexing. This function is available on z/OS V1.8, z/OS V1.9, and z/OS V1.10 with the PTFs for APARs OA24809, OA24816, and PK64715. For more information about the new DS8000 features, refer to Hardware Announcement [109-119](#), dated February 10, 2009.
- In z/OS V1.11, design changes are added for the I/O Supervisor (IOS) and System Logger to reduce IPL and restart time. The changes to System Logger reduce concurrent log stream connection time involving staging data set allocations, and IOS design is changed to streamline the channel programs used during initialization. These changes are expected to help improve IPL and Logger restart times.
- In z/OS V1.11, support is added for a new ALTRoot parmlib statement you can use to specify an alternate sysplex root file system if the current sysplex root becomes unavailable. This new support can help you improve availability by making it possible to recover from sysplex root file system failures.
- Dynamic LPA is enhanced to accept the full path and file names for modules passed using byAddr and save the path name as part of the information associated with each entity so that CSVINFO and CSVQUERY can return those

values for these modules. This support helps you determine the source of LPA modules that originally were loaded from a z/OS UNIX file system.

- In z/OS V1.11, support is added for two new commands:
 - SETALLOC is designed to allow you to change all the settings specified in ALLOCxx parmlib members with the exception of 2DGT_EXPDT, which specifies how 2-digit years in expiration dates are to be processed. The command uses keywords similar to those used in ALLOCxx parmlib members.
 - DISPLAY ALLOC shows the currently active Allocation settings as set from the ALLOCxx parmlib members used during IPL and any subsequent SETALLOC commands. Also, this command allows you to display Allocation information that can help IBM Service diagnose problems. These new commands can help improve system availability by allowing you to change Allocation settings without an IPL.
- The AutoIPL support introduced in z/OS V1.10 is extended to multisystem-capable sysplex configurations with active Sysplex Failure Management (SFM) policies in z/OS V1.11, and available for z/OS V1.10 with the PTFs for APARs OA26993 and OA26995. New LPAR firmware support is also required. This new support is designed to perform the requested AutoIPL actions when an SFM policy is active in the sysplex. For information about the required microcode levels, refer to the text of APARs OA26993 and OA26995 for z/OS V1.10, or *z/OS V1R11.0 Planning for Installation*.
- The sysplex failure management (SFM) component of XCF used in a Parallel Sysplex to manage failures and reconfiguration has been enhanced in z/OS V1.11. It is now designed to use new Base Control Program internal interface (BCPii) services to determine whether an unresponsive system has failed, expedite sysplex recovery by bypassing delay intervals when possible, and automatically reset failed systems without manual intervention. This new function is expected to allow SFM to avoid waiting for a period of time before assuming that systems have failed, improve the responsiveness of failure management, avoid operator intervention, and help limit or avoid sysplex-wide slowdowns that can result from single-system failures.
- Predictive Failure Analysis® function is extended in z/OS V1.11 to two new areas:
 - Virtual storage usage checking is designed to detect increased use of storage by persistent address spaces, such as system address spaces and started tasks, over time. This information can be used in combination with auxiliary storage utilization to provide alerts when auxiliary storage use crosses a threshold you set and an increase in storage utilization has been observed for one or more persistent address spaces. This is expected to allow operators and automation to respond to situations that are created by slow rates of storage utilization growth. For example, page data sets might be added or tasks restarted before the growth causes the system to cross an auxiliary storage shortage threshold or enter a wait state due to insufficient paging resources.
 - Message arrival rate detection is designed to monitor how many messages are issued per CPU second by persistent address spaces, nonpersistent address spaces, and the total system to compare those values to their predicted values to determine when message arrival rates are abnormally high, which might indicate a system or address space problem. PFA provides an alert and information intended to help you determine whether a problem exists and where.
- In z/OS V1.11, NFS is designed to detect that file and data set access times exceed a delay detection interval you can specify and issue an operator message that includes the operation and the pathname for the object being delayed. This is intended to help you detect problems that can affect the NFS server more quickly.
- The dump management roadmap is intended to keep pace with the growth in diagnostic data that results from larger systems and larger programs using ever-increasing amounts of memory. These improvements can help you keep dumping time and dump transmission time under control.
 - SVC Dump processing uses virtual storage to contain a copy of the data being dumped until it can be written to a dump data set; this can help minimize the time required to collect the data so that processing can resume quickly. The system prevents dump processing from consuming enough virtual storage to exhaust all available auxiliary storage. You can also specify a maximum amount

- of virtual storage using the MAXSPACE option of the CHNGDUMP command to make it less likely that an auxiliary storage shortage will cause a system-wide impact during dump processing. In z/OS V1.11, a new default option, AUXMGMT, is added to CHNGDUMP. This allows you to specify that the system is to manage the amount of virtual storage used for dump processing based on available auxiliary storage. This allows the system to react to changing auxiliary storage capacity and utilization automatically and is intended to make it unnecessary to monitor and tune your specification for MAXSPACE.
- In z/OS V1.11, dump processing design is changed to detect excessive periods of system-wide nondispatchability and allow other work to resume if dump data collection is taking too much time. A new MAXSNDSP operand on the CHNGDUMP command can be used to specify the maximum time the system will be set nondispatchable. This is to reduce the impact of collecting diagnostic data. Also, a new message, IEA045I, is issued at the start of dump processing to complement the existing IEA611I message issued when dump processing ends. This makes it easier to find the duration of dump processing.
 - JES3 is designed to cause the system to dump additional address spaces when a failure occurs in an address space that is using certain JES3 services. The additional address spaces include JES3, JES3AUX, and JESXCF. This new function provides improved first failure data capture for other address spaces that use the subsystem interface (SSI) for JES3 services.
 - z/OS UNIX System Services allows you to capture a System Call (syscall) Trace for a specific application or set of applications. This allows you to gather more information about program processing history to facilitate application debugging. You can now specify that syscall tracing be turned on or off using a new SIGTRACE signal and bpxtrace command.
 - In z/OS V1.11, a new design allows an IBM GDPS 3.4 or later Controlling system (K-system) in a GDPS/PPRC configuration to continue processing even when a failure has caused the server on which the K-system runs to lose synchronization with the sysplex timing source (Server Time Protocol (STP) or External Time Reference (ETR)). Allowing a K-system to continue processing in a failure scenario can allow it to continue to fulfill its role as the driver of GDPS's recovery actions, such as coordinating Metro Mirror disk swap or disk recovery. A loss of synchronization with the timing source in a sysplex previously would have required operator intervention. This function is also available on z/OS V1.9 and z/OS V1.10 with the PTFs for APARs OA26085 and OA28323. For more information, see Software Announcement [309-002](#), dated February 24, 2009.
 - Enhanced Contention Analysis (ECA) for GRS Latches is designed to provide improved analysis for latch contention, including a new latch identity service that can be used by exploiters to provide information for display commands so that the holder of a latch is easier to identify. A new DISPLAY GRS,ANALYZE command, similar to the one available for enqueues, is added for latches. Latch identification information and real time diagnostic data are displayed. In z/OS V1.11, System Logger and Resource Recovery Services (RRS) provide identification information for their latches. The new functions for analyzing latch waiters, blockers, and dependency contention analyses are intended to make it easier to identify deadlocks and to find the root cause of latch contention.
 - In z/OS V1.11, XCF design is changed to automatically adjust the failure detection interval (FDI) to use for systems in the sysplex when needed. The system's effective FDI is now designed to be the longer of the two intervals resulting from the FDI you specify and a value based on the system's excessive spin parameters, making the system's processing of excessive disabled spin conditions, the sysplex's handling of missing system heartbeats, and the initiation of sysplex partitioning to remove unresponsive systems more consistent. Also, a new way to specify an operator notification (OPTNOTIFY) relative to the effective FDI is provided, so that you no longer need to calculate the sum of spin loop timeouts to specify the operator notification interval.

Additional reliability, availability, and serviceability enhancements in this release include:

- In z/OS V1.11, new function in the IPCS LEDATA verb exit provides a high-level trace mechanism for C FILE I/O that can help reduce the time it takes to understand and debug complicated I/O problems. Also, the IPCS function in

combination with additional settings on the HEAPCHK option are intended to improve formatting of heap pools control blocks and extents to make it easier to find damaged cells.

- z/OS UNIX has been changed to provide a new option you can use to specify that all syscalls made during a kernel shutdown be failed for applications. Also, additional documentation and information are provided for security system calls that end in error to help you diagnose security problems for z/OS UNIX applications.
- System Logger design is changed to help protect the system from SQA shortages that can result from write requests for a log stream being issued faster than they can be processed. Thresholds are created for outstanding asynchronous IXGWRITE requests. When they are exceeded, requests will be failed with a new return code to indicate to callers that too many outstanding requests for the specified log stream exist. An Event Notification Facility (ENF) signal indicates that the backlog has been reduced enough for new requests to be accepted. This change is intended to help improve system availability.
- A new JCL keyword on the DD statement, SMSHONOR, is added. It can be used to specify that Allocation should honor the device number or esoteric device type specified by UNIT as it processes the tape library devices selected for the request by SMS. This change helps improve serviceability by allowing you to specify a specific device within a tape library when gathering diagnostic information, such as when using GTF tracing, and can help improve device availability.
- Improvements are made to z/OS UNIX file system processing design:
 - A new z/OS UNIX automount processing design discontinues automated UNMOUNT attempts when unmount failures occur.
 - A new BPXF251I message is issued when unowned file systems are recovered and made active in shared file system configurations.
 - The message issued in response to the DISPLAY OMVS,WAITERS command has been changed to include the date and time contention started to make it easier to correlate cross-system contention.
- New MODIFY DFS™ commands are designed to allow you to format the DFS trace table, restart the trace, display the size of and other information about the trace table, and change its size dynamically while the SMB server runs. These changes are intended to help improve availability and serviceability for the SMB server.
- Currently, some errors are returned to the z/OS UNIX System Services filesystem caller with reason codes that are the NFS file-and-line type, requiring that analysis be done by NFS development to identify the error. To make it easier to identify the root causes for these kinds of errors, NFS design is changed in z/OS V1.11 to convert many of these notifications to published reason codes you can use to discover the reason for the error. Also, NFS Client Memory Management is designed to provide more meaningful diagnostic information, including the module and offset of the calling function when an error occurs. In addition, NFS is designed to provide completion messages for NFS Server operator commands.
- In this release, VSAM serviceability improvements are added. VSAM design for record management and internal tracing are changed to add additional trace information, and corresponding formatting support is planned for IPCS. These changes can improve first failure data capture for VSAM, and allow you to capture VSAM diagnostics data without having to re-IPL your system, simplifying VSAM problem diagnosis.
- A new REMOUNT function is added for z/OS UNIX System Services. Supported on the ISHELL panel for working with mounted file systems, by new operands on the TSO/E unmount, z/OS UNIX CHMOUNT, and REXX unmount commands, and by callable service and an osi_service interface, this new function is designed to remount an already-mounted file system in the same mode. This is expected to help you recover from problems involving file systems that have been disabled for write.
- The XCF protocol used by zFS sysplex administration functions has been changed to allow zFS to recover from failures dynamically, without operator intervention. This is intended to improve zFS reliability and availability.
- z/OS Communications Server adds improved internal monitoring and management of storage used by sockets applications, which can for various reasons build up an excessive amount of data on their send or receive queues. In addition, z/OS Communications (OMPROUTE) can continue processing during temporary storage

shortage conditions. This function is intended to improve network and system availability during periods where network traffic volume peaks and storage is constrained.

Optimization and management capabilities

Optimization and management capabilities are designed to deliver what your business needs.

Core workloads comprise complex, multitiered systems with one part of an application or transaction not aware of the rest of the process. With the ability to intelligently manage workloads, reprioritize work, measure transactions, route network traffic, and dynamically reallocate system resources between applications quickly and efficiently, z/OS and System z are designed to handle unexpected workload spikes, and improve your system's efficiency and availability while meeting your application and business priorities.

Updates for z/OS V1.11 include:

- z/OS V1.11 is enhanced with a new function that can enable System z Application Assist Processor (zAAP) eligible workloads to run on System z Integrated Information Processors (zIIPs). This can enable you to run zIIP- and zAAP-eligible workloads on the zIIP; see details below.
- z/OS V1.11, together with IBM DB2 for z/OS Version 8 or DB2 9 DB2 utilities, now offers additional capabilities for exploiting IBM System z Integrated Information Processors (zIIPs). DB2 utilities sorting fixed-length records using IBM's memory object sorting technique, especially LOAD, REORG, and RUNSTATS utilities, will have a portion of the workload offloaded to a zIIP when one is available.
- A new z/OS component, the Base Control Program Internal Interface (BCPii), is designed to allow authorized programs to perform Hardware Management Console (HMC) functions and to communicate via an HMC network without the need for an IP network for connectivity. Initial exploiters include z/OS Capacity Provisioning and XCF Sysplex Failure Management.
- The SMF log stream unload utility has been updated to support relative dates in addition to absolute dates. This means SMF log streams can be stored, managed, and processed with relative dates (such as today, yesterday, and last week), making it easier to exploit the wealth of SMF information.
- DFSMSrmm enhances its enterprise-wide tape management capabilities with designs for improved search capabilities, new health checks, and simplified monitoring and management functions.

Details on optimization and management enhancements for z/OS V1.11 include:

- z/OS V1.11 is enhanced with a new function that can enable System z Application Assist Processor (zAAP) eligible workloads to run on System z Integrated Information Processors (zIIPs). This function can enable you to run zIIP- and zAAP-eligible workloads on the zIIP.

This new capability is ideal for customers without enough zAAP- or zIIP-eligible workload to justify a specialty engine today; the combined eligible TCB and enclave SRB workloads might make the acquisition of a zIIP cost effective. This new capability is also intended to provide more value for customers having only zIIP processors by making Java- and XML-based workloads eligible to run on existing zIIPs.

Customers who have already invested in zAAP, or have invested in both zAAP and zIIP processors, should continue to do so as this maximizes the new workload potential for the platform.

This capability is available with z/OS V1.11 (and also on z/OS V1.9 and z/OS V1.10 with the PTFs for APAR OA27495) and all System z9® and System z10 servers; some additional restrictions apply. This capability does not provide an overflow that directs additional zAAP-eligible workload to run on a zIIP, but enables the zAAP-eligible work to run on zIIP when no zAAP is defined. This new capability is not available for z/OS LPARs if zAAPs are installed on the server.

This new capability does not remove the requirement to purchase and maintain one or more general purpose processors for every zIIP processor on the server. This part of the IBM terms and conditions surrounding the IBM System z specialty engines is unchanged.

- z/OS V1.11, together with IBM DB2 for z/OS Version 8 or DB2 9 DB2 utilities, now offers additional capabilities for exploiting IBM System z Integrated Information Processors (zIIPs). DB2 utilities sorting fixed-length records using IBM's memory object sorting technique, especially LOAD, REORG, and RUNSTATS utilities, will have a portion of the workload offloaded to a zIIP when one is available. This capability is also available on z/OS V1.10 with the PTF for APAR PK85856, and requires DB2 Version 8 or DB2 9 with the PTF for APAR PK85889.
- z/OS V1.11 is updated with a new function designed to generate messages for Server Time Protocol (STP)-related hardware events. This function, in addition to messages already issued to the System z Hardware Management Console (HMC), is intended to help improve problem determination and correction times. This function is also supported on z/OS V1.9 and z/OS V1.10 with the PTF for APAR OA28323, and is supported on IBM System z10 and System z9 servers with Machine Change Level (MCL) Driver 76.
- IBM introduces a new z/OS component, the Base Control Program Internal Interface (BCPii). BCPii provides a set of programming interfaces designed to allow authorized programs to perform Hardware Management Console (HMC) functions for System z servers within an attached HMC network. These operations include obtaining information about servers and images (LPARs), issuing commands for certain hardware- and software-related functions, and listening for certain hardware and software events. BCPii communication to HMCs and Support Elements (SEs) uses internal communication protocols and does not require communication on an IP network. Therefore, it is isolated from other network traffic. BCPii is available on z/OS V1.10 with PTF UA47493, and requires a System z9 or z10 server with a microcode update. (For more information about required hardware levels, see the appropriate PSP bucket.) In z/OS V1.11, BCPii is designed to allow authorized programs to change or set data for certain HMC-managed objects associated with a CPC, Image, or Capacity Record. In addition, support for interactions with activation profile attributes is planned to be made available with the PTF for APAR OA29638 in first quarter of 2010.
- z/OS Capacity Provisioning exploits the new BCPii capability to remove the requirement for a TCP/IP connection for communication between the Capacity Provisioning Manager and the Support Element (SE) or Hardware Management Console (HMC). In addition, Capacity Provisioning provides improved logical processor management support. This support allows you to specify that Capacity Provisioning Manager should prompt the operator to configure logical processors online or offline as needed for capacity changes. Capacity Provisioning support for BCPii and logical processor management is also available on z/OS V1.10 with PTF UA47421. For more information on SFM exploitation of BCPii, see the [Availability](#) section.
- Support for enhanced WLM routing algorithms: The server-specific Work Load Manager (WLM) recommendations which are used by the Sysplex Distributor to balance workload across systems when the SERVERWLM distribution method is chosen are enhanced to allow you to specify how zIIP and zAAP specialty processor capacity influences selection of eligible target systems. In addition, new configuration controls allow you to specify that WLM consider the importance of displaceable capacity when determining server-specific recommendations. These enhancements are designed to help improve the workload balancing functions provided by WLM and Sysplex Distributor. More information about WLM and Sysplex Distributor function can be found in the [Scalability and performance](#) section.
- In z/OS V1.11, DFSMSrmm provides enhancements for simplified optimization and management capabilities:
 - The DFSMSrmm CIM agent is updated to support CIM level 2.17, and the CIM agent and CIM providers are updated to run with OpenPegasus 2.8.1.
 - DFSMSrmm TSO/E command support for extended searching for volumes is intended to provide more flexibility and scope for querying a wider range of volume attributes such as dates, actions, options, and flag settings.

- Extensive changes to the DFSMSrmm Report Generator are intended to improve usability, enable more report customization, and simplify the way selection information can be specified. The changes are intended to further improve the reporting available for DFSMSrmm, DFSMSHsm, and other DFSMS components.
- A new function call based interface to the DFSMSrmm API is added. The new interface supports associated error messages in addition to error codes.
- DFSMSrmm provides a new utility to enable control data set (CDS) updates made to a copy of a production CDS in test or recovery environments to be repeated against the original CDS. This enables a complete and up-to-date record of tape volume contents and status to be retained in a single CDS in a production RMMplex.
- In z/OS V1.8, DFSMSHsm introduced support to recover individual data sets from copy pool backup versions. DFSMSHsm provided support for preallocated, cataloged data sets residing on the same volumes they resided on when backed up. Deleted or moved data sets had to be reallocated and cataloged to the same volumes in order to recover them. In z/OS V1.11, DFSMSHsm is designed to capture catalog information for the data sets within copy pools at the time of the backup, and use that information when data sets are recovered, eliminating the previous requirements that the data sets to be recovered be preallocated and cataloged.
- The existing DFSMSHsm (H)BACKDS command allows you to create backup versions of specified data sets. In z/OS V1.11, new function allows you to specify a retention period on the data set backup command. The specified retention period is intended to allow you to keep an individual backup copy for either a shorter or longer than normal period of time.
- In z/OS V1.11, DFSMSHsm is designed to allow data sets larger than 64 K tracks in size to be migrated and backed up to disk and to enable Migration Level 1 (ML1) overflow volumes to be selected for migration processing and backup processing.
- In z/OS V1.11, DFSMS volume selection for striped data sets is changed to be more consistent with volume selection for unstriped data sets. This new design is intended to prefer enabled volumes to quiesced volumes and normal storage groups to overflow storage groups, allow volumes that are above the high threshold after a stripe is allocated to be eligible for selection with lower preference, and honor the multitiered storage group and additional volume preference attributes.
- In z/OS V1.11, the SMF log stream dump utility, IFASMF DL, allows you to specify a range of dates relative to the date on which the program is started. For example, you will be able to specify that the SMF records created yesterday, or those created for six days starting nine days ago, be processed. This design allows date ranges to be specified by days, weeks, or months. Also, IFASMF DL supports new options to manage the retention of the data in the SMF log stream and allow you to specify that data be archived (dumped and deleted) or deleted from the log stream. These new IFASMF DL functions are intended to make it easier to exploit log stream-based SMF data management.
- The PTFs for APAR OA22414 added new storage-related and performance-related information to SMF Type 23 records. In z/OS V1.11, RMF will also provide these system statistics in the Type 70 and Type 71 SMF records. This information is intended to be used for capacity planning.
- OSA-Express connection isolation is designed to prevent OSA-Express from internally routing packets between TCP/IP stacks sharing the OSA-Express port. This support provides an improved ability to enforce IP filter processing in outboard IP routers for traffic that flows between System z LPARs that share OSA-Express ports.
- z/OS Communications Server now provides updated network management interfaces to provide additional details to network management applications.
- Many installations use products or functions that employ sampling techniques to help them determine which programs are in use and provide a view of the components of application response time and each component's contribution to response time. z/OS Communications Server code is changed to make it easier for such products and functions to map load modules and entry points. This is intended to make it easier for you to gain a better view of how the network-related components of your workloads contribute to application response time.

- Extend number of reporting classes to 2048: With systems and environments becoming larger, more reporting classes are needed in WLM. In z/OS V1.11, the number of report classes is increased from 999 to 2,048. This increase allows more fine-grained reporting of your workloads.
- In z/OS V1.11, the service used to request data about a logical partition, REQLPDAT, which can return LPAR and capacity information from the system, is enhanced to support unauthorized applications. This is intended to make it easier to obtain information about the system.
- New function in z/OS Communications Server is designed to improve the accuracy of workload balancing decisions for server applications that use the Fast Response Cache Accelerator (FRCA) function with persistent HTTP connections, such as Web serving applications.
- In z/OS V1.8 and later releases, you can define capacity groups for LPARs to help you manage the 4-hour rolling average utilization of your servers while allowing capacity unused by one LPAR to be used to satisfy workload demands on other LPARs on the same server. In z/OS V1.11, the RMF Postprocessor Group Capacity report is designed to include information about the available capacity in each capacity group and the percentage of time each partition was actually capped during the reporting period. This is in addition to existing fields that report the capacity of each group and whether each partition was eligible to be capped during the same period. This new support is expected to make it easier to manage LPAR capacity groups.
- In z/OS V1.11 SMS supports the allocation of critical data sets (such as DB2 partitions) on different volumes to help reduce I/O contention. This new function is designed to expand the existing data set separation function, and allow you to specify that critical SMS-managed data sets be separated across extent pools and volumes used by other data sets specified in the separation group.
- In z/OS V1.11, HCM has been updated to support Windows Vista and IPv6 communications with HCD. Also, a number of functional enhancements have been made to HCD, including:
 - The addition of logical paths to HCD reports
 - Indication of empty esoterics in the EDT report
 - Showing the processor token in the Processor Compare Report
 - Making the CSS/OS Device Compare Report more compact
 - Adding the processor ID to HCD Channel Path List panels
 - Providing a warning when changing channel path modes between SPAN and SHR
 - Showing the partition defaults in generated IOCP decks, indicating that channel paths are assigned to a single partition when deleting a partition
 - Changes in HCM intended to work with multi-user access of IODFs for viewing, reporting, and physical changes
- With z/OS V1.11, OAM design is changed to add these retention-related enhancements:
 - Deletion-protection is designed to prevent object deletion prior to an object's expiration date. You can specify that deletion-protection be turned on and off with no restrictions on changing the object's expiration date.
 - Deletion-hold is designed to prevent object deletion until an object is RELEASED. This function is used to specify that objects are not to be deleted. For example, this is expected to be useful when multiple, differing retention periods apply to certain business records.
 - Event-based retention is designed to make the object expiration date dependent on an external event notification. Before this support, an OAM object could be automatically based on age, its usage, or a specific date derived from a management class or a management-class-approved object-specific retention period. Event-based retention policy provides an alternate mechanism whereby retention time for an object can be initiated by an external event.
 - Retention-protection is designed to prevent object deletion prior to its expiration date, and not allow an expiration date to be changed to an earlier date. The objective of retention-protection is to prevent deliberate or accidental deletion of data until a specified retention criterion is met.

- In z/OS V1.11, changes to the Open/Close/End-of-Volume (OCE) component of DFSMS design include:
 - A faster tape positioning algorithm for cartridges on IBM 3590 and later technology with EOv concatenation. This requires no change to applications.
 - Avoidance of reprocessing the same volume when duplicate volume serial numbers are detected during multivolume tape processing, and a new return code you can set in the label anomaly exit (IFG019LA) to cause abends for volume sequence problems the system can detect when processing multivolume tape data sets, and which result in messages IEC709I, IEC710I, IEC711I, and IEC712I.
 - A change to DASD data set output expiration date processing to add "NEVEREXPIRE" to the text of message IEC507D ("...REPLY "U"-USE OR 'M'-UNLOAD") when a data set has a "never-expire" date (such as 99366). This can allow you to enforce "never-expire" dates using automation.

Networking

z/OS Communications Server supports highly secure TCP/IP and SNA networking throughout an enterprise. It provides Application Programming Interfaces (APIs) and networking protocol support to enable SNA and TCP/IP applications running on z/OS to communicate with partner applications or users on the same system, on other systems within a single data center, or in distant locations. z/OS Communications Server not only maintains and improves on existing communication, but also pushes z/OS into the forefront of networking technologies, by introducing such concepts as Application Transparent TLS, policy-based networking, and centralized configuration of TCP/IP nodes.

z/OS Communications Server designs for z/OS V1.11 include:

- IBM Health Checker for z/OS RFC4301 compliance
- IBM Health Checker for z/OS DNS server check
- New SMTP client for sending Internet mail
- AT-TLS enhancements
- Enhancements to Configuration Assistant - AT-TLS and IPsec improvements
- Enhancements to Configuration Assistant - policy infrastructure simplification
- Enhancements to Configuration Assistant - new AT-TLS options
- Changes to make it easier for products and functions to map load modules and entry points
- Changes to syslog daemon (syslogd) design to improve performance and add automated archival of log files
- New ISPF-based syslog daemon browser application and search facility
- Enhanced policy infrastructure management
- Improved responsiveness to storage shortage conditions
- Disabled the use of moving DVIPA as source IP address
- Sysplex autonomics improvements for Fast Response Cache Accelerator (FRCA)
- TCP throughput improvements for high-latency networks
- Sysplex Distributor connection routing accelerator
- Enhanced resolver DNS cache
- Sysplex Distributor optimization for multitier z/OS workloads
- Sysplex Distributor support for IBM WebSphere DataPower
- QDIO routing accelerator
- Improvements to TCP/IP pathlength
- Enhanced IPv6 stateless address autoconfiguration
- New API to obtain IPv4 network interface maximum transmission unit (MTU)
- Deprecated IPv6 type 0 route header
- Enhanced QDIO for WLM IO priority

- Enhanced network management interface - detailed Communications Storage Manager (CSM) usage
- New `accept_and_recv` socket API
- Enhanced SNA High Performance Routing (HPR)
- FTP access to z/OS UNIX named pipes
- Enhanced QDIO support for OSA interface isolation
- OSA-Express 3 optimized latency mode for QDIO
- Sysplex Distributor support for enhanced WLM routing algorithms
- NSS private key and certificate services for XML appliances
- EE IPsec performance improvements
- IPsec enhancements

Note: For more z/OS Communications Server enhancements, see the [Security](#) and [Availability](#) sections.

Also, Advanced Communications Function/Trace Analysis Program (ACF/TAP) is now part of z/OS Communications Server.

Details on networking enhancements for z/OS V1.11:

- z/OS Communications Server provides two new migration health checks in this release:
 - RFC4301 check
 - DNS check

For more information about these checks see the [Ease of use](#) section.

- In z/OS V1.11, a new z/OS Communications Server mail client for sending mail from z/OS is added. The new mail client supports the existing user interface for sending mail from z/OS that was defined by the old SMTP/NJE mail gateway server, and many new mail enhancements such as secure connections, the ESMTP protocol, and IPv6 connections. The new z/OS Communications Server mail client supports sending mail only; it does not support receiving mail from the Internet. This support is designed to support secure connections to mail servers, provide simplified setup and operation, use less resource than the existing SMTP/NJE mail gateway server when sending mail from z/OS, and support existing applications that write mail messages via the JES spool interface.
- z/OS Communications Server Application Transparent SSL/TLS support (AT-TLS) is updated to support System SSL functions that have been added since z/OS V1.7, including:
 - TLS V1.1
 - Validating certificates in a way that meets the requirements of RFC3280
 - Negotiation and use of a truncated HMAC
 - Negotiation and use of a maximum SSL fragment size
 - Negotiation and use of handshake server name indication
 - Setting the CRL LDAP server access security level
 - System SSL's operational mode that is designed to meet FIPS 140-2 requirements

This support combines the simplicity of using AT-TLS with the ability to use the latest system SSL capabilities.

- IBM Configuration Assistant for z/OS Communications Server is enhanced to provide a simplified dialog for definition of AT-TLS and IPsec Policies.
- In addition to creating and maintaining policy definition files, the IBM Configuration Assistant for z/OS Communications Server is enhanced to lead administrators through other tasks needed to get z/OS Communications Server policy functions such as IPsec or AT-TLS active and running on the z/OS system.

These tasks include setting up RACF security, configuring the Policy Agent, and configuring other daemons that might be involved in the function.

This support is intended to simplify deployment of the full networking policy environment and provide improved integration of the various z/OS Communications Server networking policy components, ranging from the Configuration Assistant to the daemons running on z/OS.

- IBM Configuration Assistant for z/OS Communications Server is enhanced to support new system SSL and TLS options when defining AT-TLS policies. This support is designed to allow all current system SSL options, to allow you to specify new AT-TLS settings that support TLS V1.1, and to allow you to specify the message authentication method to be used for AT-TLS.

Note: IBM Configuration Assistant for z/OS Communications Server is included in the z/OS Management Facility and is also available as an as-is downloadable tool.

- Many installations use products or functions that employ sampling techniques to help them determine which programs are in use and provide a view of the components of application response time and each component's contribution to response time. z/OS Communications Server code is changed to make it easier for such products and functions to map load modules and entry points. This is intended to make it easier for you to gain a better view of how the network-related components of your workloads contribute to application response time.
- In z/OS V1.11, the Advanced Communications Function/Trace Analysis Program (ACF/TAP) is made a part of z/OS Communications Server element. ACF/TAP provides functions to format trace information, including VTAM buffer traces and VTAM internal traces. ACF/TAP continues to be included in ACF System Support Program (ACF/SSP). This change in ACF/TAP packaging helps you reduce cost and ordering complexity if you do not use the Advanced Communications Function/Network Control Program (ACF/NCP).
- In z/OS V1.11, z/OS Communications Server syslog daemon (syslogd) is changed to make it a multithreaded application. This is expected to speed processing of z/OS UNIX System Services log messages in most environments. Also this design allows the syslogd job name to match the JCL procedure name and provides a set of operator commands for starting, stopping, and controlling syslogd. Syslogd is enhanced to archive z/OS UNIX files to sequential data sets automatically based on configurable options. These changes are intended to improve processing performance and reliability for z/OS UNIX log messages and to simplify syslogd file space and archive management operations.
- In z/OS V1.11, z/OS Communications Server provides a new ISPF-based syslog daemon browser application to support browsing and searching both currently active syslogd files (those currently being written to by the syslog daemon) and syslogd archive data sets that were created using a new integrated syslogd archive function. This support provides another way to access the information logged by syslogd.
- In z/OS V1.11, z/OS Communications Server design is changed to enhance the networking Policy Agent to provide monitoring, automatic start, and restart support for the Defense Manager daemon, Internet Key Exchange daemon, Network Security Server daemon, syslog daemon, and Traffic Regulation Management daemon. This function will be similar to the AUTOLOG function in the TCP/IP stack, except that applications will not need to maintain a listening socket. It is intended to provide simpler management and operations for a set of applications associated with the policy infrastructure and reduce the complexity of enabling and operating a z/OS Communications Server policy infrastructure by providing a single point of control and monitoring for its most widely used components.
- z/OS Communications Server support is added to improve internal monitoring and management of storage used by sockets applications that for various reasons build up an excessive amount of data on their send or receive queues. In addition, z/OS Communications Server adds support to allow the z/OS routing daemon (OMPROUTE) to continue processing during temporary storage shortage conditions. This is intended to improve network and system availability during network traffic volume peaks when storage is constrained.
- z/OS Communications Server adds support for preventing a dynamic VIPA address (DVIPA) in moving status from being used as source IP address for outbound

connections. This support is designed to improve management of DVIPA address movement.

- New function in z/OS Communications Server is designed to improve the accuracy of workload balancing decisions for server applications that use the Fast Response Cache Accelerator (FRCA) function with persistent HTTP connections, such as Web serving applications.
- z/OS Communications Server design is changed in z/OS V1.11 to help improve performance for inbound streaming TCP connections over networks with large bandwidth and high latency by automatically tuning the window size for such TCP connections. This support is expected to improve throughput for large file transfers over long distances.
- Performance of z/OS Communications Server Sysplex Distributor when forwarding inbound IP packets for distributed connections is enhanced via a new Sysplex Distributor connection routing accelerator function. The Sysplex Distributor connection routing accelerator is based on a new general QDIO routing accelerator function that also is part of z/OS V1.11. This is expected to reduce the CPU time and latency for Sysplex Distributor connection routing.
- z/OS Communications Server enhances the resolver function by introducing system-wide caching of domain name server (DNS) responses. The resolver cache is enabled by default and shared across the entire z/OS system image. This new function is intended to provide significant performance improvements for z/OS workloads that perform repetitive resolver queries, such as Web services workloads. These performance improvements are expected without the need to set up, monitor, and administer a name server for caching purposes on your system.
- z/OS Communications Server Sysplex Distributor enhances its optimized local support in environments where multiple tiers of z/OS applications need load balancing. Prior to z/OS V1.11, you can configure Sysplex Distributor with OPTLOCAL to optimize connections when both connection endpoints reside on the same TCP/IP stack within the z/OS sysplex. In this type of environment OPTLOCAL is deployed on the tier 2 Sysplex Distributor to optimize the connections between tier 1 and tier 2 server applications. z/OS V1.11 allows a further optimization if Sysplex Distributor is also being used as the load balancer for the tier 1 server applications. This optimization allows the tier 1 Sysplex Distributor to have visibility into both tiers of the z/OS server applications on a given system when making a load balancing decision on an incoming tier 1 connection request. When using WLM-based recommendations, this optimization allows Sysplex Distributor to compute a composite WLM weight for each system that includes the capacity, performance, and health characteristics of both the tier 1 server applications and the tier 2 server applications. This new function is designed to improve the quality of the load balancing decisions made by Sysplex Distributor in a multitier z/OS server environment.
- z/OS Communications Server Sysplex Distributor is enhanced to provide workload balancing capabilities for IBM WebSphere DataPower appliances. DataPower appliances are often deployed as a front-end processing tier to z/OS applications, allowing for transparent Web services enablement of z/OS applications or for accelerated and more efficient handling of Web services security protocols, XML schema validation, and numerous additional functions. In many of these environments, multiple DataPower instances are deployed in a cluster to allow for higher availability and scalability, requiring an external, network-based load balancer to load balance incoming requests across the DataPower appliance instances. When the DataPower tier completes its handling of a request it typically then routes a request to a tier 2 application that is hosted within the z/OS environment, such as CICS TS, IMS TM, or WebSphere. These tier 2 requests might also require load balancing, especially when the applications are deployed in a z/OS sysplex environment. Sysplex Distributor can already be used to load balance the tier 2 requests into the z/OS sysplex. With this enhancement it is now possible to use Sysplex Distributor to load balance requests to both the DataPower and z/OS tiers, eliminating the need for deploying an external network-based load balancer for the DataPower tier. This enhancement works in conjunction with new support planned in the IBM WebSphere DataPower appliances. For more information, see Software Announcement [209-262](#), dated July 28, 2009 (Preview: IBM WebSphere DataPower and IBM z/OS V1.11 Logical Integration).

- z/OS Communications Server adds a QDIO accelerator function. The accelerator provides accelerated forwarding at the Data Link Control (DLC) layer for IP packets coming inbound over HiperSockets and being forwarded outbound over OSA-Express QDIO or HiperSockets and for packets coming inbound over OSA-Express QDIO and being forwarded outbound over OSA-Express QDIO or HiperSockets. The QDIO accelerator function is designed to improve performance when IP packets are routed through z/OS using any of the supported network interfaces.
- The TCP transport layer in z/OS Communications Server TCP/IP is now designed to detect and transparently react to two common sockets programming errors that can cause severe performance problems. z/OS Communications Server is designed to transparently guard against traffic stalls due to use of the Nagle algorithm and delayed TCP acknowledgments and stalls caused by TCP receive buffers that are too small. This new function is intended to help improve application availability and performance.
- z/OS Communications Server is designed to allow a client application to use IPv6 temporary auto-configured addresses generated from a random interface ID to help address security and privacy concerns identified by RFC4941, "Privacy Extensions for Stateless Address Autoconfiguration in IPv6." The use of temporary addresses with random, changing interface IDs embedded in them is intended to make it more difficult for eavesdropping software to correlate independent transactions using different IPv6 auto-configured addresses but involving the same z/OS system.
- z/OS Communications Server adds support for a new ioctl programming interface. This new interface is intended to allow applications to determine the MTU (maximum transmission unit) for a TCP/IP stack IPv4 interface. This new support is in addition to similar existing support for IPv6 interfaces. This support is intended to enhance sockets application portability with other platforms.
- z/OS Communications Server is changed to deprecate support for IPv6 Type 0 Routing Headers. This new design is intended to comply with IPv6 RFC5095, "Deprecation of Type 0 Routing Headers in IPv6."
- In z/OS V1.11, z/OS Communications Server provides a function to map WLM service class importance levels to outbound QDIO priorities in installations where outbound QDIO priority is not already being set via network Quality of Service (QoS) policies. Taking advantage of already established importance levels is expected to help ease the extension of this prioritization through z/OS and z/OS Communications Server, using OSA-Express and onto the LAN.
- The z/OS Communications Server SNA Network Management Interface (NMI) provides additional storage ownership statistics in response to the Communications Storage Manager (CSM) Statistics Request. This design allows network management applications using this NMI to request all ownership statistics or a subset of statistics based on which address space owns the storage. This support is intended to help improve problem determination based on a more granular network management insight into which address spaces use CSM storage.
- A new asynchronous (asyncio) form of the accept_and_receive socket API in z/OS V1.11 is intended to allow z/OS applications and middleware to process short-lived client TCP connections more efficiently by combining the functionality of multiple socket calls into one. This support is expected to help improve performance for TCP server applications that exploit the new API.
- The SNA High Performance Routing (HPR) performance is enhanced by implementing a new progressive mode Adaptive Rate-Based (ARB) pacing algorithm, which is expected to increase HPR performance in virtualized or CPU-constrained environments. In addition, unproductive path switches when an HPR endpoint is unresponsive are reduced or eliminated. The intent of this new function is to improve SNA Enterprise Extender (EE) performance when EE partners are located on virtualized distributed platforms.
- z/OS Communications Server FTP implements a new design that will allow z/OS applications that support reading from named pipes to process data transferred into a named pipe while FTP is still writing data into that pipe. Likewise, it allows FTP to initiate transfer of data written to a named pipe while an application is still writing to that pipe. This support helps reduce overall latency when transferring data to and from z/OS systems in combination with pre- or postprocessing by other z/OS applications or subsystems.

- OSA-Express connection isolation is designed to prevent OSA-Express from internally routing packets between TCP/IP stacks sharing the OSA-Express port. This support provides an improved ability to specify that IP filter processing in outboard IP routers for traffic that flows between System z LPARs that share OSA-Express ports be enforced.
- z/OS V1.11 Communications Server is designed to help improve performance for workloads with demanding latency requirements (such as interactive workloads, including SAP using DB2 connect) when configuring an OSA-Express3 to operate in optimized latency mode (OLM). This is intended to help improve performance for applications that have a critical requirement to minimize response times for inbound and outbound data when servicing remote client.
- The server-specific WLM recommendations which are used by the Sysplex Distributor to balance workload across systems when the SERVERWLM distribution method is chosen are enhanced to allow you to specify how zIIP and zAAP specialty processor capacity influences selection of eligible target systems. In addition, new configuration controls allow you to specify that WLM consider the importance of displaceable capacity when determining server-specific recommendations.
- z/OS Communications Server in z/OS V1.11 enhances network security services (NSS) to further enable XML appliance security as a logical extension of z/OS security. Two new services are added: a certificate service to provide certificate management operations, and a private key service to allow retrieval of private keys from RACF certificates, and to perform RSA signature creation and RSA decryption using ICSF-protected keys. This support is intended to enhance z/OS centralized management of security for XML appliances such as IBM WebSphere DataPower.
- z/OS Communications Server designs intended to improve performance in several areas to accommodate enhancements in IP security for Enterprise Extender connections are added for z/OS V1.11. IP processing better optimizes the Enterprise Extender path length when configured for IPsec and better utilizes zIIP processors on systems that are configured to use zIIPs. This new function is intended to help reduce the cost of securing EE traffic with IPsec security.
- z/OS V1.11 Communications Server improves management of IPsec through enhancements to the IPsec command, the Network Management Interface (NMI), and System Management Facilities (SMF) records. This support is intended to provide improved usability of z/OS Communications Server IPsec for network security.

In z/OS V1.11, z/OS Communications Server no longer supports:

- Boot Information Negotiation Layer (BINL) server function
- Berkeley Internet Name Domain 4.9.3 (BIND 4.9.3) DNS server function, including DNS/WLM Connection Optimization
- Dynamic Host Configuration Protocol (DHCP) server function
- Network Database (NDB) server function

Accessibility by people with disabilities

A U.S. Section 508 Voluntary Product Accessibility Template (VPAT) containing details on accessibility compliance can be requested at

http://www.ibm.com/able/product_accessibility/index.html

Product positioning

The many enhancements in z/OS V1.11 continue to position z/OS as a key mainframe operating system. These innovations provide proof points of IBM's commitment to System z. Designed and developed together with System z servers and key IBM middleware such as DB2, IMS, CICS, and WebSphere Application Server, z/OS provides the qualities of service that many customers rely upon for their mission-critical business data, transactions, and applications.

System z and z/OS are ideally suited to perform as a data serving hub for the enterprise. The platform's classic strengths of availability, security, reliability, scalability, and management have made the mainframe the de facto gold standard for data serving and OLTP. Market requirements for increased security and simplified data management, and the increasing need for real-time Business Intelligence make consolidating more data onto the mainframe an attractive option for many enterprises. New technologies, such as XML, represent net data serving workloads on the platform.

System z and z/OS are ideal for participating in service-oriented architecture (SOA) solutions. SOA services may be considered similar to and treated the same as transactions and one of the key strengths of the mainframe and z/OS is transaction processing. As organizations adopt SOA as the guiding architectural framework for development of enterprise applications, the newly deployed services quickly become business-critical components of the application infrastructure. Eventually, SOA services must be treated as mission critical and should be deployed on the robust, scalable, secure, high-performance platform offered by z/OS.

The culmination of over four decades of cooperation, coordination, and integration between z/OS and System z servers, the mainframe is an ideal security hub for the enterprise. IBM's commitment to z/OS System Integrity, coupled with the latest security enhancements, can help your business protect users, applications, and data which can ultimately help manage risk and meet compliance guidelines. Centralized definition, application, maintenance, and management of security policies help simplify security infrastructures as well.

To address mainframe skills at a functional level, z/OS will also continue to deliver on IBM's commitment of simplifying z/OS (as well as overall mainframe) operations. z/OS simplification is not intended to "dumb-down" z/OS function. Rather, the intent is to simplify systems management, improve application, system programmer, and operator productivity, and make the functions easier to understand and use for both current and new IT professionals.

Statements of direction

IBM intends to provide the capability to deliver the z/OS Customized Offerings (such as ServerPac, CBPDO, Customized Offerings Driver, SystemPac®, ProductPac®) and service orders on DVD media. Though IBM recommends using Internet delivery when ordering z/OS products or service, eliminating tape handling, the option to specify DVD physical delivery may provide an option for those who cannot accept Internet delivery. See the previous stated direction to discontinue delivery of software on 3480, 3480 Compressed (3480C), and 3490E tape media, as announced in Software Announcement [208-186](#), dated August 05, 2008.

In Software Announcement [204-180](#), dated August 10, 2004, IBM announced its intent to withdraw support for VSAM IMBED, REPLICATE, and KEYRANGE attributes in a future release. Based on customer feedback, IBM no longer plans to remove this support from z/OS in the foreseeable future. IBM still recommends that you stop using these attributes and plans to remove IMBED and REPLICATE attributes during logical DFSMSdss™ restore operations and DFSMSHsm recall operations as announced in Software Announcement [207-175](#), dated August 07, 2007.

IBM intends to update z/OS with support for the latest Internet Key Exchange protocol, version 2 (IKEv2), as defined by industry standards documented in RFC4306, "Internet Key Exchange (IKEv2) Protocol," and RFC4718, "IKEv2 Clarifications and Implementation Guidelines." This support is intended to allow z/OS to maintain compliance with industry-standard IPv6 profiles, and to expand the options available to network administrators for configuring IPsec-protected communications with z/OS systems.

IBM intends to update the Security Server RACF component of z/OS to support certificates with longer distinguished names. This function is planned to be made available on z/OS V1.10 and z/OS V1.11 by the end of the first quarter of 2010.

z/OS V1.11 Communications Server is designed to address FIPS 140-2 requirements for SSL/TLS connections via the Application Transparent Transport Layer Security (AT-TLS) component. The native SSL/TLS support in the TN3270 server and FTP client and server will not be enhanced to address FIPS 140-2 requirements. Customers who need to provide SSL/TLS-secured TN3270 and FTP connections that are designed to be consistent with FIPS 140-2 requirements are advised to use AT-TLS for this purpose.

z/OS V1.11 is planned to be the last z/OS release where RFC4301 compliance is optional. In a future release of z/OS, IBM intends to make RFC4301 compliance mandatory. RFC4301, "Security Architecture for the Internet Protocol," specifies the base architecture for IPsec-compliant systems, including restrictions on the routing of fragmented packets. In z/OS V1.10 and V1.11 RFC4301 compliance enforcement is an optional setting in the z/OS IPsec policy. Changing an IPsec policy from being non-compliant to compliant might require minor changes to IP filters for IP traffic that is routed through z/OS. The Configuration Assistant for z/OS Communications Server includes functions to assist with identifying and making such changes.

IBM plans to remove the Enhanced PSP Tool, host compare program, and associated extract files from the IBM Technical Support Web site at

<http://www14.software.ibm.com/webapp/set2/psp/srchBroker>

effective December 31, 2010. The Enhanced PSP Tool's function has been replaced by the addition of FIXCAT (fix category) information to Enhanced HOLDDATA and the REPORT MISSINGFIX function introduced in z/OS V1.10 SMP/E, which offers distinct advantages over the Enhanced PSP Tool. This SMP/E function is also available for all supported releases of z/OS in SMP/E for z/OS V3.5 (5655-G44), which you can order separately. Enhanced HOLDDATA is available in all IBM service delivery offerings and in the 730-day file from the Enhanced HOLDDATA Web site at

<http://service.software.ibm.com/holddata/390holddata.html>

The last release of z/OS to support Run-Time Library Services for Language Environment was z/OS V1.5. In the release following z/OS V1.11, IBM plans to remove the underlying CSVRTLS services from z/OS. A way to track its usage, and to enable you to find any programs that might be using these services, is planned to be made available for z/OS V1.9 and V1.10, and included in V1.11 orders with APAR OA29019 in September 2009.

The msys for Setup element of z/OS is planned to be removed in the release following z/OS V1.11. IBM intends to continue to deliver improvements to help with z/OS setup and configuration in the future.

In a future release, IBM plans to withdraw support for z/OS Distributed Computing Environment (DCE) and Distributed Computing Environment Security Server (DCE Security Server). IBM recommends the IBM WebSphere Application Server, the IBM Network Authentication Service, and/or the IBM Directory Server as replacement strategies for each of the DCE technologies. See the DCE Replacement Strategies Redbook for more details

<http://www.redbooks.ibm.com/redbooks/pdfs/sg246935.pdf>

In a future release, IBM plans to withdraw support for the z/OS Distributed File Service support that utilizes the Distributed Computing Environment (DCE) architecture. IBM recommends the z/OS Network File System (NFS) implementation as the replacement. The Distributed File Service also supports the Server Message Block (SMB) architecture. Support for SMB remains, and is not affected by this withdrawal of support.

In a future release, IBM plans to withdraw support for z/OS UNIX System Services Connection Scaling, specifically the Connection Manager and Process Manager components.

z/OS V1.11 is the last release for which SDK1.4 (5655-I56) support is planned. On z/OS V1.11, these z/OS Java products are supported until withdrawn from service:

- IBM 31-bit SDK for z/OS, Java Technology Edition, Version 6.0 (5655-R31)
- IBM 64-bit SDK for z/OS, Java Technology Edition, Version 6.0 (5655-R32)
- IBM 31-bit SDK for z/OS, Java 2 Technology Edition, Version 5.0 (5655-N98)
- IBM 64-bit SDK for z/OS, Java 2 Technology Edition, Version 5.0 (5655-N99)
- IBM SDK for z/OS, Java 2 Technology Edition, Version 1.4 (5655-I56)

For more information about z/OS Java SDK products see

<http://www.ibm.com/servers/eserver/zseries/software/java/>

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

Hardware and software support services

SmoothStart/installation services

IBM offers a number of remote and on-site IBM Operational Support Services, Migration Services, and Installation Services designed to accelerate productive use of the IBM solution. These services are provided by IBM or an IBM Business Partner at an additional charge. For additional information, contact an IBM representative and ask for IBM Global Technology Services (GTS) Services for z/OS.

Reference information

Marketing Announcement [309-002](#), dated February 24, 2009 (GDPS V3.6 -- enterprise-wide infrastructure availability and disaster recovery)

Software Announcement [209-135](#), dated April 28, 2009 (Compete, comply, and control with IBM CICS Transaction Server for z/OS V4.1)

Hardware Announcement [109-119](#), dated February 10, 2009 (IBM System Storage DS8000 series (Machine type 2107) delivers new scalability and business continuity capabilities)

Hardware Announcement [109-120](#), dated February 10, 2009 (IBM System Storage DS8000 series (Machine type 2421, 2422, 2423, and 2424) delivers new security, scalability, and business continuity)

Program number

Program number	Program name
5694-A01	z/OS Version 1 Release 11

Business Partner information

If you are a Direct Reseller - System Reseller acquiring products from IBM, you may link directly to Business Partner information for this announcement. A PartnerWorld® ID and password are required (use IBM ID).

<https://www.ibm.com/partnerworld/mem/sla.jsp?num=209-242>

Early Support Program

On a limited basis, IBM offers an early availability program for new z/OS releases prior to general availability (GA) through the z/OS Early Support Program (ESP). Eligible ESP participants usually have access to new z/OS enhancements up to a few months early. In addition to receiving the new code, ESP participants receive early publications, education, and additional assistance on topics such as migration, installation, and usage. This is a unique opportunity to communicate with z/OS developers and other z/OS users about your experiences with z/OS during the ESP. There are a limited number of openings for eligible participants in the ESP so contact your IBM representative if you are interested in participating. For more information on the z/OS Early Support Program, e-mail the Global Product Introduction team at PI@us.ibm.com.

Implementation Services for System z - IT process automation

To enable z/OS unique features to improve system performance and operational efficiency, IBM Global Technology Services announced and made available the IBM Implementation Services for System z - IT process automation on March 31, 2009.

This IT process automation service is designed for clients who want to:

- Increase efficiency by optimizing performance and reducing complexity through automation
- Enable high availability during business operations
- Build on the current investments in hardware, software, applications, and skills while potentially reducing computing costs

The offering consists of three selectable modules; each is a stand-alone module that can be individually acquired:

- Systems Modification Program/Extended (SMP/E) maintenance automation
- Open System Adapter Integrated Console Controller (OSA-ICC) implementation
- System Management Facility (SMF) Logging using System Logger implementation

For more information on these services contact your IBM representative or refer to

<http://www.ibm.com/services/server>

Healthcheck services for System z

Routine assessments of your IBM System z environment are critical for detecting the configuration abnormalities and errors that can leave your organization vulnerable to risks and performance exposures. But in today's environment, you might lack the resources or in-house expertise to perform an effective analysis. So how can you be confident that your System z environment is configured for optimal performance and availability? With IBM Server Optimization and Integration Services - Healthcheck services for System z, our experts use the IBM Health Checker for z/OS tool and leverage broad System z skills to perform an in-depth assessment of your environment and identify areas of exposure. We provide a comprehensive report that includes recommendations based on best practices to help you mitigate risks and optimize the utilization of available hardware and software resources.

Highlights:

- Identifies exposures and provides recommendations to help mitigate risks
- Provides suggestions to help improve system performance for a better return on investment
- Delivers fast, thorough assessment leveraging broad system priorities

For more information on this service contact your IBM representative or refer to

<http://www.ibm.com/services/server>

Important Web sites

- z/OS Web site
<http://www.ibm.com/systems/z/os/zos/>
- General Q & A
<http://www.ibm.com/systems/z/faq/>
- IBM's direction as previously announced
http://www.ibm.com/systems/z/os/zos/zos_sods.html
- z/OS Internet Library
<http://www.ibm.com/systems/z/os/zos/bkserv/>
- z/OS Basic Skills Information Center
<http://publib.boulder.ibm.com/infocenter/zoslnctr/v1r7/index.jsp>
- Descriptions of courses worldwide
<http://www.ibm.com/services/learning>
- z/OS downloads
<http://www.ibm.com/systems/z/os/zos/downloads/>
- CustomPac
<http://www.ibm.com/services/custompac>
- ShopzSeries
<http://www.ibm.com/software/shopzseries>
- z/OS Communications Server
<http://www.ibm.com/software/network/commsserver/zos/>
- IBM Open Class® Library Transition Guide
<http://publibz.boulder.ibm.com/epubs/pdf/cbcit100.pdf>

Education support

Here are just a few of the courses available for classroom delivery:

- Introduction to z/OS Environment (ES050)
- Fundamental System Skills for z/OS (ES10A)
- z/OS Facilities (ES155)
- z/OS Operations (ES270)
- z/OS Installation (ES41A)
- Basic z/OS Tuning Using the Workload Manager (WLM) (ES545)
- Basics of z/OS RACF Administration (ES191)
- Introducing z/OS UNIX System Services (OP052)
- Advanced Parallel Sysplex Operations and Recovery (ES902)
- DB2 for z/OS and Data Sharing Implementation (CF311)
- DB2 for z/OS Data Sharing Recovery/Restart (CF320)
- GDPS/XRC Concepts and Implementation (GDPS2)
- IMS Parallel Sysplex Workshop (CM621)
- IMS Shared Queues (CM611)
- Parallel Sysplex Implementation Workshop (ES420)
- Parallel Sysplex Operations and Recovery (MV900)
- zSeries® Parallel Sysplex Operations (H4041)

In the U.S. and Canada, call 1-800-IBM-TEACH (426-8322) to enroll in one or more of these classes. To find other z/OS-related courses, visit

<http://www.ibm.com/training/us/catalog/zseries>

The IBM International Technical Support Organization offers a number of classes and technical update seminars in many countries around the world for IT professionals. These classes and workshops are developed and taught by the same IBM team that brings you Redbooks®. For more information about these offerings see

<http://www.redbooks.ibm.com/portals/systemz?Open&page=workshops>

Technical information

Specified operating environment

Hardware requirements

z/OS V1.11 will run on these IBM System z servers:

- z10 EC
- z10 BC
- z9 EC
- z9 BC
- z900
- z990
- z800
- z890

For a complete description of z/OS V1.11 hardware prerequisites, refer to *z/OS Planning for Installation* (GA22-7504).

Software requirements

The z/OS base is a system that can be IPLed. There are no software prerequisites in order to IPL. Specific functions might require additional products not included in the z/OS base, or in the optional features of z/OS. Refer to *z/OS Planning for Installation* (GA22-7504) for a listing of specific software requirements at

http://publibz.boulder.ibm.com/cgi-bin/bookmgr_OS390/BOOKS/E0Z2B11B

Coexistence, release migrations, and fallback

z/OS gives you compatibility and flexibility as you migrate systems in a multisystem configuration by allowing multiple releases of z/OS to coexist. This includes non-Parallel Sysplex and Parallel Sysplex multisystem configurations.

Coexistence allows systems within a multisystem configuration to be upgraded to a new release level of z/OS one system at a time. This is contingent on the fact that the release you are migrating to can coexist with the lowest release running in your multisystem configuration.

The Coexistence-Migration-Fallback and Service policies are aligned. IBM continues the practice of providing service support for each release of z/OS for three years following its general availability (GA) date. IBM, at its sole discretion, might choose to leave a release supported for more than three years. In that case, more than three releases can be coexistence, migration, and fallback supported. However, any z/OS release having three or fewer months of service remaining at the time of GA of a new release will not be coexistence, migration, and fallback supported.

Note: These statements represent current planning of IBM. IBM reserves the right to change or alter the Coexistence-Migration-Fallback policy in the future or to

exclude certain releases beyond those stated. IBM development plans are subject to change or withdrawal without further notice. Any reliance on this statement is at the relying party's sole risk and does not create any liability or obligation for IBM.

Migration forward as well as fallback should be made within the same z/OS releases supported by the coexistence policy.

The following table shows the z/OS releases that are coexistence-supported with z/OS V1.11.

Coexistence-supported releases

Release	Coexistence-supported with release in Column 1
z/OS V1.9 (4)	z/OS V1.7 (1), z/OS V1.8 (2), z/OS V1.9 z/OS.e V1.7, z/OS.e V1.8 (3)
z/OS V1.10 (5)	z/OS V1.8, z/OS V1.9, z/OS V1.10 z/OS.e V1.8
z/OS V1.11	z/OS V1.9, z/OS V1.10, z/OS V1.11
z/OS V1.12 (6)	z/OS V1.10, z/OS V1.11, z/OS V1.12
z/OS V1.13 (6)	z/OS V1.11, z/OS V1.12, z/OS V1.13

Notes:

1. z/OS V1.7, z/OS.e V1.7 end of service was September 2008.
2. z/OS V1.8 and z/OS.e V1.8 end of service will be September 2009.
3. z/OS.e V1.8 was the last release of z/OS.e. It has been replaced with the new zNALC pricing offering available with z/OS.
4. z/OS V1.9 end of service is planned to be September 2010.
5. z/OS V1.10 end of service is planned to be September 2011.
6. Operating system levels beyond z/OS V1.11 represent current intentions of IBM.

This consistent coexistence, migration, and fallback policy applies to release migrations for all configurations, whether they are:

- Single system configurations
- Individual systems within a multisystem configuration
- Cases where a simultaneous IPL is used to migrate all systems in a multisystem configuration at the same time

It is very important that you order the required z/OS release you need for migration and coexistence while it is still available. Refer to information under [Key dates](#) to find out how long z/OS V1.10 will remain orderable.

For additional information on z/OS coexistence and release migration information, refer to *z/OS Planning for Installation* (GA22-7504) at

http://publibz.boulder.ibm.com/cgi-bin/bookmgr_OS390/BOOKS/E0Z2B11B

For migrations inside the IBM migration and coexistence policy, IBM Global Technology Services (GTS) has fee-based offerings that provide a PTF on demand service for toleration and coexistence maintenance based upon a customer's SMP/E Consolidated Software Inventory (CSI). With these offerings, you specify the release of z/OS, or other products, or hardware (for example, 2094) to which you are migrating, and all configured toleration/coexistence maintenance for your current system (as specified by your CSI) will be delivered to you as a customized package in electronic or physical format. This is provided through the S/390® SoftwareXcel offering, via the Service Request and Delivery (SRD) function.

GTS also provides hands-on fee-based services to assess whether a migration outside the migration and coexistence policy might be possible. For more

information on the migration services that GTS provides for both inside and outside the migration and coexistence policy, contact your local IBM sales specialist.

JES coexistence, release migrations, and fallback

IBM recommends that you migrate to the next version of JES2 or JES3 at the same time you migrate to the rest of z/OS. This way, you benefit directly from the new function provided by the most current JES and enable other elements and features to benefit from this level.

However, because such a migration is not always practical, certain prior levels of JES2 and JES3 are supported with z/OS V1.11 so that you can stage your migration to z/OS V1.11 JES2 or JES3 (that is, migrate to the next level of JES2 or JES3 later). If you stage your migration to z/OS V1.11 JES2 or JES3, coexistence and fallback to a prior JES2 or JES3 is supported so long as the prior z/OS level can coexist with other z/OS systems in the same MAS or multisystem complex.

For additional information on z/OS JES release migration and coexistence, refer to *z/OS Planning for Installation* (GA22-7504) by visiting

http://publibz.boulder.ibm.com/cgi-bin/bookmgr_OS390/BOOKS/E0Z2B11B

Performance considerations

Additional information on z/OS V1.11 performance will be published at general availability. Contact an IBM representative at or after general availability.

User group requirements

z/OS V1.11 satisfies or partially satisfies requirements from IBM customers and one or more of the worldwide user group communities. Information on the specific user group requirements (numbers and descriptions) can be found at

http://www.ibm.com/systems/z/os/zos/bkserv/user_group_reqs.html

Planning information

Direct customer support

Direct customer support is provided by IBM Operational Support Services - SoftwareXcel Enterprise Edition or SoftwareXcel Basic Edition. These fee services can enhance your productivity by providing voice and electronic access into the IBM support organization. IBM Operational Support Services - SoftwareXcel Enterprise Edition or SoftwareXcel Basic Edition will help answer questions pertaining to usage, how-to, and suspected software defects for eligible products.

Installation and technical support is provided by IBM Global Services. For more information on services, call 1-888-426-4343. To obtain information on customer eligibility and registration procedures, contact the appropriate support center.

Security, auditability, and control

Data security and auditability in the z/OS environment are enhanced by the functions available in the optional Security Server for z/OS feature. The customer is responsible for evaluation, selection, and implementation of security features, administrative procedures, and appropriate controls in application systems and communication facilities.

Ordering information

Ordering z/OS through the Internet

ShopzSeries provides an easy way to plan and order your z/OS ServerPac or CBPDO. It will analyze your current installation, find replacement products, and present a new configuration based on currently available products. You can also add more products to your order, and ShopzSeries will help you make sure all product requisites are satisfied. ShopzSeries is available in the U.S., Canada, and several countries in Europe. In countries where ShopzSeries is not available, contact your IBM representative (or IBM Business Partner) to handle your order via the traditional IBM ordering process. For more details and availability, visit the ShopzSeries Web site a:

<http://www14.software.ibm.com/webapp/ShopzSeries/ShopzSeries.jsp>

Current licensees

For pricing information previously announced for z/OS V1, refer to:

- Software Announcement [202-036](#), dated February 19, 2002
- Software Announcement [202-105](#), dated April 30, 2002
- Software Announcement [203-131](#), dated May 13, 2003
- Software Announcement [204-056](#), dated April 07, 2004
- Software Announcement [205-167](#), dated July 27, 2005
- Software Announcement [207-006](#), dated January 09, 2007
- Withdrawal Announcement [907-245](#), dated December 04, 2007

Key dates

- **August 18, 2009:** z/OS V1.11 CFSW configurator support for stand-alone path (5694-A01) and price proposal support.
- **September 11, 2009:** First date for ordering z/OS V1.11 ServerPac, SystemPac, and CBPDO using CFSW configuration support or ShopzSeries, the Internet ordering tool. Note that most z/OS media (executable code) is shipped only through Customized Offerings (ServerPac, SystemPac, and CBPDO).
- **September 25, 2009:** z/OS V1.11 general availability via ServerPac, and CBPDO and SystemPac.
- **October 13, 2009:** Recommended last date for submitting z/OS V1.10 orders via the entitled Customized Offerings (ServerPac and CBPDO). This date will allow for adequate order processing time.
- **October 26, 2009:** Last date for processing orders for z/OS V1.10 via ServerPac and CBPDO.
- **November 20, 2009:** General availability of Cryptographic Support for z/OS V1R9-R11 Web deliverable. This Web deliverable will support z/OS V1.9 through z/OS V1.11.
- **June 28, 2010:** Recommended last date for submitting z/OS V1.10 orders via the fee Customized Offering SystemPac. This date will allow for adequate order processing time.
- **July 26, 2010:** Last date for processing orders for z/OS V1.10 via SystemPac.
- **September 30, 2010:** End of service for z/OS V1.9 (5694-A01).

To obtain the Web deliverable listed above, visit

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

It is very important that you order the required z/OS release you need for migration and coexistence while it is still available. Refer to information under [Key dates](#) to find out how long z/OS V1.10 will remain orderable.

Products that are unavailable via CBPDO, ServerPac, or SystemPac such as Lotus® Domino® (5655-B86) can also be separately ordered for use with z/OS.

ServerPac, CBPDO, and SystemPac are offered for electronic delivery where ShopzSeries product ordering is available. For more details on electronic delivery, refer to the ShopzSeries help information at

<http://www.software.ibm.com/ShopzSeries>

Refer to the ShopzSeries Web site for product catalogs for the Customized Offerings

<http://www.software.ibm.com/ShopzSeries>

If a product catalog for your country is not available in ShopzSeries, please use one of the following countries, United States or Germany, and select English language for the most complete product catalogs for the Customized Offerings.

Current licensees of z/OS V1

z/OS V1 customers can migrate to z/OS V1.11 by ordering the release through the Customized Offerings (ServerPac, SystemPac, and CBPDO) as they have done in the past.

For more details, refer to the [Ordering information](#) section.

New licensees of z/OS V1.11

This product ships its executable code via Customized Offerings (ServerPac, SystemPac, and CBPDO). The media type is chosen during the customized offering ordering procedure. Refer to the [Customized offerings](#) section for the media types offered.

Production of z/OS V1.11 orders will begin on the planned general availability date, **September 25, 2009**. Ship dates for orders will be based on order sequence, Customized Offering selected, production capability, and customer-requested arrival date. Due to the amount of customization of ServerPac orders, shipments will begin approximately **two weeks after** general availability. Due to the amount of additional customization of SystemPac orders, shipments will begin approximately four weeks after order and data input verification. For CBPDO orders, shipments will begin one week after general availability. In all cases, no delivery commitments are to be made to the customer until confirmed arrival dates are in ESW.

Basic license

To order a basic license, specify the z/OS V1.11 program number 5694-A01. Proceed to select the features listed which are required and then select any optional features.

Single version charging

To elect single version charging, the customer must notify IBM and identify to IBM the prior program and replacement program and the designated machine the programs are operating on.

Basic machine-readable material

The following no-charge features are added to z/OS V1.11 and can be ordered effective **August 18, 2009**. These no-charge media features have pricing/billing features associated with them. It is those associated pricing/billing features where the charges are listed and not the media features listed below. See **Notes** below for details on past announcements for this information.

z/OS V1.11 Feature description	z/OS V1.11 Orderable supply ID
Base	S015BMP

Notes:

- The billing features and pricing information for the above feature descriptions remain unchanged and are provided in:
 - Software Announcement [202-036](#), dated February 19, 2002
 - Software Announcement [202-105](#), dated April 30, 2002
 - Software Announcement [203-131](#), dated May 13, 2003
 - Software Announcement [204-056](#), dated April 07, 2004
 - Software Announcement [205-167](#), dated July 27, 2005
 - Software Announcement [207-006](#), dated January 09, 2007
 - Withdrawal Announcement [907-245](#), dated December 04, 2007
 - Software Announcement [209-262](#), dated July 28, 2009
- This product ships its executable code via Customized Offerings (ServerPac, SystemPac, CBPDO). The media type is chosen during the customized offering ordering procedure. Refer to the [Customized offerings](#) section for the media types offered.

Basic publications

A program directory and one copy of the following publication are supplied automatically with the basic machine-readable material:

Basic unlicensed hardcopy publications

Title	Order number
z/OS Hot Topics Newsletter	GA22-7501

The z/OS publications are available on the Internet at

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

Basic unlicensed softcopy publications

Title	Order number
z/OS V1R11 and Software Products DVD Collection	SK3T-4271

For a fee, the customer can order the softcopy collections or any z/OS V1.11 documents available in hardcopy using the IBM Publications Center on the Web

<http://www.ibm.com/shop/publications/order>

For customers in 23 countries, the IBM Publications Center offers the option to order hardcopy publications or softcopy collections by customer number. Verify whether this option is available in the user's country.

For other publications ordering options, visit

http://www.ibm.com/systems/z/os/zos/bkserv/order_books.html

z/OS Version 1 Release 11 Collection (BookManager and PDF)

Starting with the September GA, the *z/OS Version 1 Release 11 and Software Products DVD Collection* (SK3T-4271) will be entitled. This collection includes softcopy tools, libraries for z/OS Version 1 Release 11 (the element and feature libraries), the libraries for multiple releases of z/OS software products, previous

additions of the z/OS Hot Topic newsletter, and selected IBM System z Redbooks. Both BookManager® and PDF formats, when available, are included on the DVDs. The contents of the popular zFavorites for zSeries mini-CD are also included on the DVD collection. This collection requires a DVD drive that can read discs in DVD-9 (single-sided, dual-layer) format. If this collection is refreshed after general availability, an updated collection is automatically sent to z/OS V1.11 licensees.

If you are currently subscribed to the previously entitled *z/OS Base Elements CD Collection* (SK3T-4269) your subscription will automatically be switched over to the *z/OS Base Elements and Software Products DVD Collection* (SK3T-4271). No action needs to be taken on your part for this change to take place.

By general availability, the z/OS V1.11 books will be available at

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

For creating softcopy repositories, SoftCopy Librarian is the flagship tool for uploading and managing BookManager and PDF softcopy files on a z/OS host or server and on LANs and workstations. SoftCopy Librarian is a free program that is available on the softcopy tools disc of the collections or the Web. Use it to obtain and manage shelves from IBM or OEM (original equipment manufacturers), CD or DVD collections, or the Internet from the IBM PUBLIB Web site, as well as from other Web sites that provide support for the SoftCopy Librarian.

Starting in April 2009, SoftCopy Librarian V4.3 is supported on Windows 2000, Windows XP, and Windows Vista.

The latest version of the SoftCopy Librarian can be downloaded from this Web site

<http://publib.boulder.ibm.com/epubs/df/ebrsclwj.exe>

Optional machine-readable material

Optional unpriced features - z/OS V1.11

The following optional features, offered at no additional charge, are added to z/OS V1.11 and can be ordered effective **August 18, 2009**.

z/OS v1.11 Feature description	z/OS v1.11 Orderable supply ID
Communications Server Security Level 3	S015BN2
z/OS Security Level 3	S015BN4

Notes:

1. This product ships its executable code via Customized Offerings (ServerPac, SystemPac, and CBPDO). The media type is chosen during the customized offering ordering procedure. Refer to the [Customized offerings](#) section for the media types offered.
2. All the above features can be exported outside the U.S.
3. These features should be ordered during this release cycle since they are **not** automatically included in all orders due to need for export regulation tracking.

Optional priced features

The following optional no-charge features are added to z/OS V1.11 and can be ordered effective **August 18, 2009**. These optional no-charge media features have pricing/billing features associated with them. It is those associated pricing/billing features where the charges are listed and not the media features listed below. See **Notes** below for details on past announcements for this information.

z/OS v1.11 Feature description	z/OS v1.11 Orderable supply ID
BDT FTF	S015BNJ

BDT SNA NJE	S015BLB
BookManager Build	S015BLC
C/C++ without Debug	S015BLR
DFSMS dss	S015BLK
DFSMS dss,hsm	S015BLP
DFSMS rmm	S015BML
DFSMSStvs	S015BM5
DFSORT	S015BMK
GDDM-PGF	S015BMW
GDDM-REXX	S015BN8
HCM	S015BMC
HLASM Toolkit	S015BLH
Infoprint Server	S015BN6
JES3	S015BM9
RMF	S015BM8
SDSF	S015BMX
Security Server	S015BLV

Notes:

1. The billing features and pricing information for the above feature descriptions are described in
 - Software Announcement [202-036](#), dated February 19, 2002
 - Software Announcement [202-105](#), dated April 30, 2002
 - Software Announcement [203-131](#), dated May 13, 2003
 - Software Announcement [204-056](#), dated April 07, 2004
 - Software Announcement [205-167](#), dated July 27, 2005
 - Software Announcement [207-006](#), dated January 09, 2007
 - Withdrawal Announcement [907-245](#), dated December 04, 2007
2. This product ships its executable code via Customized Offerings (ServerPac, SystemPac, and CBPDO). The media type is chosen during the customized offering ordering procedure. Refer to the [Customized offerings](#) section for the media types offered.
3. If the customer subsequently enables any of the optional priced features, those features also become subject to the payment terms of the existing z/OS license as described in *z/OS Licensed Program Specifications* (GA22-7503). The customer must notify IBM when an optional feature is enabled that was shipped disabled from IBM.
4. One or both of the BDT optional features (File-to-File or SNA NJE) must be ordered and installed in order to use the BDT function shipped with the base.
5. The DFSMS dss feature cannot be ordered with the DFSMS dss,hsm feature. Likewise, the DFSMS dss,hsm feature cannot be ordered with the DFSMS dss feature.

Optional unpriced language features

The z/OS V1.11 language features will become generally available on the same date the release becomes available.

z/OS V1.11 provides support in the languages listed below. However, not all elements within z/OS V1.11 are translated into each language. Refer to *z/OS Planning for Installation* (GA22-7504) for information on which elements are translated into which languages, by visiting

http://publibz.boulder.ibm.com/cgi-bin/bookmgr_OS390/BOOKS/E0Z2B11B

The following optional features, offered at no additional charge, are added to z/OS V1.11 and can be ordered effective **August 18, 2009**.

The Language features for z/OS V1.11 are:

z/OS v1.11	z/OS v1.11
Language feature description	Orderable supply ID

Brazilian Portuguese Base (PTB)	S015BM1
Brazilian Portuguese BookMgr Build	S015BLM
Canadian French Base (FRC)	S015BMJ
Canadian French BookMgr Build	S015BNM
Danish Base (DAN)	S015BNL
Dutch Base (NLD)	S015BNF
French Base (FRA)	S015BN5
French BookMgr Build	S015BMV
German Base (DEU)	S015BMH
German BookMgr Build	S015BLJ
Italian Base (ITA)	S015BLX
JPN Base	S015BNG
JPN C/C++ without Debug	S015BLD
JPN Infoprint Server	S015BMN
JPN RMF	S015BMG
JPN SDSF	S015BLF
JPN Security Server	S015BN0
Upper Case English Base (ENP)	S015BM7
Korean Base (KOR)	S015BMZ
Norwegian Base (NOR)	S015BNB
Spanish Base (ESP)	S015BN7
Spanish BookMgr Build	S015BMF
Swedish Base (SVE)	S015BM4
Swiss German Base (DES)	S015BNH
Simplified Chinese Base (CHS)	S015BM3
Traditional Chinese Base (CHT)	S015BMT

Notes:

- The above feature descriptions are offered at no additional charge.
- This product ships its executable code via Customized Offerings (ServerPac, SystemPac, and CBPDO). The media type is chosen during the customized offering ordering procedure. Refer to the [Customized offerings](#) section for the media types offered.

Unlicensed documentation

Features not offered in z/OS V1.11

All features offered in z/OS V1.10 are offered in z/OS V1.11 except for the following z/OS optional unlicensed publications:

- z/OS Security Server RACF Collection
- z/OS Software Products Collection

These features are replaced by *z/OS Version 1 Release 11 and Software Products DVD Collection (SK3T-4271)*.

Optional unlicensed publications

Optional unlicensed softcopy publications

The following optional one-time charge features are added to z/OS V1.11 and can be ordered effective **August 18, 2009**.

Subscriptions to the following softcopy collections may be ordered for a fee by specifying the one-time charge feature numbers listed below:

Title	Order number	Orderable Supply ID
IBM System z Redbooks Collection	SK3T-7876	S015BLZ
z/OS Version 1 Release 11 and Software Products DVD Collection	SK3T-4271	S015BMR

Notes:

- The Redbooks collection is updated concurrently with z/OS releases.
- The feature descriptions listed above are the same offered in z/OS V1.10.
- When the above softcopy collections are ordered as features of z/OS V1.11, the special subscription price includes automatic shipment of all updates made while the product version can be ordered.

The *IBM System z Redbooks Collection* contains IBM Redbooks, in PDF format, related to z/OS and other System z products. IBM Redbooks, which are produced by the International Technical Support Organization, include timely technical information based on realistic scenarios and are created by IBM experts, customers, and Business Partners from around the world.

The IBM Redbooks are also available for viewing or downloading on the following Web site:

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

To find Redbooks that apply to z/OS, enter z/OS in the search field at the top of the Web page.

The *z/OS Version 1 Release 11 and Software Products DVD Collection (SK3T-4271)* includes softcopy tools, libraries for z/OS Version 1 Release 11 (the element and feature libraries), the libraries for multiple releases of z/OS software products, and selected IBM System z Redbooks. Both BookManager and PDF formats, when available, are included on the DVDs. The contents of the popular zFavorites for zSeries mini-CD are also included on the DVD collection. This collection requires a DVD drive that can read discs in DVD-9 (single-sided, dual-layer) format.

Optional licensed publications

Effective with z/OS V1.7, there are no longer any licensed publications, which previously required a separate key code to access on ResourceLink.

z/OS V1.10 features withdrawn

The following z/OS V1.10 features are withdrawn from marketing effective October 26, 2009:

z/OS v1.10 Orderable supply ID	z/OS v1.10 Feature description
S014MN7	z/OS V1.10 Base
S014MNL	z/OS V1.10 BDT FTF
S014MM6	z/OS V1.10 BDT SNA NJE
S014MM9	z/OS V1.10 BookManager Build
S014MMN	z/OS V1.10 C/C++ without Debug
S014MMK	z/OS V1.10 DFSMS dss,hsm
S014MMB	z/OS V1.10 DFSMS rmm
S014MN1	z/OS V1.10 DFSMS dss
S014MNX	z/OS V1.10 DFSMStvs
S014MN9	z/OS V1.10 DFSORT
S014MNG	z/OS V1.10 GDDM-PGF
S014MNV	z/OS V1.10 GDDM-REXX
S014MNP	z/OS V1.10 HCM
S014MMT	z/OS V1.10 HLASM Toolkit
S014MP1	z/OS V1.10 Infoprint Server
S014MND	z/OS V1.10 JES3
S014MN5	z/OS V1.10 RMF
S014MNJ	z/OS V1.10 SDSF
S014MNV	z/OS V1.10 Security Server
S014MMV	z/OS V1.10 Communications Server Security Level 3
S014MNM	z/OS V1.10 z/OS Security Level 3
S014MP9	z/OS V1.10 SK3T-4272 z/OS Security Server RACF Collection
S014MM3	z/OS V1.10 SK3T-4270 z/OS Software Products Collection

S014MPB	z/OS V1.10 SK3T-7876 IBM z/OS V1 System z Redbook Collection
S014MP0	z/OS V1.10 SK3T-4271 z/OS V1R10 and Software Products DVD Collection
S014MM5	z/OS V1.10 Braz Port Base (PTB)
S014MMR	z/OS V1.10 Braz Port BookMgr Build
S014MM7	z/OS V1.10 Can Fren Base (FRC)
S014MMJ	z/OS V1.10 Can Fren BookMgr Build
S014MP6	z/OS V1.10 Danish Base (DAN)
S014MMW	z/OS V1.10 Dutch Base (NLD)
S014MP5	z/OS V1.10 French Base (FRA)
S014MPD	z/OS V1.10 French BookMgr Build
S014MP7	z/OS V1.10 Germ Base (DEU)
S014MMP	z/OS V1.10 Germ BookMgr Build
S014MP3	z/OS V1.10 Ital Base (ITA)
S014MP2	z/OS V1.10 JPN Base
S014MNF	z/OS V1.10 JPN C/C++ without Debug
S014MMZ	z/OS V1.10 JPN Infoprint Server
S014MNN	z/OS V1.10 JPN RMF
S014MN6	z/OS V1.10 JPN SDSF
S014MNB	z/OS V1.10 JPN Security Server
S014MM4	z/OS V1.10 Upper Case English Base (ENP)
S014MN2	z/OS V1.10 Kor Base (KOR)
S014MN3	z/OS V1.10 Norw Base (NOR)
S014MNS	z/OS V1.10 Span Base (ESP)
S014MN4	z/OS V1.10 Span BookMgr Build
S014MN0	z/OS V1.10 Swed Base (SVE)
S014MN8	z/OS V1.10 Swiss Germ BASE (DES)
S014MP8	z/OS V1.10 Simp Chin Base (CHS)
S014MNC	z/OS V1.10 Trad Chin Base (CHT)

Licensed documentation

Subsequent updates (technical newsletters or revisions between releases) to the publications shipped with the product will be distributed to the user of record for as long as a license for this software remains in effect. A separate publication order or subscription is not needed.

Customized offerings

Product deliverables are shipped only via Customized Offerings (for example, CBPDO, ServerPac, 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.software.ibm.com/ShopzSeries>

Media type for this software product is chosen during the customized offerings ordering process. Based on your customer environment, it is recommended that the highest possible density tape media is selected. Currently offered media types are:

- CBPDOs - 3480, 3480 Compressed, 3490E, 3590, 3592*
- ServerPacs - 3480, 3480 Compressed, 3490E, 3590, 3592*
- SystemPacs - 3480, 3480 Compressed, 3490E, 3590, 3592*

*3592 is highest density media. Selecting 3592 will ship the fewest number of media.

Once a product becomes generally available, it will be included in the next ServerPac and SystemPac monthly update.

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 two weeks after inclusion in ServerPac.
- SystemPac shipments will begin four weeks after inclusion in SystemPac due to additional customization, and data input verification.

Terms and conditions

The terms and conditions of z/OS Version 1 (5694-A01) are unaffected by this announcement.

IBM Operational Support Services - SupportLine

Yes

Prices

For all local charges, contact your IBM representative.

Order now

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L3R 2Z1

Reference: LE001

The Americas Call Centers, our national direct marketing organization, can add your name to the mailing list for catalogs of IBM products.

Note: Shipments will begin after the planned availability date.

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