

**Session 8681:**

**Migrating to z/OS 1.12:  
Part 1 of 2**

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**Abstract for Session 8681: Migrating to z/OS 1.12: Part 1 of 2**

This is part one of a two-part session that will be of interest to System Programmers and their managers who are migrating to z/OS 1.12 from either z/OS 1.10 or z/OS 1.11. It is strongly recommended that you attend both sessions for a complete migration picture.

In part one, the speaker will focus on preparing for your z/OS 1.12 migration. She will discuss the changed content of z/OS 1.12. She will cover ordering and delivery options, and will explain the coexistence, migration, fall back, and service policies. Driving and target system requirements for both software and hardware will be highlighted along with some migrations actions you can perform now on your current z/OS release.

*The general availability date for z/OS V1 R12 was September 24, 2010.*



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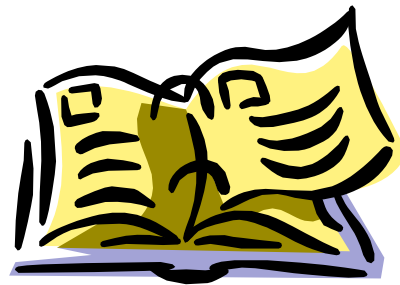
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## Migrating to z/OS 1.12: Part 1 of 2 Agenda

- ▶ **Content of z/OS R12**
  - Changing and Withdrawn Elements and Features
- ▶ **z/OS Ordering and Deliverables**
  - Products Related to z/OS
- ▶ **z/OS Policies**
  - z/OS End of Service dates
  - z/OS Coexistence-Migration-Fallback
- ▶ **Planning for z/OS R12:**
  - Ensuring System Requirements are Satisfied
    - Driving and Target System Requirements
  - Coexistence System Requirements
    - Programmatic Verification is Available!
  - Migration Actions You Can Do NOW
  - Programmatic Verification of Migration Actions for z/OS R12
- ▶ **ServerPac Installation Enhancements for z/OS R12**





## Structure of *Migrating to z/OS R12* Presentations

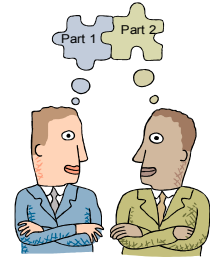
### ► Session 8681: Part 1 of 2 (Planning)

–Content is what you just saw on the prior foil

### ► Session 8682: Part 2 (Some Migration Actions)

–Migrations actions for z/OS R11 and R12 from selected elements:

- General migration actions
- BCP
- Communications Server
- DFSMS
- Distributed File Service
- ICSF, HCM, IBM Tivoli Directory Server
- Infoprint Server
- JES2 and JES3
- Language Environment
- z/OS UNIX



Attend both to get a complete migration picture!  
(Along with z/OS Migration book!)

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Migrating to z/OS 1.12: Part 1 of 2

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## Scope

- **Focus on Migrating to z/OS R12 from z/OS R11 and R10**
  - If migrating to a new server level, see:
    - for z890 and z990: migration action in *z/OS Migration "Migrate to a z990 or z890 server"*
    - for z9 EC and BC: migration action in *z/OS Migration "Migrate to a System z9 server"*
    - for z10 EC and BC: migration action in *z/OS Migration "Migrate to a System z10 server"*
    - For z196: attend session **"Everything a z/OS System Programmer Needs to Know to Exploit a z196 Server"**.
- **Other conference sessions on specific enhancements to z/OS R12:**
  - *z/OS New Facilities and Features*
  - *What's New in DFSMS Overview*
  - *Reclaim Those Empty CAs!*
  - *z/OS 1.12 JES2 New Functions, Features, and Migration Actions*
  - *z/OS 1.12 UNIX System Services Latest Status and New Features*
  - ...



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**Related Publications:**

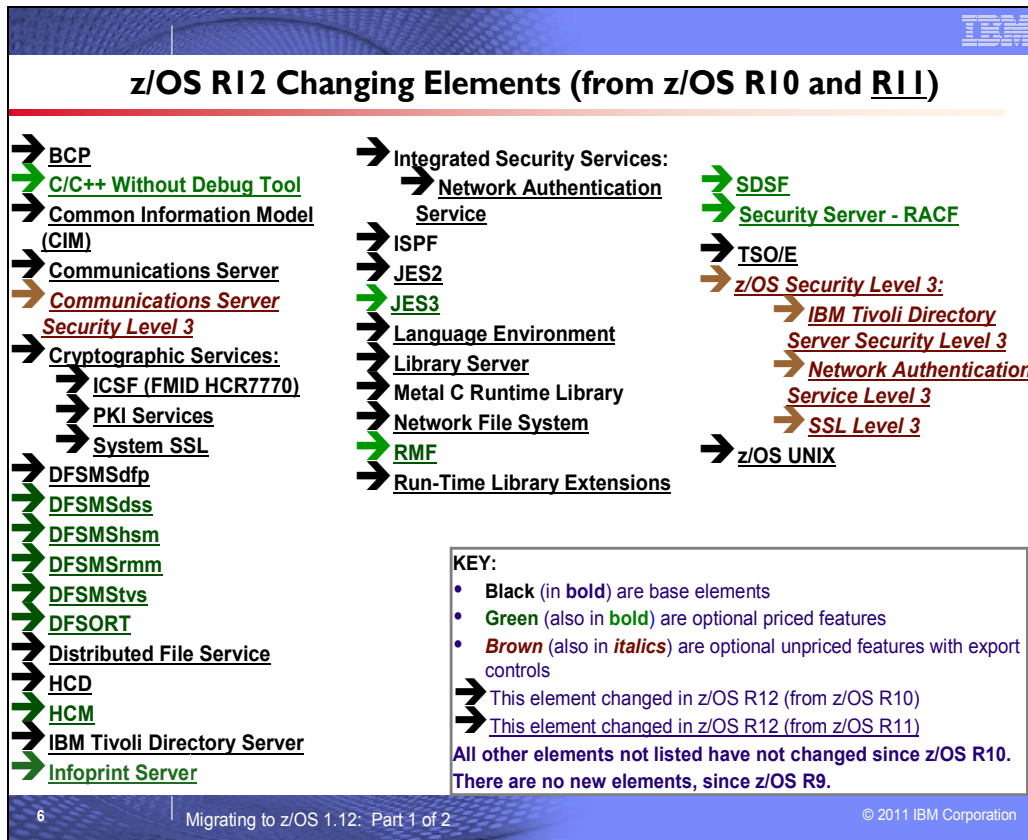
z/OS R12 *Planning for Installation* (GA22-7504-24) – refresh level!  
 z/OS R12 *Migration* (GA22-7499-18) - refresh level!  
 z/OS R12 *Introduction and Release Guide* (GA22-7502)  
 z/OS R12 *Program Directory* (n/a)  
 System z *Platform Test Report for z/OS and Linux Virtual Servers* (available from <http://www.ibm.com/servers/eserver/zseries/zos/integtst/>)  
 z/OS *Summary of Interface and Message Changes* (SA22-7505)  
 z/OS *MVS Initialization and Tuning Reference* (SA22-7592)  
 z/OS *UNIX System Services Planning* (GA22-7800)  
 ServerPac: *Installing Your Order* (no order number; custom-built to your order)  
 ServerPac: *Using the Installation Dialog*, (SA22-7815)

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<a href="http://www.ibm.com/systems/z/os/zos/features/unix/bpxa1ty1.html">http://www.ibm.com/systems/z/os/zos/features/unix/bpxa1ty1.html</a>	IBM Ported Tools for z/OS web page

**IBM Education:**

IBM courses are available for z/OS. For schedules and enrollment on the world wide web, IBM Global Campus

URL: <http://www.ibm.com/services/learning/> .



## z/OS Elements and Features









z/OS consists of base elements and optional features:

- The **base elements** (or simply *elements*) deliver essential operating system functions. When you order z/OS, you receive all of the base elements.
- The **optional features** (or simply *features*) are orderable with z/OS and provide additional operating system functions. Optional features are unpriced or priced:
  - *Unpriced features* are shipped to you **only if** you order them. If you plan to use any unpriced features, IBM recommends that you order them when you order your base elements. You must not wait until the next release becomes available. Once a release's base elements are no longer orderable, usually neither are its unpriced features.
  - *Priced features* are **always** shipped to you. When IBM packages your order, we *enable* the priced features that you ordered. These features are ready to use after you install z/OS (and customize them as needed). We *disable* the priced features that you did not order. Although they are installed on your system, you cannot use them. Later on, if you decide to use them, you notify IBM and you enable them dynamically (which is known as *dynamic enablement*). You dynamically enable by updating parmlib member IFAPRDxx and you notify IBM by contacting your IBM representative.

Elements and features may be exclusive or nonexclusive:

- An element or feature is called *exclusive* to z/OS if it exists only within z/OS (not also as a separately orderable, or stand-alone, product) and if future functional enhancements will occur only within z/OS.
- An element or feature is called *nonexclusive* if it exists both (1) within z/OS and (2) as a stand-alone product.

Listed in the foil above are the changing elements within z/OS R12 since z/OS R10. For a complete list of all the z/OS R12 base elements and optional features, see Appendix A in this presentation.

<h2 style="text-align: center;">Element and Functions Withdrawn from z/OS R11</h2> 		
<b>BIND DNS 4.9.3 from CS</b> 	Base Element – consider BIND DNS 9.2.0* (as of z/OS R4) as replacement, or other solutions. (* note future removal.)	<b>As of R11</b>
<b>Network Database (NDB) function from CS</b> 	Base Element - investigate the distributed data facility (DDF) provided by z/OS DB2, and the DB2 Run-Time Client	<b>As of R11</b>
<b>DHCP server function from Communications Server</b> 	Base Element - investigate using a DHCP server on Linux for System z	<b>As of R11</b>
<b>Boot Information Negotiation Layer (BINL) function from CS</b> 	Base Element - investigate the use of <i>IBM Tivoli Provisioning Manager for OS Deployment</i> for network based operating system installation services	<b>As of R11</b>
<b>Integrated Security Services LDAP Server</b> 	Base Element - implement IBM Tivoli Directory Server for z/OS (avail since R8)	<b>As of R11</b> 
<b>Attaching zFS multi-file system aggregates in a shared file system environ.</b> 	Base Element – For shared multi-fs aggr: mounting was removed in R8, attaching has been removed in R11.	<b>As of R11</b>
<b>IPCS Problem Management Subcommands</b>	Base Element – Consider using IBM Tivoli Information Management for z/OS V7 (5698-A08) or other similar product.	<b>As of R11</b>
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**Withdrawn in z/OS R11 (last delivered in z/OS R10)**

This section lists items that were withdrawn in z/OS R11. You should take this into account if you are migrating from z/OS R10 to z/OS R12. The removal of these functions may have migration actions which you can perform now, in preparation for z/OS R12.

- Network Database (NDB) function: z/OS V1R10 was the last release in which z/OS Communications Server supported the Network Database (NDB) function. Starting with z/OS V1R11 you have to use the distributed data facility (DDF) provided by DB2 for z/OS, and the DB2 Runtime Client.
- BIND DNS 4.9.3: z/OS V1R10 was the last release in which z/OS Communications Server supported BIND DNS 4.9.3. If you have been using BIND DNS 4.9.3 as a caching-only name server, use the z/OS Resolver DNS Caching function in z/OS V1R11 instead. If you have been using BIND DNS 4.9.3 as a primary or secondary authoritative name server, migrate to BIND DNS on Linux for System z. If you want to implement a temporary replacement, implement BIND DNS 9.2.0, which has been included in z/OS beginning with V1R4. (Note that support for BIND DNS 9.2.0 is planned to be removed in the release following z/OS R13.) Use the dnsmigrate tool to migrate a z/OS BIND 4.9.3 DNS server configuration file to a z/OS BIND 9.2.0 DNS server configuration file.
- Boot Information Negotiation Layer (BINL): z/OS V1R10 was the last release in which z/OS Communications Server supported the Boot Information Negotiation Layer (BINL). Starting with z/OS V1R11, you have to use another product, such as IBM Tivoli Provisioning Manager for OS Deployment V5 (5724-Q99), for network-based operating system installation services.
- DHCP server: z/OS V1R10 was the last release in which z/OS Communications Server supported the Dynamic Host Configuration Protocol (DHCP) server function. Starting with z/OS V1R11, you have to use a DHCP server on a system other than your z/OS system.
- Integrated Security Services LDAP Server: z/OS V1R10 was the last release of z/OS that supported the Integrated Security Services LDAP Server. A new optimized LDAP server, a component of IBM Tivoli Directory Server for z/OS (IBM TDS), was delivered by PTF for z/OS V1R8 and is integrated in z/OS V1R9 and later. If you are currently using the Integrated Security Services LDAP Server, you must migrate to IBM TDS. IBM TDS

is designed to allow greater consolidation of LDAP directories on z/OS to help simplify enterprise management and disaster recovery.

- Beginning in z/OS V1R11, you can no longer attach zFS multi-file system aggregates that are shared across systems in a sysplex. IBM has previously recommended that multi-file system aggregates not be shared in a sysplex environment. Any attempts to attach zFS multi-file system aggregates will fail in a z/OS UNIX shared file system environment with message IOEZ00046E. Attaching zFS compatibility mode aggregates, which have a single file system per data set, will continue to be supported in all environments.
- z/OS V1R10 is the last release that includes IPCS Problem Management Subcommands. As of z/OS V1R11, the subcommands have been removed from z/OS. If you currently use the IPCS problem management subcommands to report and track problems, consider using IBM Tivoli Information Management for z/OS V7 (5698-A08) or other similar products. IBM plans to continue to enhance the dump and trace analysis and display facilities of IPCS. The removed subcommands are:
  - ADDDSN — add a data set name to a problem
  - ADDPROB — add a problem to IPCS
  - DELDSN — delete a data set from a problem
  - DELPROB — delete a problem from IPCS
  - LISTDSN — list data set attributes
  - LISTPROB — list problems
  - MODDSN — modify data set attributes
  - MODPROB — modify problem attributes

<b>Element and Functions Withdrawn from z/OS R12</b>		
<b>Optional setting for RFC4301 compliance (from Communications Server)</b> 	Base Element – All IP security filters must be compliant with RFC4301. You can no longer use the RFC4301Compliance parameter on the IpFilterPolicy statement to specify whether Policy Agent enforces compliance. It is ignored, and the Policy Agent will enforce the rule that all IP filters are compliant.	<b>As of R12</b>
<b>CSVRTLS services in the BCP for Language Environment RunTime Library Services</b>	Base Element support – LE RTLS support was removed in z/OS R5. BCP RTLS services (SET RTLS, DISPLAY RTLS, RTLS in IEASYSxx and CSVRTLSxx, and CSVRTLS macro) are removed in z/OS R12. Usage tracking assistance is provided in OA29995 (R11) and OA29019 (R10).	<b>As of R12</b>
<b>mssys for Setup</b>	Base Element – CBPDO users should run job CLNOS390. ServerPac users do not need to do anything.	<b>As of R12</b>

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### Withdrawn in z/OS R12 (last delivered in z/OS R11)

This section lists items that were withdrawn in z/OS R12. You should take this into account if you are migrating from z/OS R11 to z/OS R12, or from z/OS R10 to z/OS R12. The removal of these functions may have migration actions which you can perform now, in preparation for z/OS R12.

- Beginning with z/OS R12, all IP security filters must be compliant with RFC 4301. You can no longer use the RFC4301Compliance parameter on the IpFilterPolicy statement to specify whether Policy Agent enforces compliance. The RFC4301Compliance parameter is ignored and Policy Agent enforces the rule that ensures all IP filters are compliant.








IP filter policy support for filtering fragments was improved in z/OS R10. Before z/OS V1R10, Communications Server filtered all IP fragments using a policy of first possible filter match and filtered IPv6 fragments as protocol IPv6Frag. Beginning with z/OS R10, Communications Server follows rules and restrictions established by RFC 4301 (<http://www.ietf.org/rfc/rfc4301.txt>) to ensure proper classification of fragments. RFC 4301, "Security Architecture for the Internet Protocol", specifies the base architecture for IPSec-compliant systems, including restrictions on the routing of fragmented packets.

Communications Server does not implement stateful fragment checking, therefore, restrictions were added as required by RFC 4301 to require that IP filter rules for routed traffic do not allow specific ports, types, or codes. The configuration parameter RFC4301Compliance could be used in z/OS R10 and z/OS R11 to optionally configure whether the RFC 4301 rules should be applied. Beginning with z/OS R12, this parameter (RFC4301Compliance on the IpFilterPolicy statement) is deprecated. All IP filter rules must support the RFC 4301 rules and restrictions.

- z/OS R5 was the last release of z/OS to support Run-Time Library Services (RTLS) for Language Environment. In z/OS R12, the underlying CSVRTLS services are removed from z/OS. A way to track CSVRTLS usage, and to let you find any programs that might be using these services is available. Exploit the z/OS tracking facility to help determine if you are using any of the CSVRTLS services (SET RTLS command, DISPLAY RTLS command, CSVRTLS macro, and RTLS system parameter in IEASYSxx parmlib member) removed from z/OS R12:



- For z/OS R11, install PTF UA49184 for APAR OA29995.
- For z/OS R10, install PTF UA50068 for APAR OA29019.
- Starting in z/OS R12, support is withdrawn for Managed System Infrastructure for Setup (msys for Setup). In the future, IBM intends to continue to deliver improvements to help with z/OS setup and configuration. As of z/OS R12, discontinue using msys for Setup for function enablement, setup, or configuration of z/OS.

<h2 style="text-align: center;">Functions Planned to be Withdrawn</h2> <p style="text-align: center; color: green;"><i>in the future...</i></p>		
<b>z/OS UNIX Connection Manager and Process Manager</b>	Base Element	In z/OS R13
<b>DCE and DCE Security Server</b>	Base Elements – IBM WebSphere Application Server, the IBM Network Authentication Service, and/or the IBM Directory Server as replacement strategies for each of the DCE technologies.	In z/OS R13
<b>DFS support that utilizes the DCE architecture</b> 	Base Element support – z/OS Network File System (NFS) implementation as the replacement	In z/OS R13
<b>zFS multi-file system aggregates (from Distributed File Service)</b> 	Base Element - zFS compatibility mode aggregates will be supported 	In the release after z/OS R13
<b>BIND 9.2.0 function (from the Communications Server)</b> 	Base Element support – for use as a caching-only name server, use Resolver cache function (in z/OS R11). For use as a primary or secondary authoritative name server, consider using BIND on Linux for System z.	In the release after R13
<b>BPX.DEFAULT.USER</b>	Base Element support – use BPX.UNIQUE.USER instead (as of R11) or assign unique UIDs and GIDs. 	In the release after R13
<b>Capacity Provisioning using System z API with SE and HMC</b>	Base Element support – will use BCPii instead. <i>System z API will still be supported on the SE and HMC.</i>	In the release after R13
<b>Language Environment runtime options via USERMOD</b> 	Base Element support – use CEEPRMxx instead (with z/OS R12 NONOVR support, if necessary)	Future

### Planned for removal in future z/OS releases

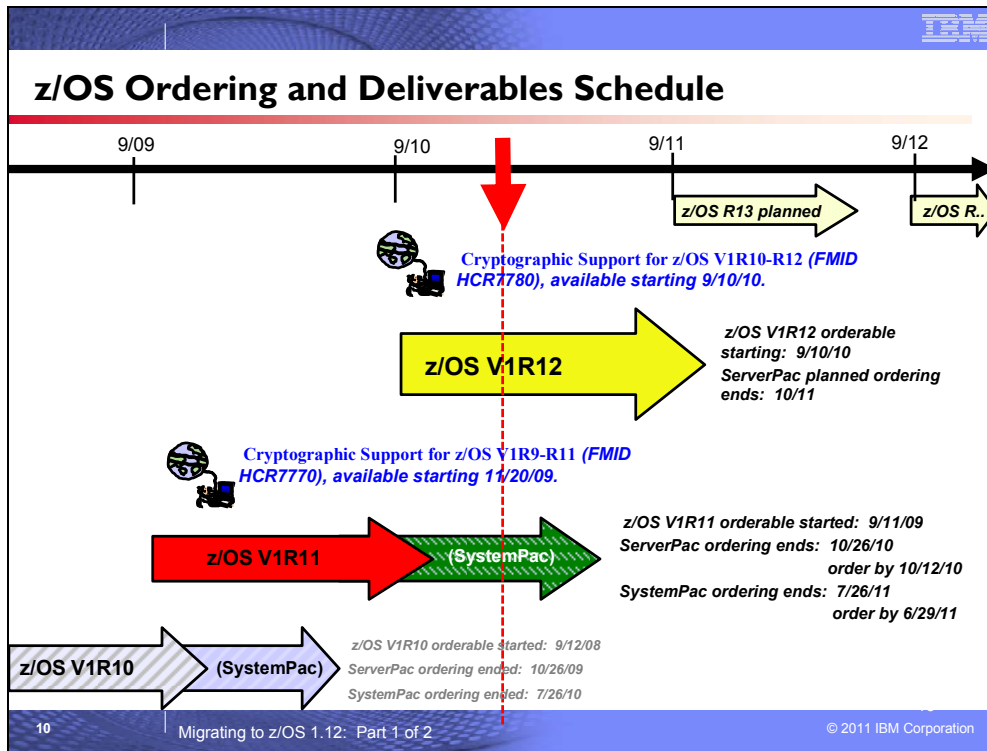
This section lists items that IBM has announced it intends to remove in future z/OS releases. You are encouraged to consider these removals when making your plans for system upgrades. These statements represent IBM's current intentions. IBM development plans are subject to change or withdrawal without further notice.

- z/OS R12 is the last release to include the z/OS UNIX System Services Connection Scaling, specifically the Connection Manager and Process Manager components. This support was provided in SMP/E FMIDs HCMG100 (for Connection Manager, and JCMG1J0 if Japanese) and HPMG110 (for Process Manager, and JPMG1J0 if Japanese).
- z/OS R12 is the last release to include 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 the IBM Directory Server as replacements. See the DCE Replacement Strategies Redbook for more details:  
<http://www.redbooks.ibm.com/redbooks/pdfs/sg246935.pdf>
- z/OS R12 is the last release to include z/OS Distributed File Service support using the Distributed Computing Environment (DCE) architecture. IBM recommends the z/OS Network File System (NFS) as a replacement. Support in Distributed File Service for Server Message Block (SMB) architecture remains, and is not affected by this withdrawal of support.
- z/OS V1.13 is planned to be the last release to support multi-file system zSeries File System (zFS) aggregates, including zFS clones. Support for the zfsadm clone command and mount support for zFS file system data sets containing a cloned (.bak) file system will be removed. IBM recommends that you use copy functions such as pax and DFSMSdss to back up z/OS UNIX file systems to separate file systems. Support for zFS compatibility mode aggregates will remain.
- z/OS V1.13 is planned to be the last release in which the BIND 9.2.0 function will be available. If you currently use or plan to use the z/OS BIND 9.2.0 function as a caching-only name server, you should use the resolver function, which became generally available in z/OS V1.11, to cache Domain Name Server (DNS) responses. If you currently use or plan to use the z/OS BIND 9.2.0 function as a primary or secondary authoritative name server, you should investigate using BIND on Linux for System z or BIND on an IBM blade in an IBM zEnterprise BladeCenter Extension (zBX).

- z/OS V1.13 is planned to be the last release to support BPX.DEFAULT.USER. IBM recommends that you either use the BPX.UNIQUE.USER support that was introduced in z/OS V1.11, or assign unique UIDs to users who need them and assign GIDs for their groups.
- z/OS V1.13 is planned to be the last release to provide the z/OS Capacity Provisioning support that utilizes the System z API for communication with the Support Element (SE) or Hardware Management Console (HMC). This protocol is based on IP network connection using SNMP. IBM recommends configuring the Capacity Provisioning Manager for communication via the z/OS BCP Internal Interface (BCPii) protocol. The SE and HMC support for the System z API remains, and is not affected by this withdrawal of support.
- In a future release, IBM plans to remove the capability to change the default Language Environment run-time options settings via SMP/E installable USERMODs. IBM recommends using the CEEPRMxx parmlib member to change the default Language Environment run-time options for the system.

#### **DFSMS IMBED, REPLICATE, and KEYRANGE Statement**

In IBM United States 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 DFSMSshm recall operations as announced in IBM United States Software Announcement 207-175 dated August 7, 2007. For information about how to detect IMBED and REPLICATE attributes on existing data sets and catalogs, refer to INFO APAR I113894.



### z/OS Ordering and Deliverable Key Dates

Key Dates for recent z/OS releases:

- **July 22, 2010:** z/OS V1.12 CFSW configurator support for stand-alone path (5694-A01) and price proposal support.
- **September 10, 2010:** First date for ordering z/OS V1.12 ServerPac, SystemPac, 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 10, 2010:** General availability of Cryptographic Support for z/OS V1R10-R12 Web deliverable (FMID HCR7780). This Web deliverable will support z/OS V1.10 through z/OS V1.12.
- **September 10, 2010:** DVD support for Custom Built Product Offerings (ServerPac, CBPDO, SystemPac, ProductPac, FunctionPac, SFS).
- **September 24, 2010:** z/OS V1.12 general availability via ServerPac, CBPDO and SystemPac.
- **October 12, 2010:** Recommended last date for submitting z/OS V1.11 orders via the entitled Customized Offerings (ServerPac and CBPDO). This date will allow for adequate order processing time.
- **October 25, 2010:** Last date for 34xx tape media orders for all Custom Built Product Offerings
- **October 26, 2010:** Last date for processing orders for z/OS V1.11 via ServerPac and CBPDO.
- **June 29, 2011:** Recommended last date for submitting z/OS V1.11 orders via the fee Customized Offering SystemPac. This date will allow for adequate order processing time.
- **July 26, 2011:** Last date for processing orders for z/OS V1.11 via SystemPac.
- **February 22, 2011:** Customized Offerings Driver on DVD
- **February 22, 2011:** Service orders available on DVD
- **February 21, 2011:** Last date for 34xx tape media orders for the Customized Offerings Driver
- **February 21, 2011:** Last date for 34xx tape media orders for service
- **September 30, 2011:** End of service for z/OS V1.10 (5694-A01).
- **September 2011:** Planned availability for z/OS V1.13 (5694-A01)

### Web deliverables

Sometimes enhancements are provided as Web deliverables, **and not integrated in your ServerPac, CBPDO, or SystemPac deliverable**. For example, some of the ICSF enhancements are available this way. z/OS Web deliverables are available from <http://www.ibm.com/eserver/zseries/zos/downloads/>. They are packaged as two files that you download:

- A **readme** file, which contains a sample job to uncompress the second file, transform it into a format that SMP/E can process, and invoke SMP/E to RECEIVE the file. This file must be downloaded as text.
- A **pax.z** file, which contains an archive (compressed copy) of the FMIDs to be installed. This file needs to be downloaded to a workstation and then uploaded to a host as a binary file.

For Web downloads, you must perform the following tasks:

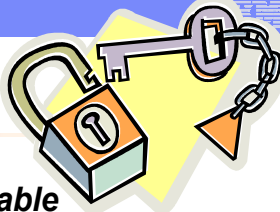
1. Allocate a R/W HFS or zFS directory on the z/OS driving system where the package will be staged (optional).
2. Download both parts of the package from the download zone:  
<http://www.ibm.com/eserver/zseries/zos/downloads/>
3. Run the sample job provided in the README.TXT file. The job will invoke the GIMUNZIP service routine to extract the original data from the packages.
4. Obtain and install service for the target system. Service is not included in Web deliverables. You can obtain service for Web deliverables through your regular preventive service deliverables that you use for z/OS.
5. Install (SMP/E APPLY) the downloaded FMIDs.

**Cryptographic Support for z/OS V1R10-R12 Web deliverable** (ICSF FMID HCR7780) was made available on September 1, 2010. This Web deliverable supports z/OS R10 through z/OS R12, and includes these new functions:

- An improved symmetric key store (CKDS), to significantly increase the number of keys that can be stored in the CKDS and to reduce the overhead associated with updates to the CKDS. These improvements are intended to help position ICSF as the enterprise key store and reduce the batch update window for customers that add or rotate keys in the CKDS frequently.
- 64-Bit enablement for the full set of ICSF callable services. This support is designed to reduce application overhead and simplify the use of ICSF callable services in 64-bit environments by eliminating the need to switch between 64-bit and 31-bit modes.
- Additional content in audit records to include identity information intended to help you meet the requirements of specialized industry standards such as PCI DSS. New sections are planned to be added to SMF type 82 records to contain the identities of the ICSF server and cryptographic service caller. This enhancement is intended to help simplify compliance audits by minimizing the need to correlate ICSF audit records with other security audit records in order to obtain the identity information associated with the ICSF audit event.
- API support for new symmetric encryption modes introduced in the IBM zEnterprise 196 (z196) server CP Assist for Cryptographic Functions (CPACF). The new encryption modes include CMAC, CCM, GCM, CFB, OFB, XTS and CBC-S. These new modes will be supported for both CPACF clear keys and CPACF protected keys. This new support is intended to help application programmers take advantage of these new encryption modes while using the familiar CCA callable services provided by z/OS ICSF.
- ICSF is also planned to provide new support for new functions on zEnterprise 196 servers with the Crypto Express3 feature and minimum driver and microcode levels dated August 2010 or later:
  - New CCA key token wrapping mechanisms designed to bring CCA key tokens into compliance with banking and finance industry standards that mandate key bundle compliance. This support is intended to enable ICSF to utilize key tokens that comply with ANSI x9.24-1 key management requirements for symmetric keys wrapped under either symmetric master keys or key-encrypting keys.
  - Support for enhanced Personal Identification Number (PIN) protection techniques for online PIN verification via ATM and Point of Sale (POS) systems. The enhancements are intended to provide the functions defined as extensions to the ANSI x9.8 and ISO 9564-1 PIN Management and Security standards.
  - New CCA functions implementing the Elliptic Curve Digital Signature Algorithm (ECDSA). These are intended to allow applications using ICSF to generate elliptic curve key pairs, store elliptic curve keys in the PKDS, and both generate and verify elliptic curve digital signatures. Support is planned for both NIST and Brainpool standard curves, and to support the Crypto Express 3 Coprocessor card performing ECDSA within the bounds of the secure hardware.

- New CCA functions for Hashed Message Authentication Codes (HMAC) using the SHA-1 and SHA-2 families of hash functions. HMACs are widely used in internet and storage protocols and are used in specific geographies for the banking and finance industry. This support is designed to allow applications using ICSF to generate HMAC keys, store HMAC keys in the CKDS, and to generate and verify HMACs. This support is to be made available with the Cryptographic Support for z/OS V1.10 through z/OS V1.12 Web deliverable with the PTF for APAR OA33260, planned for February 2011 availability.

## Crypto Support in z/OS Releases



Release	Level Integrated and Available
z/OS R12	ICSF FMID HCR7770 is incorporated. <ul style="list-style-type: none"> <li>▪ <b>Cryptographic Support for z/OS V1R10-R12 Web deliverable (FMID HCR7780) available on 9/1/10.</b></li> </ul>
z/OS R11	ICSF FMID HCR7751 is incorporated. <ul style="list-style-type: none"> <li>▪ <b>Cryptographic Support for z/OS V1R10-R12 Web deliverable (FMID HCR7780) available on 9/1/10.</b></li> <li>▪ Cryptographic Support for z/OS V1R9-R11 Web deliverable (FMID HCR7770) available on 11/20/09.</li> </ul>
z/OS R10	ICSF FMID HCR7750 is incorporated. <ul style="list-style-type: none"> <li>▪ <b>Cryptographic Support for z/OS V1R10-R12 Web deliverable (FMID HCR7780) available on 9/1/10.</b></li> <li>▪ Cryptographic Support for z/OS V1R8-R10 Web deliverable (FMID HCR7751) available on 11/21/08.</li> <li>▪ Cryptographic Support for z/OS V1R9-R11 Web deliverable (FMID HCR7770) available on 11/20/09.</li> </ul>

Your current ICSF level indicates which migration actions you'll need to perform when going to z/OS R12.

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### z/OS ICSF Release Levels

The support for cryptography (z/OS base element ICSF) has been delivered via Web deliverables and release incorporations for z/OS R10, R11, and R12.

z/OS Releases and Crypto Web Deliverables		
Deliverable	General availability	Delivery method
<b>z/OS V1R10, FMID HCR7750 Incorporated</b>	September 26, 2008	New release of products
Cryptographic Support for z/OS V1R8-R10 (FMID HCR7751)	November 21, 2008	Web deliverable
Cryptographic Support for z/OS V1R9-R11 (FMID HCR7770)	November 20, 2009	Web deliverable
Cryptographic Support for z/OS V1R10-R12 (FMID HCR7780)	September 10, 2010	Web deliverable
<b>z/OS V1R11, FMID HCR7751 Incorporated</b>	September 25, 2009	New release of products
Cryptographic Support for z/OS V1R9-R11 (FMID HCR7770)	November 20, 2009	Web deliverable
Cryptographic Support for z/OS V1R10-R12 (FMID HCR7780)	September 10, 2010	Web deliverable
<b>z/OS V1R12, FMID HCR7770 Incorporated</b>	September 24, 2010	New release of products
Cryptographic Support for z/OS V1R10-R12 (FMID HCR7780)	September 1, 2010	Web deliverable

Refer to this technote: <http://www.ibm.com/support/techdocs/atsmastr.nsf/WebIndex/TD103782> for a complete history of ICSF deliverables, and functions contained in those deliverables.



## z/OS VIR12 Ordering

- **Program Number: 5694-A01**
- **When using ShopzSeries, use an installed software report to ensure you order the latest releases of your installed products.**
  - **Make sure your export controlled features are ordered:**
    - **z/OS Security Level 3**
    - **Communications Server Security Level 3**
- **Ordering consideration for Cryptographic Services:**
  - **ICSE:** since ICSF is integrated into z/OS R12 is *\*not\** the highest level available as of September 1, 2010 (FMID HCR7780). You may want to add the Web deliverable to your z/OS system.
- **Important media ordering dates!**
  - **September 10, 2010: first date for product support on DVD**
  - **October 25, 2010: last date for product ordering 34xx tape media**
    - **If you must use physical delivery, choose 3590 or 3592 tape media.**
    - **Electronic delivery is recommended, when possible.**

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### **z/OS V1R12 Ordering**

The program number for z/OS Version 1 Release 12 is **5694-A01**. When ordering this program number, remember to order all the optional features that you were licensed for in previous releases of z/OS. If you order via ShopzSeries, then you can use the installed software report. When using this report, your order will be automatically populated with the latest releases of all of your installed products.

In z/OS V1R12 there are only two export controlled unpriced features: **z/OS Security Level 3**, and **Communications Server Security Level 3**. z/OS Security Level 3 contains the sub-elements: IBM Tivoli Directory Server for z/OS Security Level 3, Network Authentication Service Level 3, OCSF Security Level 3, and System Secure Sockets Layer (SSL) Security Level 3.

Typically, when one new z/OS release becomes orderable in ServerPac and CBPDO, the previous release is orderable for only a month. Due to this short overlap, it is very important that you order the z/OS release you need for migration and coexistence while it's still available for ordering. Typically, a z/OS release remains orderable in the fee'd deliverable SystemPac longer than in ServerPac.

### **Important Media Ordering Consideration!**

IBM will discontinue product delivery of software on 3480, 3480 Compressed (3480C), and 3490E tape media after October 25, 2010. IBM recommends using Internet delivery when ordering your z/OS products or service which eliminates tape handling. If you must use physical delivery, you may continue to choose 3590 or 3592 tape media. Internet delivery is IBM's strategic delivery method, therefore future software delivery enhancements will be focused on Internet delivery.

Some important tape media dates:

- **October 25, 2010:** Last date for 34xx tape media orders for all Custom Built Product Offerings
- **February 21, 2011:** Last date for 34xx tape media orders for the Customized Offerings Driver
- **February 21, 2011:** Last date for 34xx tape media orders for service

### **DVD Support**

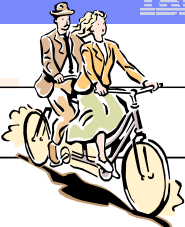
IBM will provide the capability to deliver the z/OS Customized Offerings (such as ServerPac, CBPDO, Customized Offerings Driver, SystemPac, ProductPac) and service orders on DVD media. Though IBM recommends using



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.

Some important DVD dates:

- **September 10, 2010:** DVD support for Custom Built Product Offerings (ServerPac, CBPDO, SystemPac, ProductPac, FunctionPac, SFS)
- **February 22, 2011:** Customized Offerings Driver on DVD
- **February 22, 2011:** Service orders available on DVD

<b>Some Popular Products for z/OS</b>		
<ul style="list-style-type: none"> <li>• <b><u>IBM z/OS Management Facility, V1 R12 (5655-S28, 5655-S29)</u></b> <ul style="list-style-type: none"> <li>• Available at no charge.</li> </ul> </li> </ul>		
<ul style="list-style-type: none"> <li>• <b><u>IBM Debug Tool for z/OS V10 R1 (5655-V50) and V11 R1 (5655-W45)</u></b> <ul style="list-style-type: none"> <li>• Debug Tool no longer incorporated, as of z/OS R5</li> </ul> </li> </ul>		
<ul style="list-style-type: none"> <li>• <b><u>IBM Ported Tools for z/OS V1 R2 (5655-M23, 5655-M29), available 7/9/10.</u></b> <ul style="list-style-type: none"> <li>• VIR2 is updated with newer versions of the associated open source code; specifically OpenSSH 5.0p1, OpenSSL 0.9.8k, and zlib 1.2.3. Can collect SMF Type 119 records, and other new functions!</li> <li>• <b>and features (all the same level): <u>IBM Ported Tools for z/OS: Perl Feature, IBM Ported Tools for z/OS: PHP Feature, IBM Ported Tools for z/OS: Suppl Toolkit Feature</u> (bzip2, cURL 7.16.1), <u>IBM Ported Tools for z/OS: IBM HTTP Server V7.0 Feature (5655-M23)</u></b></li> </ul> </li> </ul>		
<ul style="list-style-type: none"> <li>• <b><u>XML Toolkit for z/OS V1 R9 (5655-J51, 5655-I30)</u></b> <ul style="list-style-type: none"> <li>• Contains XML VIR8 and VIR7 levels, as well</li> </ul> </li> <li>• <b><u>XML Toolkit for z/OS V1 R10 (5655-J51, 5655-I30) – only contains XML VIR10 level</u></b></li> </ul>		
<ul style="list-style-type: none"> <li>• <b><u>IBM 64-bit SDK for z/OS, Java 2 Technology Edition, V5 (5655-N99, 5655-I48)</u></b></li> <li>• <b><u>IBM 31-bit SDK for z/OS, Java 2 Technology Edition, V5 (5655-N98, 5655-I48)</u></b></li> <li>• <b><u>IBM 64-bit SDK for z/OS, Java 2 Technology Edition, V6 (5655-R32, 5655-I48)</u></b></li> <li>• <b><u>IBM 31-bit SDK for z/OS, Java 2 Technology Edition, V6 (5655-R31, 5655-I48)</u></b></li> </ul>		
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### **Some Popular Products to Consider Using and Ordering with z/OS**

#### **IBM z/OS Management Facility Version 1 Release 12 (5655-S28, 5655-S29)**

The IBM z/OS Management Facility V1.12, in conjunction with z/OS V1.12, adds two new system management tasks: Workload Management (policy editor), and Sysplex Status and Monitoring Desktops (for monitoring resources). z/OSMF V1.12 also provides enhancements to the already valuable Incident Log and Configuration Assistant for the z/OS Communications Server functions, and the ability to add other application launch points and links to the z/OSMF menu. The Configuration Assistant for the z/OS Communications Server has been updated with added support for IP security IKEv2, new cryptographic and authentication algorithms, and enhancements to the support for Application Transparent Transport Layer Security (AT-TLS). The z/OS Management Facility Workload Management (policy editor) task can help reduce many hours of manual tasks to minutes. The Sysplex Status and Monitoring Desktops tasks can provide real time performance status of all your z/OS servers and sysplexes, as well as Linux images from one location, and it takes just a few key clicks to view real-time performance metrics. The Incident Log adds support for encrypted parallel FTP dumps to be sent to IBM and allows you to add additional custom information to individual incidents.

A large portion of the z/OS Management Facility application is written in Java, and therefore is eligible to run on IBM System z Application Assist Processors (zAAPs). Some functions in z/OS Management Facility use the Common Information Model (CIM) and, starting with z/OS V1.11, are eligible for the IBM System z Integrated information Processor (zIIP). Also starting with z/OS V1.11, zAAP-eligible workloads may run on the zIIP processor, thus helping maximize the return on your zIIP investment.

#### **IBM Debug Tool for z/OS Version 11 Release 1 (5655-W45)**

IBM Debug Tool for z/OS helps examine, monitor, and control the execution of application programs by letting you:

- Interactively debug an application as it runs
- Perform seamless debugging of mixed-language applications
- Make adjustments to your application while debugging
- Display, monitor, and alter program variables

Debug Tool also supports many programming languages and numerous execution environments. Updates include:

- The IBM Debug Tool Plug-in for Eclipse, when integrated with Debug Tool for z/OS and CICS Explorer, debugs z/OS-based load modules running on z/OS, including load modules that run in a subsystem such as CICS, DB2, or IMS. The plug-in GUI interface allows you to access debugging capability similar to that accessed by the host full-screen interface, allowing you to do the following tasks:
  - Set and clear breakpoints at a specific line
  - Set and clear breakpoints for an error or warning-level error that is based on Language Environment® severities
  - Run to a breakpoint
  - Step into a procedure
  - Step over a procedure
  - View variable values and change them as you step through the code
  - View variable values in the context of a larger area of storage
  - View the call stack
- A new mode of operation, explicit debug mode, is now supported. In this mode, the user identifies the compile units to debug, then Debug Tool loads debug data only for those compile units. This mode can significantly improve debugger performance when it is debugging very large and complex programs. This new mode is an alternative to the standard Debug Tool mode of operation where debug data is automatically loaded for all compile units. It is intended to be used only when debugging large, complex applications that don't perform as well in the standard Debug Tool mode.
- A new user interface is added to the Terminal Interface Manager (TIM) that helps you create and manage the TEST runtime options data set.
- The TIM has been enhanced to remove the need for a site to set up a separate TN3270E port or to customize a set of terminal LUs.
- A GUI interface is added that helps you create and manage the TEST runtime options data set from the workstation.
- The Debug Tool Language Environment user exit for DB2 (EQADDCXT) now supports debugging of DB2 stored procedures of type SUB invoked using the call\_sub function.
- EQAOPTS commands can now be specified at runtime in addition to the use of a user-generated EQAOPTS load module. This allows individual users to enter EQAOPTS commands at runtime by supplying a data set containing EQAOPTS commands.
- Support is added for debugging of assembler programs that exploit the latest IBM zEnterprise 196 architecture.
- Enhanced performance while debugging C and C++ applications.
- A Popup window, which displays the result of the LIST expression command when the Log window, is not visible.
- Support for the Enterprise PL/I ADDRDATA built-in function.
- Support for the Enterprise PL/I V4.1 compiler and its new GONUMBER(SEPARATE) option.
- For programs compiled with any level of Enterprise PL/I, you can now list a single element of an array of structures. For programs compiled with Enterprise PL/I V4.1, you can list a single element of an array of structures in automonitor or use the L prefix command in the Source window to list a single element of an array of structures.
- For programs compiled with any level of Enterprise PL/I, you can now change the format in which Debug Tool displays an array. By using the SET LIST BY SUBSCRIPT ON command, you can have Debug Tool display the array as it is stored in memory.
- A new keyword LABELS is added to the LIST NAMES command where you can list the names of all section and paragraph names in a COBOL program, and the names of all instruction labels in an assembler program.
- The following breakpoints are enhanced:
  - AT CHANGE and AT LABEL breakpoints are enhanced to allow a user to limit the scope of the breakpoint to a specific compile unit.
  - AT GLOBAL is enhanced to provide an OCCURRENCE option or wild card (\*) to stop for any condition raised in the application.
  - The QUERY LOCATION command is enhanced to provide more information when Debug Tool stops for an AT CHANGE breakpoint.
- Automonitor enhancements:
  - You can change the subscripts of an array directly in the Monitor window.
  - You can delete multiple items from Monitor window at one time.
  - You can use the cursor (in combination with the CLEAR MONITOR command) to indicate which variable to remove from the Monitor window.

- Automated allocation of the commands, log, preferences, save settings and save breakpoints and monitor specifications files.
- New functions are included in Debug Tool Utilities to help an application programmer more easily start debugging IMS applications running in BTS.
- A CICS transaction, DTNP, is provided which issues NEWCOPY or PHASEIN of application programs.
- Documentation is provided to assist debugging of Language Environment C/C++, COBOL, and PLI programs in the Java JNI environment in z/OS.

### IBM Debug Tool for z/OS Version 10 Release 1 (5655-U27)

IBM Debug Tool for z/OS V10 includes the following enhancements:

#### Business flexibility

- The Debug Tool CICS Control (DTCN) Primary Menu screen is enhanced to support both a Load Module Name resource and a Compile Unit Name resource. The combination of a Load Module Name resource and a Compile Unit Name resource provides additional granularity which helps in identifying the program you want to debug.
- A RESTful HTTP access interface to read, create, update, and delete profiles in the DTCN profile repository is supported. A GUI interface allows you to manipulate the profiles from the workstation.
- Debug Tool now supports debugging C and C++ programs that run in the Airline Control System (ALCS). This support is available only if you debug in remote debug mode.
- The publication, *The IBM Debug Tool Customization Guide* now provides instructions for defining Terminal Interface Manager as an application under IBM Session Manager.
- Currency support for IMS V11 and CICS TS V4.1 is provided.

#### IT simplification

- Support is added for debugging of modules loaded from the Library Lookaside (LLA).
- The CODEPAGE(ccsid) option is added to the XML option of the LIST CONTAINER and LIST STORAGE commands to improve the display of character strings on a 3270 that are encoded in alternate code pages.
- The command SET MONITOR LIMIT is added so that the monitor window can display more than 1000 lines. QUERY MONITOR LIMIT will display the monitor limit setting.
- Support is added for multiple concurrent updates of variable values in the monitor window.
- A new command POPUP, is provided to open a Command window to improve the ability to enter a long Debug Tool command. In addition, the Command window is automatically displayed when the user enters a command continuation character or starts a multiline command. A SET POPUP command is also included to control the size of the Command window.
- A new command, FINDBP, is provided which will help you easily find line, statement, and offset breakpoints in the Source object while in full-screen mode.
- A new command is added, POSITION nnnn, to position to a line in the selected window.
- A new CICS Screen Control Mode, using the new DTSC transaction to improve the control and management of debug sessions in an MRO environment is provided.
- Set and Query IgnoreLink for CICS in remote debug mode is supported.
- Automatic saving and restoring of settings and breakpoints is now supported under IMS/TM.
- The EQASET transaction can now be used to associate an IMS LTERM with a TSO user ID when the Debug Tool IMS Language Environment® exit is used and the user has not signed on.
- The ability to display a complex data item such as a group or a structure as a single character string is added in remote debug mode.
- The LIST TITLED WSS command can now be used in the MONITOR command to place the variables defined in the Working-Storage section of a COBOL program into the monitor window.

- Display of COBOL DISPLAY messages in the debug console when in remote debug mode is supported.
- Enterprise PL/I %INCLUDE files and C/C++ header files support is enhanced in remote debug mode.
- Support is added for On Demand Load and Capture Source for C and C++ debug side files created with the DBGLD and CDADBGLD utilities shipped with the z/OS V1.11 XLC C/C++ compiler.
- Support is included for an additional processing mode for STEP OVER in Assembler compile units for "calls" whose target is an internal routine within the same compile unit. This new mode is enabled by the SET ASSEMBLER STEPOVER EXTINT statement.
- AT® CHANGE monitoring of assembler variables with dynamically updated addresses such as those in a DSECT is added.
- Support for the L (LIST) and M (MONITOR) prefix commands is extended to Assembler and Disassembly.

### Governance

- The EQASET transaction is enhanced to associate debug parms with LTERM ID if signon security is disabled and the user has not signed on.
- Support is added to run in Browse Mode. In this mode, modifications to storage or registers and modifications to control flow (for example, using the GOTO or JUMPTO commands) are not allowed. Browse Mode allows debugging of a program but does not allow the user to change the behavior of the program. This may be desirable in a production environment to prevent unauthorized changes to the program behavior.
- You can now show column 73-80 in a source view for a COBOL program.

As of z/OS V1R5, optional feature C/C++ *with* Debug Tool is no longer in z/OS. The functional replacement that you will need to order for that feature is the C/C++ without Debug Tool feature in z/OS and also the independent standalone program product - IBM Debug Tool for z/OS.

### IBM Ported Tools for z/OS Version 1 Release 2 (5655-M23, 5655-M29)

IBM Ported Tools for z/OS is a program product available at no cost to you (for the product or for the features). It is designed to deliver ported tools and utilities (modified to operate within the z/OS environment) which are useful for application development on, and secure communications to, the z/OS platform. IBM Ported Tools for z/OS includes utilities such as OpenSSH, Perl, PHP, bzip2, cURL, Xvfb, and IBM HTTP Server 7.0 where OpenSSH is in the product base and the remaining items are separate features.

For Version 1 Release 2 of the IBM Ported Tools for z/OS product (available July 9, 2010), the base is updated to include a more current OpenSSH as well as more current versions of associated Open SSL and zlib information. Only the base is updated; the other utilities included in the IBM Ported Tools for z/OS product are optional features and are not updated. IBM Ported Tools for z/OS is delivered in SMP/E format and provides the following OpenSSH features:

- Authentication for both client and server
- Privacy through encryption
- Data integrity
- Authorization
- Forwarding or tunneling
- An optional feature of compression

This latest release of OpenSSH has been enhanced with the following:

- OpenSSH has been updated with newer versions of the associated open source code; specifically OpenSSH 5.0p1, OpenSSL 0.9.8k, and zlib 1.2.3.
- OpenSSH can be configured to allow OpenSSH keys to be stored in SAF key rings.
- OpenSSH can be configured to collect SMF Type 119 records for both the client and the server for login failures and file transfers.
- OpenSSH is now an XPLINK application.

Xvfb support is now provided through FMID HVFB111 instead of being in the base of IBM Ported Tools for z/OS which is now FMID HOS1120. The Xvfb for z/OS code is provided as a separate FMID in order to allow IBM to provide more efficient support. However, Xvfb (FMID HVFB111) will be delivered whenever the base of IBM Ported

Tools for z/OS (FMID HOS1120) is ordered. FMID HVFB111 is the same code that was available as PTFs UA21819 and UA32671 with the base of IBM Ported Tools for z/OS V1.1 which was FMID HOS1110.

If running on z/OS V1.10 or z/OS V1.11, PTFs for the following APARs must be applied: PK86329, and OA29401.

### **IBM Ported Tools for z/OS: Perl for z/OS Feature (5655-M23, 5655-M29)**

IBM Ported Tools for z/OS: Perl for z/OS Feature provides a port of the Perl (version 5.8.7) scripting language to the z/OS UNIX platform. Perl (Practical Extraction and Report Language) is a very popular general-purpose programming language that is widely used on UNIX and other computing platforms.

Support for z/OS UNIX has been available for several years in the open-source version of Perl. Building this version of Perl is often difficult even for experienced users, and requires access to several GNU utilities.

Perl for z/OS is preconfigured and precompiled, and is designed to eliminate the need for those complicated tasks. EBCDIC-related factors in the Perl application have been addressed; therefore, it is anticipated that Perl applications can run with data generated entirely in the z/OS UNIX environment. As with any z/OS related programming language, Perl programs that process data originating from non-EBCDIC (typically ASCII) systems must still convert this data from ASCII to EBCDIC, and vice versa. Tips for conversion can be found in IBM Ported Tools for z/OS: Perl for z/OS User's Guide (SA23-1347) at <http://www.ibm.com/servers/eserver/zseries/zos/bkserv/> or [http://www.ibm.com/servers/eserver/zseries/zos/unix/port\\_tools.html](http://www.ibm.com/servers/eserver/zseries/zos/unix/port_tools.html).

### **IBM Ported Tools for z/OS: PHP for z/OS Feature (5655-M23, 5655-M29)**

IBM Ported Tools for z/OS: PHP for z/OS Feature (PHP for z/OS) provides a port of the PHP (version 5.1.2) scripting language to the z/OS UNIX System Services platform. PHP (PHP: Hypertext Preprocessor) is a general purpose scripting language that is well-suited for Web development. PHP's syntax is similar to that of C and Perl, making it easy for anyone with basic programming skills to learn. It allows one to embed program statements directly within an HTML page. PHP is both powerful and flexible: it has a rich set of APIs and it contains a Perl-compatible regular expression library. PHP is popular in the computing industry and is available on a wide variety of platforms. PHP for z/OS includes an extension to access DB2 for z/OS via ODBC. This allows PHP applications to access DB2 data on z/OS.

### **IBM Ported Tools for z/OS: Supplementary Toolkit for z/OS Feature (5655-M23, 5655-M29)**

IBM Ported Tools for z/OS: Supplementary Toolkit for z/OS Feature has been created to provide miscellaneous utilities that are commonly used on other platforms, and now on the z platform as well. The initial delivery contained bzip2. bzip2 is a powerful data compression tool. It is widely used on other platforms in the industry and has now been made available to run on z/OS UNIX System Services. Its usage syntax is intuitive and therefore makes it attractive for a wide audience. As with most compression utilities, it provides both compression and decompression capabilities. Additional utilities and updates to the Supplementary Toolkit may be made via the service stream, in order to provide a seamless delivery mechanism – watch for them on <http://www.ibm.com/servers/eserver/zseries/zos/unix/suptlk/>

The following additional utilities were made available via the service stream:

- IBM Integrated Removable Media Manager for the Enterprise on System z (IRMM) command line interface (CLI) (APAR: OA22006). **IRMM CLI** permits a z/OS administrator to fully administer, control, and monitor the distributed tape infrastructure from z/OS. **Note:** in line with Withdrawal Announcement 909-291, dated December 01, 2009, for 5655-S57, Integrated Removable Media Manager for the Enterprise on System z V1.1, the portion of the Supplementary Toolkit associated with IRMM will no longer be marketed after March 1, 2010.
- cURL 7.16.1 (APAR: OA22944). **cURL** is an open source tool that can transfer data from or to a server or servers, using one of the supported protocols (HTTP, HTTPS, FTP, FTPS, TFTP, DICT, TELNET, LDAP or FILE). The command is designed to work without user interaction. cURL offers a variety of useful functions like proxy support, user authentication, FTP upload, HTTP post, SSL connections, cookies, file transfer, resume, and more. It is a command-line UNIX application, and runs in the z/OS UNIX System Services environment.

### **IBM Ported Tools for z/OS: IBM HTTP Server V7.0 Feature (5655-M23, 5655-M29)**

IBM Ported Tools for z/OS: IBM HTTP Server V7.0 provides an HTTP Server, or Webserver (based on Apache Software Foundation's Apache HTTP Server (version 2.2.8)) for the z/OS UNIX System Services environment. IBM HTTP Server V7.0 provides support for dynamic content via CGI/FastCGI, compression, caching, proxying, request rewriting, SSL, and LDAP Authentication. Because it uses the z/OS UNIX System Services environment, authentication and authorization can be based on SAF credentials and secure connections use z/OS System SSL (and ICSF).

The IBM Ported Tools for z/OS: IBM HTTP Server V7.0 feature has the same functionality found in the WebSphere Application Server for z/OS V7.0 product.

### **XML Toolkit for z/OS Version 1 Release 9 (5655-J51, 5655-I30)**

The C++ XML parser within this toolkit is a port of the IBM XML Parser for C++, XML4C V5.6, which is based on Apache's Xerces C++ V2.6 parser.

- Specify that XML Schema annotations not be generated
- Specify that XML Schema annotations not be regenerated when deserializing a grammar
- Turn off default entity resolution
- Perform schema-only validation when there is a Document Type Definition (DTD)

The IBM XSLT Processor for C++, XSLT4C V1.10 within this toolkit, which is based on Apache's Xalan C++ V1.10 XSLT processor, has been updated with:

- XML1.1 and Namespaces for XML1.1 support
- Improved pluggable memory management
- Improvements in Xalan XML serializers designed to provide improved performance.

Support for the Java XML Parser and Processor is not packaged with the IBM XML Toolkit for z/OS. This support can now be obtained within the IBM SDK for z/OS, product offerings.

The XML Toolkit for z/OS is based on open-source software developed by the Apache Software Foundation that does not provide for compatibility with prior releases. Care must be taken when installing IBM XML Toolkit for z/OS, V1.9, because the XML parsers and the XSLT processors in this toolkit are not compatible with previous releases. Please note, the IBM XML Toolkit for z/OS, V1.9 packages the latest XML parser and XSLT processor from Apache as well as those XML parsers and the XSLT processors from previous XML Toolkits so that applications that are using XML Toolkit for z/OS, V1.8 or XML Toolkit for z/OS, V1.7 will continue to run. This is intended to allow for continued use of these levels of the toolkit by applications that have written to their specific APIs.

This release contains FMIDs HXML170, HXML180, and HXML190.

### **XML Toolkit for z/OS Version 1 Release 10 (5655-J51, 5655-I30)**

The XML Parser, C++ Edition has been updated with the following support:

- Ability to optionally utilize z/OS XML System Services (z/OS XML) as an underlying parsing technology when performing DOM (Document Object Model) and SAX2 (Simple API for XML) based parsing operations. Support is provided for both non-validating parsing as well as validating parsing utilizing schema based on the W3C Schema recommendation. This enhancement is provided by way of a set of new z/OS-specific parser C++ classes that are similar in name to and closely mimic the existing DOM and SAX2 interfaces. Utilizing z/OS XML provides redirection to zAAP specialty processors of the portion of the XML parsing operation performed by z/OS XML and may result in significant improved raw performance as well.
- A new feature that supports importing multiple schemas with the same namespace.
- Improved source offset support, enhancing the ability to obtain information that correlates parsed output with the associated data in the input document being parsed. This new support is included in the new z/OS-specific parser classes described above.

**This release contains FMID HXML1A0. If you need a prior level of XML Toolkit for z/OS, then you must order the previous release of the product.** XML Toolkit for z/OS V1.9 remains orderable, and is orderable with XML Toolkit for z/OS V1.10.

**IBM 64-bit SDK for z/OS, Java 2 Technology Edition, V5 (5655-N99, 5655-I48)**

64-bit SDK for z/OS, Java 2 Technology Edition, V5 is a Java SDK that contains a reengineered Java 2 virtual machine at the SDK 5 level and the IBM Just-in-Time (JIT) compiler. The program is a key building block for developing on demand applications. 64-bit SDK for z/OS, Java 2 Technology Edition, V5 is designed to be compliant with the Java SDK 5 compatibility test and is intended to provide the stability, service, and scalability you expect from a zSeries program.

64-bit SDK for z/OS, Java 2 Technology Edition, V5 is designed to provide:

- Support for Java application programming in a 64-bit environment
- Java 2 APIs at the SDK 5 level
- Continuation of the "write once, run anywhere" Java paradigm
- Java Record I/O (JRIO)
- XML support
- System Authorization Facility (SAF) and cryptography support
- Use the System z9 and zSeries Application Assist Processors (zAAPs) available on z9 EC, z9 BC, z990 and z890 servers
- Additional reliability, availability, and serviceability (RAS) enhancements

Ordering information: The program numbers are IBM 64-bit SDK for z/OS, Java 2 Technology Edition, V5 (5655-N99), and IBM SDK for z/OS Software Subscription and Support (5655-I48)

**IBM 31-bit SDK for z/OS, Java 2 Technology Edition, V5 (5655-N98, 5655-I48)**

31-bit SDK for z/OS, Java 2 Technology Edition, V5 is a Java SDK that contains a reengineered Java 2 virtual machine at the SDK 5 level and the IBM Just-in-Time (JIT) compiler. The program is a key building block for developing on demand applications. 31-bit SDK for z/OS, Java 2 Technology Edition, V5 is compliant with the Java SDK 5 compatibility test and is designed to provide the stability, service, and scalability you expect from a zSeries program.

31-bit SDK for z/OS, Java 2 Technology Edition, V5 is designed to provide:

- Support for Java application programming in a 31-bit environment
- Java 2 APIs at the SDK 5 level
- Continuation of the "write once, run anywhere" Java paradigm
- Java Record I/O (JRIO)
- XML support
- System Authorization Facility (SAF) and cryptography support
- Use the System z9 and zSeries Application Assist Processors (zAAPs) available on z9 EC, z9 BC, z990 and z890 servers
- Additional reliability, availability, and serviceability (RAS) enhancements

Ordering information: The program numbers are IBM 31-bit SDK for z/OS, Java 2 Technology Edition, V5 (5655-N98), and IBM SDK for z/OS Software Subscription and Support (5655-I48)

**IBM 31-bit SDK for z/OS, Java 2 Technology Edition, V6 (5655-R31, 5655-I48)**

31-bit SDK for z/OS, Java Technology Edition, V6 provides a software development kit (SDK) at the Java technology level, designed to be compliant with the Sun SDK 6 application programming interfaces (APIs). With 31-bit SDK for z/OS, Java Technology Edition, V6 you can:

- Test and deploy Java applications in a 31-bit environment
- Continue the "write once, run anywhere" Java paradigm
- Use your System z Application Assist Processors (zAAPs) available on z9 BC, z9 EC, z990, and z890 servers to run eligible Java work
- Leverage traditional System z benefits: scalability, reliability, availability, and serviceability.

**IBM 64-bit SDK for z/OS, Java 2 Technology Edition, V6 (5655-R32, 5655-I48)**

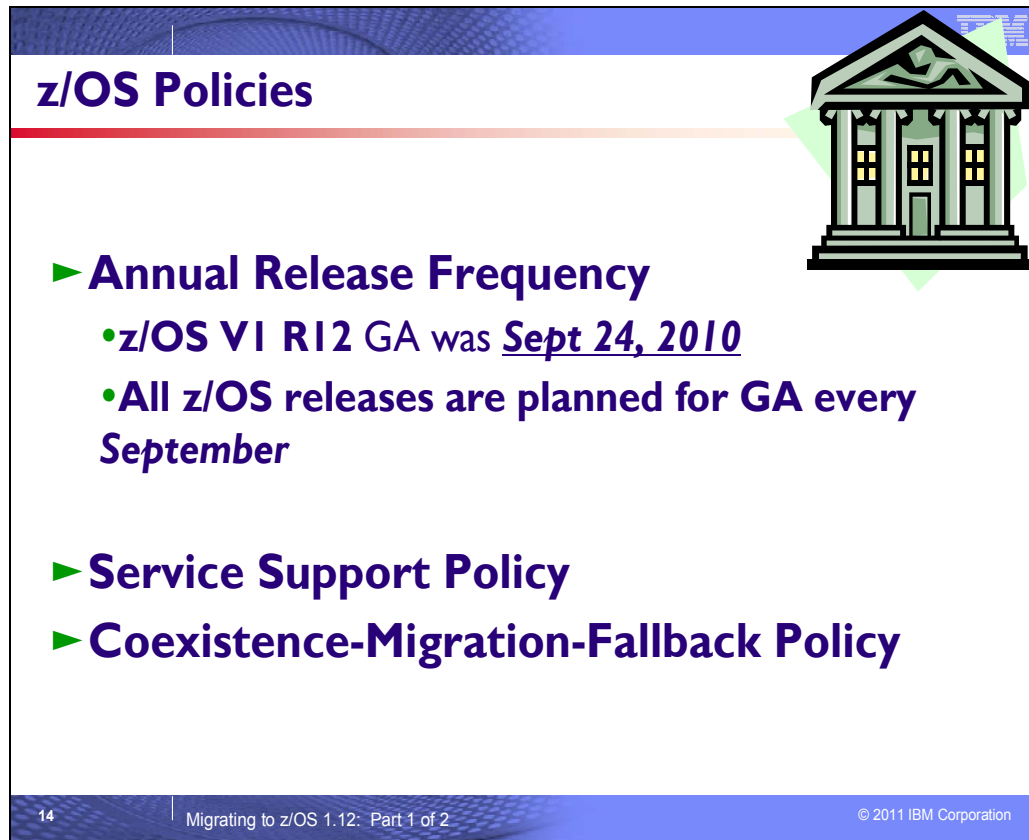
64-bit SDK for z/OS, Java Technology Edition, V6 provides a software development kit (SDK) at the Java technology level, designed to be compliant with the Sun SDK 6 application programming interfaces (APIs). With 64-bit SDK for z/OS, Java Technology Edition, V6 you can:



- Test and deploy Java applications in a 64-bit environment
- Continue the "write once, run anywhere" Java paradigm
- Use your System z Application Assist Processors (zAAPs) available on z9 BC, z9 EC, z990, and z890 servers to run eligible Java work
- Leverage traditional System z benefits: scalability, reliability, availability, and serviceability.

**End of Service Dates for Older IBM SDK levels:**

- **IBM 64-bit SDK for z/OS, Java 2 Technology Edition, V1 Release 4 (5655-I56):** was out of service as of September 30, 2008.
- **IBM 31-bit SDK for z/OS, Java 2 Technology Edition, V1 Release 4 (5655-M30):** has announced it will be out of service as of September 30, 2011. z/OS R11 was the last release for which IBM SDK V1R4 support was available.



**z/OS Policies**

- ▶ **Annual Release Frequency**
  - z/OS VI R12 GA was Sept 24, 2010
  - All z/OS releases are planned for GA every **September**
- ▶ **Service Support Policy**
- ▶ **Coexistence-Migration-Fallback Policy**

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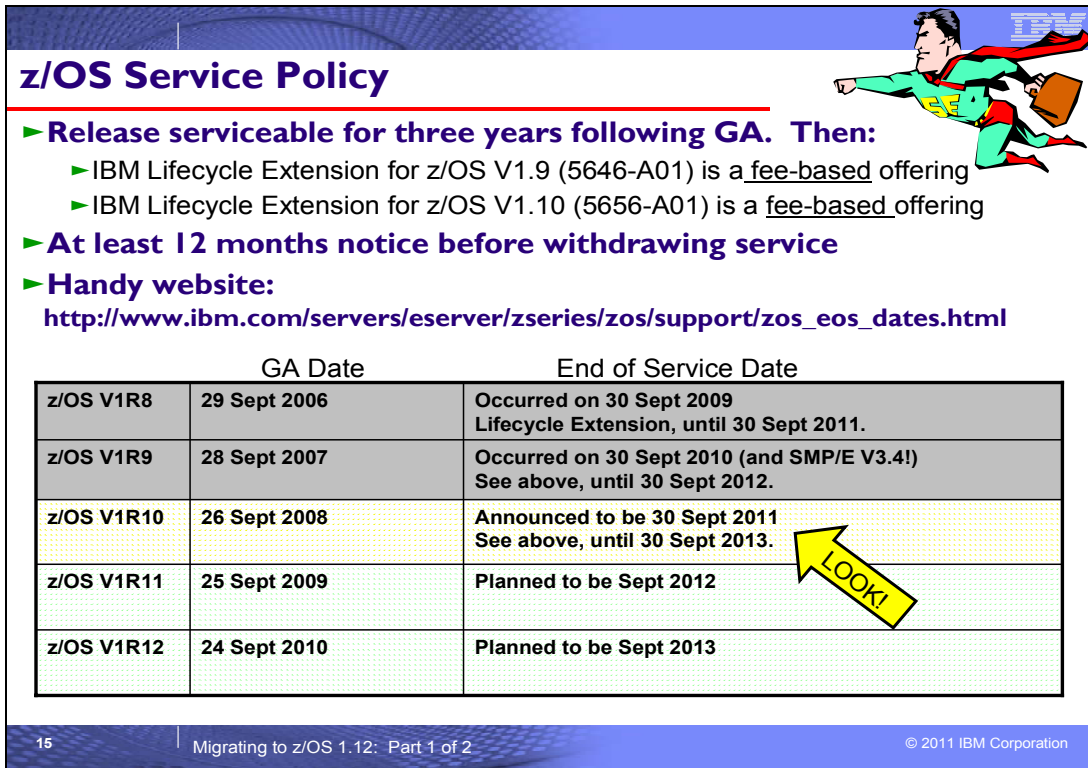
### Release Frequency

Since August 2002 the release schedule for z/OS has been a 12-month cycle. At this time, IBM aligned the coexistence, migration, and fallback policy with the service policy, with the annual releases.

### Starting with z/OS R6, IBM intends to deliver z/OS releases annually, with general availability in September.

This predictable release cycle will enable you to better plan your migration, freeing you to increase the value of your computing environment to your business and deliver better service to your end users. New z/OS functions will continue to be delivered between releases through the normal maintenance stream or as Web deliverables. In addition, significant new functions may be delivered between releases as features of the product. *z/OS V1R12 is the seventh release to be delivered on this annual release cycle.*

These statements regarding the new release strategy represent current intentions of IBM. Any reliance on these statements is at the relying party's sole risk and will not create any liability or obligation for IBM. All statements regarding IBM's plans, directions, and intent are subject to change or withdrawal without notice.



**z/OS Service Policy**

- ▶ **Release serviceable for three years following GA. Then:**
  - ▶ IBM Lifecycle Extension for z/OS V1.9 (5646-A01) is a fee-based offering
  - ▶ IBM Lifecycle Extension for z/OS V1.10 (5656-A01) is a fee-based offering
- ▶ **At least 12 months notice before withdrawing service**
- ▶ **Handy website:**  
[http://www.ibm.com/servers/eserver/zseries/zos/support/zos\\_eos\\_dates.html](http://www.ibm.com/servers/eserver/zseries/zos/support/zos_eos_dates.html)

	GA Date	End of Service Date
z/OS V1R8	29 Sept 2006	Occurred on 30 Sept 2009 Lifecycle Extension, until 30 Sept 2011.
z/OS V1R9	28 Sept 2007	Occurred on 30 Sept 2010 (and SMP/E V3.4!) See above, until 30 Sept 2012.
z/OS V1R10	26 Sept 2008	Announced to be 30 Sept 2011 See above, until 30 Sept 2013.
z/OS V1R11	25 Sept 2009	Planned to be Sept 2012
z/OS V1R12	24 Sept 2010	Planned to be Sept 2013

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**Service Policy**

IBM's current policy is to provide maintenance (service) for each release of z/OS for three years following its general availability (GA) date. However, service on the last release of a version might be extended beyond the intended three-year period. Prior to withdrawing service for any version or release of z/OS, IBM intends to provide at least 12 months notice. The service policy for z/OS also applies to any enhancements (including but not limited to web deliverables), such as the *System REXX Support for z/OS V1.8* download that was provided for z/OS R8.

See the table below for expiration dates for service support. Planned end of service dates are based on the 3-year service policy.

Version and release	General availability (GA)	End of service (EOS)
OS/390 V2R8	24 September 1999	Occurred 30 September 2002
OS/390 V2R9	31 March 2000	Occurred 31 March 2003
OS/390 V2R10	29 September 2000	Occurred 30 September 2004
z/OS V1R1	30 March 2001	Occurred 31 March 2004
z/OS V1R2	26 October 2001	Occurred 31 October 2004
z/OS V1R3	29 March 2002	Occurred 31 March 2005
z/OS V1R4	27 September 2002	Occurred on 31 March 2007
z/OS V1R5	26 March 2004	Occurred on 31 March 2007
z/OS V1R6	24 September 2004	Occurred on 30 September 2007
z/OS V1R7	30 September 2005	Occurred on 30 September 2008 * *See "z/OS V1.7 Lifecycle Extended Service" below for a fee-based accommodation, through 30 September 2010.
z/OS V1R8	29 September 2006	Occurred 30 September 2009 *See "z/OS V1.8 Lifecycle Extended Service" below for a fee-based accommodation, through 30 September 2011.
z/OS V1R9	28 September 2007	Occurred September 2010 *See "z/OS V1.9 Lifecycle Extended Service" below for a fee-based accommodation, through 30 September 2012.
z/OS V1R10	26 September 2008	30 September 2011 (announced) *See "z/OS V1.10 Lifecycle Extended Service" below for a

		fee-based accommodation, through 30 September 2013.
z/OS V1R11	25 September 2009	September 2012 (planned)
z/OS V1R12	Planned for 24 September 2010	September 2013 (planned)

### **z/OS V1.7 Lifecycle Extended Service - through September 30, 2010**

To address our customer requirements of support and service IBM is announcing a special extended lifecycle accommodation (5637-A01) exclusively for z/OS V1.7. z/OS V1.7 offered many advances in platform simplification, security, availability, and application development capabilities making it one of the most popular releases of z/OS ever.

The IBM Lifecycle Extension for z/OS V1.7 provides corrective service, which is a work around or fix to a problem. If you are licensed for the IBM LifeCycle Extension for z/OS V1.7 problem reporting remains unchanged. The IBM Support Center can be contacted to report problems that may be associated with z/OS V1.7. The IBM Support Center will provide a fix or circumvention for new problems that are defects in z/OS V1.7. Any PTF for z/OS V1.7 that was available prior to the end of z/OS V1.7 warranty period (September 30, 2007) will continue to be available through the existing service acquisition portals such as SMP/E RECEIVE ORDER and ShopzSeries.

***The IBM LifeCycle Extension for z/OS V1.7 does not provide preventive service or new function, nor does it provide any extension or changes to IBM's coexistence or migration policy for z/OS.***

Customers with SoftwareXcel or SupportLine support should contact their IBM representative, an IBM Business Partner, or the IBM Call Center for additional information.

- Starting October 1, 2008, IBM will offer a fee-based, corrective service extension for up to a 2 year period following the z/OS V1.7 discontinuance of the warranty service (September 30, 2008). This support enables users who have not completed their migration to z/OS V1.8 or z/OS V1.9 to continue to receive corrective service for z/OS V1.7 in the 2 year period of October 1, 2008 through September 30, 2010
- Available as a six month minimum purchase with the option of either:
  - Purchasing the support for a longer period OR
  - Extending the existing purchase period in increments of one month

If you purchase the IBM Lifecycle Extension for z/OS V1.7, you must license it for all IBM z/Architecture servers running z/OS V1.7; however, you may specify unique duration periods for servers migrating their z/OS V1.7 images on differing schedules.

If you require support for defects for z/OS V1R7 beyond September 2010, contact an IBM representative for a special bid.

### **z/OS V1.8 Lifecycle Extended Service - through September 30, 2011**

The IBM Lifecycle Extension for z/OS V1.8 (5638-A01) provides fee-based corrective service (a fix, bypass, or restriction to a problem) beyond the September 30, 2009, withdrawal of program services date for z/OS V1.8 (5694-A01). If you acquire the IBM Lifecycle Extension for z/OS V1.8, problem reporting remains unchanged for the duration of the Lifecycle Extension period. During this time, the IBM Support Center can be contacted to report problems that may be associated with z/OS V1.8, and the IBM Support Center will provide a fix, bypass, or restriction for new problems that are defects in z/OS V1.8. Any PTF for z/OS V1.8 that was available prior to the withdrawal of z/OS V1.8 program services (September 30, 2009) will continue to be available through the existing service acquisition portals such as SMP/E RECEIVE ORDER and ShopzSeries.

Starting October 1, 2009, IBM will offer a fee-based, corrective service extension for up to a 2-year period following the z/OS V1.8 discontinuance of program services (September 30, 2009). This support enables users who have not completed their migration to z/OS V1.9 or z/OS V1.10 to continue to receive corrective service for z/OS V1.8 in the 2-year period of October 1, 2009, through September 30, 2011. ***This does not alter the z/OS coexistence, migration, fallback, or service policy.***

The Lifecycle Extension for z/OS V1.8 is flexible, with a minimum 3-month purchase and a maximum period of duration through September 30, 2011. This supports variable migration plans, where you could have differing migration schedules either for single machines or within a Parallel Sysplex. Lifecycle Extension must be ordered for all machines running z/OS V1.8 at a physical location, either for individual IBM z/Architecture machines or for one or more IBM z/Architecture machines within a qualified Parallel Sysplex (in which case MSU aggregation may apply). However, you can add or remove machines running z/OS V1.8 as your migration plans progress.

You must notify IBM if:

- The permanent MSUs change for any IBM z/Architecture machine running z/OS V1.8
- You add or remove an IBM z/Architecture machine that is running z/OS V1.8
- You add or remove z/OS V1.8 from any IBM z/Architecture machine

You must notify IBM within the same calendar month that the changes occur as these changes may affect the pricing for that machine or qualified Parallel Sysplex.

### **z/OS V1.9 Lifecycle Extended Service - through September 30, 2012**

To address our customers' requirements for defect support, IBM is announcing an extended lifecycle accommodation for z/OS V1.9. IBM Lifecycle Extension for z/OS V1.9 offers fee-based corrective service to users who have not completed their migration from z/OS V1.9 to either z/OS V1.10 or V1.11.

The IBM Lifecycle Extension for z/OS V1.9 (5646-A01) provides fee-based corrective service (a fix, bypass, or restriction to a problem) beyond the September 30, 2010, withdrawal of program services date for z/OS V1.9 (5694-A01). If you acquire the IBM Lifecycle Extension for z/OS V1.9, problem reporting remains unchanged for the duration of the Lifecycle Extension period. During this time, the IBM Support Center can be contacted to report problems that may be associated with z/OS V1.9, and the IBM Support Center will provide a fix, bypass, or restriction for new problems that are defects in z/OS V1.9. Any PTF for z/OS V1.9 that was available prior to the withdrawal of z/OS V1.9 program services (September 30, 2010) will continue to be available through the existing service acquisition portals such as SMP/E RECEIVE ORDER and ShopzSeries.

Starting October 1, 2010, IBM will offer a fee-based, corrective service extension for up to a 2-year period following the z/OS V1.9 discontinuance of program services (September 30, 2010). This support enables users who have not completed their migration to z/OS V1.10 or z/OS V1.11 to continue to receive corrective service for z/OS V1.9 in the 2-year period of October 1, 2010, through September 30, 2012. This does not alter the z/OS coexistence, migration, fallback, or service policy. The Lifecycle Extension for z/OS V1.9 is flexible, with a minimum 3-month purchase and a maximum period of duration through September 30, 2012. This supports variable migration plans, where you could have differing migration schedules for either single machines or machines within a Parallel Sysplex. Lifecycle Extension must be ordered for all machines running z/OS V1.9 at a physical location, either for individual IBM z/Architecture machines or for one or more IBM z/Architecture machines within a qualified Parallel Sysplex (in which case MSU aggregation may apply). However, you can add or remove machines running z/OS V1.9 as your migration plans progress.

You must notify IBM if:

- The permanent MSUs change for any IBM z/Architecture machine running z/OS V1.9
- You add or remove an IBM z/Architecture machine that is running z/OS V1.9
- You add or remove z/OS V1.9 from any IBM z/Architecture machine

You must notify IBM within the same calendar month that the changes occur as these changes may affect the pricing for that machine or qualified Parallel Sysplex.

### **z/OS V1.10 Lifecycle Extended Service - through September 30, 2013**

To address our customers' requirements for defect support, IBM is announcing an extended lifecycle accommodation for z/OS V1.10. IBM Lifecycle Extension for z/OS V1.10 offers fee-based corrective service to users who have not completed their migration from z/OS V1.10 to either z/OS V1.11 or z/OS V1.12. The IBM Lifecycle Extension for z/OS V1.10 (5656-A01) provides fee-based corrective service (a fix, bypass, or restriction to a problem) beyond the September 30, 2011, withdrawal of program services date for z/OS V1.10 (5694-A01). If you acquire the IBM Lifecycle Extension for z/OS V1.10, problem reporting remains unchanged for the duration of the Lifecycle Extension period. During this time, the IBM Support Center can be contacted to report problems that may be associated with z/OS V1.10, and the IBM Support Center will provide a fix, bypass, or restriction for problems that are defects in z/OS V1.10. Any PTF for z/OS V1.10 that was available prior to the withdrawal of z/OS V1.10 program services (September 30, 2011) will continue to be available through the existing service acquisition portals such as SMP/E RECEIVE ORDER and ShopzSeries.

- Starting October 1, 2011, IBM will offer a fee-based, corrective service extension for up to a 2-year period following the z/OS V1.10 discontinuance of program services (September 30, 2011). This support enables users who have not completed their migration to z/OS V1.11 or z/OS V1.12 to continue to receive corrective service for z/OS V1.10 in the 2-year period of October 1, 2011, through September 30, 2013. **This does not alter the z/OS coexistence, migration, fallback, or service policy.**

- The Lifecycle Extension for z/OS V1.10 is flexible, with a minimum 3-month purchase and a maximum period of duration through September 30, 2013. This supports variable migration plans, where you could have differing migration schedules for either single machines or machines within a Parallel Sysplex. Lifecycle Extension must be ordered for all machines running z/OS V1.10 at a physical location, either for individual IBM z/Architecture machines or for one or more IBM z/Architecture machines within a qualified Parallel Sysplex (in which case MSU aggregation may apply). However, you can add or remove machines running z/OS V1.10 as your migration plans progress.

You must notify IBM if:

- The permanent MSUs change for any IBM z/Architecture machine running z/OS V1.10
- You add or remove an IBM z/Architecture machine that is running z/OS V1.10
- You add or remove z/OS V1.10 from any IBM z/Architecture machine
- You must notify IBM within the same calendar month that the changes occur as these changes may affect the pricing for that machine or qualified Parallel Sysplex.

## z/OS R12 Coexistence

z/OS R8      z/OS R9      z/OS R10      z/OS R11      z/OS R12      z/OS R13

With z/OS V1.8 Lifecycle      With z/OS V1.9 Lifecycle

- Starting with z/OS R6, IBM has aligned the coexistence, fallback, and migration policy with the service policy.
- **z/OS R10, z/OS R11, and z/OS R12** are supported for coexistence, migration, and fallback
- **Keep in mind:** exploitation of new function can require that all systems be at z/OS R12 before use. Fallback maintenance may not be available for all exploitation cases. Consult the appropriate exploitation documentation to understand the limitations on fallback.

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### Understanding Coexistence

*Coexistence* occurs when two or more systems at different software levels share resources. The resources could be shared at the same time by different systems in a multisystem configuration, or they could be shared over a period of time by the same system in a single-system configuration. Examples of coexistence are two different JES releases sharing a spool, two different service levels of DFSMSdfp sharing catalogs, multiple levels of SMP/E processing SYSMODs packaged to exploit the latest enhancements, or an older level of the system using the updated system control files of a newer level (even if new function has been exploited in the newer level).

The sharing of resources is inherent in multisystem configurations that involve Parallel Sysplex implementations. But other types of configurations can have resource sharing too. Examples of configurations where resource sharing can occur are:

- A single processor that is time-sliced to run different levels of the system, such as during different times of the day
- A single processor running multiple images by means of logical partitions (LPARs)
- Multiple images running on several different processors
- Parallel Sysplex or non-Parallel Sysplex configurations

**Note:** The term coexistence does not refer to z/OS residing on a single system along with VSE/ESA, VM/ESA, or z/VM in an LPAR or as a VM guest.

z/OS systems can coexist with specific prior releases. This is important because it gives you flexibility to migrate systems in a multisystem configuration using rolling IPLs rather than requiring a systems-wide IPL. The way in which you make it possible for earlier-level systems to coexist with z/OS is to install coexistence service (PTFs) on the earlier-level systems.

You should complete the migration of all earlier-level coexisting systems as soon as you can. Keep in mind that the objective of coexistence PTFs is to allow existing functions to continue to be used on the earlier-level systems when

run in a mixed environment that contains later-level systems. Coexistence PTFs are not aimed at allowing new functions provided in later releases to work on earlier-level systems.

### Rolling z/OS across a multisystem configuration

A *rolling IPL* is the IPL of one system at a time in a multisystem configuration. You might stage the IPLs over a few hours or a few weeks. The use of rolling IPLs allows you to migrate each z/OS system to a later release, one at a time, while allowing for continuous application availability. For example, data sharing applications offer continuous availability in a Parallel Sysplex configuration by treating each z/OS system as a resource for processing the workload. The use of rolling IPLs allows z/OS systems running these applications to be IPLed one at a time, to migrate to a new release of z/OS, while the applications continue to be processed by the other z/OS systems that support the workload. By using LPAR technology, you can use rolling IPLs to upgrade your systems without losing either availability or capacity.

You can use rolling IPLs when both of the following are true:

- The release to which you're migrating falls is supported for coexistence, fallback, and migration with the releases running on the other systems.
- The appropriate coexistence PTFs have been installed on the other systems in the multisystem configuration.

Even when you're using applications that do not support data sharing, rolling IPLs often make it easier to schedule z/OS software upgrades. It can be very difficult to schedule a time when all applications running on all the systems in a multisystem configuration can be taken down to allow for a complex-wide or Parallel Sysplex-wide IPL. The use of rolling IPLs not only enables continuous availability from an end-user application point of view, but it also eliminates the work associated with migrating all z/OS systems in a multisystem configuration at the same time.

### Understanding fallback

Fallback (backout) is a return to the prior level of a system. Fallback can be appropriate if you migrate to z/OS R12 and, during testing, encounter severe problems that can be resolved by backing out the new release. By applying fallback PTFs to the "old" system before you migrate, the old system can tolerate changes that were made by the new system during testing.

Fallback is relevant in all types of configurations, that is, single-system or multisystem, with or without resource sharing. As an example of fallback, consider a single system that shares data or data structures, such as user catalogs, as you shift the system image from production (on the "old" release) to test (on the new release) and back again (to the old release). The later-level test release might make changes that are incompatible with the earlier-level production release. Fallback PTFs on the earlier-level release can allow it to tolerate changes made by the later-level release.

As a general reminder, always plan to have a backout path when installing new software by identifying and installing any service required to support backout.

Fallback is at a system level, rather than an element or feature level, except for z/OS JES2 and z/OS JES3. That is, except for z/OS JES2 and z/OS JES3, you can't back out an element or feature; you can only back out the entire z/OS product. z/OS JES2 and z/OS JES3 fallback can be done separately as long as the level of JES is supported with the release of z/OS and any necessary fallback PTFs are installed.

Fallback and coexistence are alike in that the PTFs that ensure coexistence are the same ones that ensure fallback.

**Note:** Keep in mind that new functions can require that all systems be at z/OS V1R12 level before the new functions can be used. Therefore, be careful not to exploit new functions until you are fairly confident that you will not need to back out your z/OS V1R12 systems, as fallback maintenance is not available in these cases. You should consult the appropriate element or feature documentation to determine the requirements for using a particular new function.

### Which releases are supported for coexistence, fallback, and migration?

**Starting with z/OS R6, IBM has aligned the coexistence, fallback, and migration policy with the service policy.** IBM intends to continue with 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, may choose to leave a release supported for more than three years. This change to the coexistence, fallback, and migration policy is effective starting with z/OS R6 (that is, the first release of the new annual release cycle). **As a general rule, this means that three releases will be supported for coexistence, fallback, and migration over a period of three years.** This



represents an increase of one year over the two-year period provided by the current coexistence, fallback, and migration policy of four releases under a six-month release cycle. The intention of this policy change is to simplify and provide greater predictability to aid in release migrations.

Exceptions are:

- In some cases, more than three releases may be coexistence, fallback, and migration supported if IBM at its sole discretion chooses to provide service support for greater than three years for a release.
- Any z/OS release having three or fewer months of service remaining at general availability of a new release will not be coexistence, fallback, or migration supported with the new release.

Thus, except for JES2 and JES3, **z/OS V1R12 is coexistence, fallback, and migration supported with the following two z/OS releases: V1R11 and V1R10.** This means that:

- Coexistence of a V1R12 system with a V1R11 or V1R10 system is supported.
- Fallback *from* V1R12 to V1R11 or V1R10 is supported.
- Migration *to* V1R12 *from* V1R11 or V1R10 is supported.

For JES2 and JES3, the way in which three consecutive releases is determined is different than for the rest of the operating system. If a JES2 or JES3 release is functionally equivalent to its predecessor (that is, its FMID is the same), then the release is considered to be the same JES release. Thus, **z/OS V1R12 JES2 and JES3 are coexistence, fallback, and migration supported with the following JES releases: V1R12, V1R11, and V1R10.**

As of z/OS V1R2, compliance to the coexistence, fallback, and migration policy for JES2 and JES3 is enforced. A migration to a JES2 or JES3 release level that is not supported by the policy results in the following:

- For JES2: If the JES2 release level for a system that is initializing is not compatible with the other active systems in the JES2 MAS, message HASP710 is issued and the JES2 address space for the initializing system is terminated.
- For JES3: If the JES3 release level for a local is not compatible with the global in a JES3 multisystem complex, message IAT2640 is issued and the JES3 local is not allowed to connect to the global.

The z/OS coexistence, fallback, and migration policy applies to the elements and features of z/OS, not to customer-developed applications, vendor-developed applications, or IBM products that run on z/OS. IBM performs integration testing and will provide service as necessary to support the z/OS coexistence, fallback, and migration policy.

See the table below for a summary of current and planned coexistence, fallback, and migration support. These statements represent IBM's current intentions. IBM reserves the right to change or alter the coexistence, fallback, and migration 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 of direction is at the relying party's sole risk and does not create any liability or obligation for IBM.

Releases that are coexistence, fallback, and migration supported with z/OS V1R6 and beyond

z/OS release (see note 1)	Releases that are coexistence, fallback, and migration supported with the release in column one (see note 1)	Explanation (see note 2)
R6	R6, R5, R4, R3	The new policy starts. General availability of R6 was September 2004. R2 would be the oldest service-supported release at that time and therefore the oldest release that is coexistence, fallback, and migration supported. However, its end-of-service date (October 2004) is within three months of R6 general availability (September 2004), so R3 becomes the oldest release that is coexistence, fallback, and migration supported with R6.
R7	R7, R6, R5, R4	General availability of R7 was September 30, 2005. R4 is the oldest release that is service supported at that time and therefore the oldest release that is coexistence, fallback, and migration supported with R7.
R8	R8, R7, R6, R5	General availability of R8 was September 29, 2006. R4 is the oldest release that is service

		supported at that time because its end-of-service date was extended by 18 months to 31 March 2007. <b>However, R4 is not coexistence, fallback, and migration supported with R8.</b> Therefore, R5 is oldest release that is coexistence, fallback, and migration supported with R8.
R9	R9, R8, R7	General availability of R9 was September 28, 2007. R7 is the oldest release that is service supported at that time and therefore the oldest release that is coexistence, fallback, and migration supported with R9.
R10	R10, R9, R8	General availability of R10 was September 26, 2008. R8 is the oldest release that is service supported at that time and therefore the oldest release that is coexistence, fallback, and migration supported with R10.
R11	R11, R10, R9	General availability of R11 was September 25, 2009. R9 is the oldest release that is service supported at that time and therefore the oldest release that is coexistence, fallback, and migration supported with R11.
R12	R12, R11, R10	General availability for R12 was September 24, 2010. R10 is the oldest release that is service supported at that time and therefore the oldest release that is coexistence, fallback, and migration supported with R12.
R13	R13, R12, R11	Planned availability for R13 is September 2011. At that time, R11 is planned to be the oldest release that is service supported and therefore the oldest release that is coexistence, fallback, and migration supported with R13.

Notes:

1. For readability, the version numbers have been omitted from the releases shown. Also, release numbering of future releases (later than R7) is for illustrative purposes and is not a guarantee of actual release numbers.
2. Future general availability (GA) dates are projections based on the annual release cycle. Future end of service (EOS) dates are projections based on the 3-year service policy.

## Positioning for z/OS R12

- ▶ **Read Documentation and PSP buckets**
  - **z/OS Migration** and **z/OS Planning for Installation**
  - Software PSP buckets: ZOSV1R12: ZOSGEN, SERVERPAC, ...
  - Use FIXCATs tool for PSP bucket verification! CANNOT use EPSPT!
- ▶ **DASD Storage Requirements for z/OS R12:**

	z/OS R10	z/OS R11	z/OS R12	
<b>Target</b>	6,700	6,063	5,891	The 3390-6 limit is 6678 cylinders !!!
<b>DLIB</b>	9,200	8,781	8,599	
<b>File System</b>	3,100	3,100	3,100	Approaching 3390-3 limit of 3339 cylinders !!!

sizes in 3390 cylinders

- ▶ **Ensuring System Requirements Are Satisfied**
  - Driving System Requirements
  - Target System Requirements
    - Hardware and Software
  - Coexistence System Requirements
- ▶ **Migration Actions You Can Do NOW**

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### z/OS Documentation: Where to Start

To gain an overview of z/OS and plan for the installation, review:

- *z/OS V1R12 Migration (GA22-7499-18)* – refresh level!
- *z/OS V1R12 Planning for Installation (GA22-7504-24)* – refresh level!
- *zSeries Platform Test Report for z/OS and Linux Virtual Servers* (formerly, the *z/OS Parallel Sysplex Test Report*)
- *z/OS V1 R12 Introduction and Release Guide (GA22-7502)* - great for finding new functions in a release!

To install z/OS, review Preventive Service Planning (PSP) Buckets for:

- ServerPac (if using ServerPac to install)
- z/OS and individual elements (including ZOSGEN, which is handy for coexistence service as mentioned later in this presentation)
- Hardware, if you will using specific HW functions or upgrading your server

In addition, to install z/OS using ServerPac, review:

- *ServerPac: Using the Installation Dialog (SC28-1244)*
- The custom-built installation guide, *ServerPac: Installing Your Order*

To install z/OS using CBPDO, review the *z/OS Program Directory*.

### PSP Buckets

z/OS, and most products that run on it, provide files containing information that became available after the product documents were printed. Kept on IBM's RETAIN system and also available using IBMLink, these files are called preventive service planning (PSP) "buckets", or just "PSPs". PSP buckets are identified by an *upgrade* identifier, and specific parts of them are called *subsets*. Each upgrade contains information about a product. Subsets contain information about specific parts of a product. For example, the z/OS PSP bucket has subsets for the BCP, JES2, ServerPac, and others.

For software upgrades for ServerPac and CBPDO installations, refer to *z/OS Program Directory*. For software upgrades for SystemPac installations, the upgrade is CUSTOMPAC and the subsets are SYSPAC/FVD (for full volume dump format) and SYSPAC/DBD (for dump-by-data-set format).

At the beginning of each PSP bucket is a change index. For each subset, the change index identifies the date of the latest entries in each section. You can quickly determine whether there are new entries you need to read by checking the change index. Since z/OS V1R7, the contents of PSP buckets are no longer shipped with CBPDO and ServerPac orders. Instead of the actual PSP information, you now receive the names of relevant upgrades and subsets, and you're directed to the PSP Web site (<https://techsupport.services.ibm.com/server/390.psp390>) for the contents of the buckets. This ensures that you see the latest PSP information, as the PSP information that was provided with an order was current only on the day the order was created.

The upgrade for the z/OS R12 PSP bucket is ZOSV1R12. Recognizing that there are many PSP buckets to review, z/OS uses descriptive element names, instead of FMIDs for the subsets. This reduces the number of PSP buckets that must be reviewed, since most elements are composed of multiple FMIDs. There are subsets in the ZOSV1R12 upgrade for general topics (ZOSGEN), and for the ServerPac deliverable (SERVERPAC) that should be reviewed also. DFSMS is consolidated into one subset. All PSP upgrades and subset IDs are listed in the *z/OS Program Directory*. However, the non-exclusive elements' stand-alone product upgrade and subsets are used.

### Hardware PSP upgrade identifiers

Hardware PSP bucket upgrade IDs are in the form xxxxDEVICE and contain the latest software dependencies for the hardware, and recommended PTFs and APARs required for specific processor models. The PSP hardware upgrade identifiers are:

- 2817DEVICE for the z196 server. For an IBM zEnterprise BladeCenter Extension (zBX) attached to your z196 CPC, either to support IBM Smart Analytics Optimizer for DB2 for z/OS, V1.1 (5697-AQT) or to support IBM POWER7 Blades, the PTFs are identified in the 2458DEVICE PSP bucket.
  - The FIXCAT names are IBM.Device.Server.z196-2817 and IBM.Device.Server.zBX-2458.
- 2097DEVICE for the z10 EC server.
  - The FIXCAT name is IBM.Device.Server.z10-EC-2097.
- 2098DEVICE for the z10 BC server
  - The FIXCAT name is IBM.Device.Server.z10-BC-2098.
- 2094DEVICE for the z9 EC server
  - The FIXCAT name is IBM.Device.Server.z9-EC-2094.
- 2096DEVICE for the z9 BC server
  - The FIXCAT name is IBM.Device.Server.z9-BC-2096.
- 2084DEVICE for the z990 server
  - The FIXCAT name is IBM.Device.Server.z990-2084.
- 2086DEVICE for the z890 server
  - The FIXCAT name is IBM.Device.Server.z890-2086.
- 2064DEVICE for the z900 server
  - The FIXCAT name is IBM.Device.Server.z900-2064.
- 2066DEVICE for the z800 server
  - The FIXCAT name is IBM.Device.Server.z800-2066.

Specific functions for each server also have corresponding FIXCATs.

### Verifying the PTFs in the PSP buckets are installed

To simplify finding the appropriate PSP bucket and identifying which PTFs listed in the PSP bucket need to be installed on your system, you can use the SMP/E FIXCAT support (Note that the Enhanced PSP Tool (EPSPT) is no longer available to use.)


Use the SMP/E V3R5 REPORT MISSINGFIX command in conjunction with the FIXCAT type of HOLDDATA. For complete information about the REPORT MISSINGFIX command, see *SMP/E Commands*. For a description of what FIXCATs are available, go to <http://www.ibm.com/systems/z/os/zos/smpe/> and click on "Guide to fix category values and descriptions".

## DASD Storage Requirements






Keep in mind the DASD required for your z/OS system includes all z/OS elements (per the z/OS Policy). That is, it includes ALL elements, ALL features that support dynamic enablement, regardless of your order, and ALL unpriced features that you ordered. This storage is in addition to the storage required by other products you might have installed. All sizes include 15% freespace to accommodate the installation of maintenance.

The total storage required for z/OS data sets is listed in the space table in the *z/OS Program Directory*, and is also provided below.

For z/OS R12:

- The total storage required for all the target data sets is 5,891 cylinders on a 3390 device. **It is strongly recommended that you review the size of your existing target volumes and plan for the required target volume storage for z/OS R12.**
- The total storage required for all the distribution data sets listed in the space table is 8,599 cylinders on a 3390 device.
-  The total file system (HFS or zFS) storage is 3,100 cylinders on a 3390 device for the ROOT and 50 cylinders for the /etc file system. For the CIM element, the space required for the /var VARWBEM file system is 50 cylinders. **It is strongly recommended that you put your file system ROOT data set on multiple 3390-3 volumes (a multi-volume data set) or on a volume larger than a 3390-3.** Use IBM Health Checker for z/OS check ZOSMIGREC\_ROOT\_FS\_SIZE to determine whether a volume has enough space for the z/OS version root file system, available back to z/OS R9 in APARs OA28684 and OA28631.


## Driving System Requirements - ServerPac

- **Minimum to Install z/OS R12 ServerPac via tape:**


  1. Either of the following:
    - **z/OS R10**, or
    - Customized Offerings Driver V3 (5751-COD, a subset of z/OS R10)
  2. ...plus the same requirements since z/OS R8 for OMVS address space, LE run-time options, ...
- **Minimum to Install z/OS R12 ServerPac electronically:**

  - The above, plus:
    - **ICSF** configured and active (which is preferred, for performance)
    - **-or- IBM SDK Java 2 Technology Edition V1.4 or later** (ICSF is **not** necessary in this case!)
- **Minimum to Install z/OS R12 ServerPac via DVD:**

  - Enough space on your workstation to hold the DVD files.
- **Minimum to Service the New Target System:**

  - Includes shipped levels of **program binder**, SMP/E, and HLASM<sub>2</sub> and UNIX System Services requirements!
  - **(Don't overlook SMP/E APAR IO11698...)**

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## SMP/E Migration Actions for z/OS R12 from z/OS R10

### Migration Action before using SMP/E with APAR IO11698:

- **Authorize use of SMP/E commands and services (Required, as of IO11698 on SMP/E V3R5 (level 35.27, RSU1005))**

  - As of this APAR, users must have sufficient access authority to invoke SMP/E functions (RECEIVE, APPLY, GIMZIP, ...). The resource names are:
    - GIM.CMD.command such as GIM.CMD.APPLY
    - GIM.PGM.command such as GIM.PGM.GIMUNZIP
  - Give **READ** access to all users that need to use these functions. Generically:
 

```
RDEFINE FACILITY GIM.* UACC(NONE)
PERMIT GIM.* CLASS(FACILITY) ID(userid)
ACCESS(READ)
```

Or discretely, such as:

```
GIM.CMD.APPLY or GIM.PGM.GIMUNZIP
```

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## z/OS Driving System Requirements

The *driving system* is the system image (hardware and software) that you use to install the target system. The *target system* is the system software libraries and other data sets that you are installing. You log on to the driving system and run jobs there to create or update the target system. Once the target system is built, it can be IPLed on the same hardware (same LPAR or same processor) or different hardware than that used for the driving system.

If your driving system will share resources with your target system after the target system has been IPLed, *be sure to install applicable coexistence service* on the driving system before you IPL the target system. If you don't install the coexistence service, you will probably experience problems due to incompatible data structures (such as incompatible data sets, VTOCs, catalog records, GRS tokens, or APPC bind mappings).

### Customized Offerings Driver (5751-COD)

The Customized Offerings Driver V3 (5751-COD) is an entitled driving system you can use if:

- you don't have an existing system to use as a driving system, or
- your existing system does not meet driving system requirements and you don't want to upgrade it to meet those requirements.

At z/OS R12 GA, this driver is a subset of a z/OS R10 system (with the level of SMP/E at V3R5).

The Customized Offerings Driver is in DFSMSdss dump/restore format and supports 3390 triple-density or higher DASD devices. The Customized Offerings Driver requires a locally attached non-SNA terminal and a system console from the IBM (or equivalent) family of supported terminal types: 317x, 327x, 319x, or 348x. An IBM (or equivalent) supported tape drive is also required to restore the driver.

The Customized Offerings Driver is intended to run in single-system image and monoplex modes only. Its use in multisystem configurations is not supported. The Customized Offerings Driver is intended to be used only to install new levels of z/OS using ServerPac or CBPDO, and to install service on the new software until a copy (clone) of the new system can be made. The use of the Customized Offerings Driver for other purposes is not supported.

The Customized Offerings Driver includes an HFS and the necessary function to use Communications Server (IP Services), Security Server, and the system-managed storage (SMS) facility of DFSMSdftp, but these items are not customized. However, existing environments can be connected to, and used from, the Customized Offerings Driver system.

## Identifying Driving System Software Requirements for ServerPac for z/OS R12

Driving system requirements for installing z/OS R12 by way of ServerPac or dump-by-data-set SystemPac are:

- *An operating system:* Use either of the following:
  - z/OS V1R10 or later, or
  - The Customized Offerings Driver V3 (5751-COD).
- *A terminal:* A locally-attached or network-attached terminal that can be used to establish a TSO/E session on the IPLed system is required.
- *Proper authority:* Use the RACFDRV installation job as a sample of the security system definitions required so that you can perform the installation tasks.
- *Proper security:*
  - In order for you to install into the zFS, the user ID you use must have read access to the SUPERUSER.FILESYS.PFCTL resource in the RACF FACILITY class.
  - In order for you to install the z/OS UNIX files, the following is required:
    - The user ID you use must be a superuser (UID=0) or have read access to the BPX.SUPERUSER resource in the RACF facility class.
    - The user ID you use must have read access to facility class resources BPX.FILEATTR.APF, BPX.FILEATTR.PROGCTL, and BPX.FILEATTR.SHARELIB (or BPX.FILEATTR.\* if you choose to use a generic name for these resources). The commands to define these facility class resources are in SYS1.SAMPLIB member BPXISEC1.
    - Group IDs uucpg and TTY, and user ID uucp, must be defined in your security database. These IDs must contain OMVS segments with a GID value for each group and a UID value for the user ID. (For ease of use and manageability, define the names in uppercase.)

- The group ID and user ID values assigned to these IDs cannot be used by any other IDs. They must be unique.
- You must duplicate the required user ID and group names in each security database, including the same user ID and group ID values in the OMVS segment. This makes it easier to transport the HFS data sets from test systems to production systems. For example, the group name TTY on System 1 must have the same group ID value on System 2 and System 3. If it is not possible to synchronize your databases you will need to continue running the FOMISCHO job against each system after z/OS UNIX is installed.
  - If names such as uucp, uucpg, and TTY are not allowed on your system, or if they conflict with existing names, you can create and activate a user ID alias table. For information about defining these group and user IDs to RACF and about creating a user ID alias table (USERIDALIASTABLE), see *z/OS UNIX System Services Planning*. Other sources of information are SYS1.SAMPLIB member BPXISEC1. (**Note:** You can use the RACFDRV installation job as a sample of the security system definitions required to perform the installation tasks.)
- *Language Environment run-time options:* As of z/OS R7, ServerPac requires that the following Language environment run-time options are **not** specified as nonoverrideable (NONOVR) in the CEEDOPT CSECT: ALL31, ANYHEAP, BELOWHEAP, DEPTHCONDLIMIT, ERRCOUNT, HEAP, HEAPCHK, HEAPPOOLS, INTERRUPT, LIBSTACK, PLITASKCOUNT, STACK, STORAGE, THREADHEAP, and THREADSTACK .
- *Language Environment:* The CustomPac Installation Dialog uses the Language Environment run-time library SCEERUN. If SCEERUN is not in the link list on the driving system, you must edit the ServerPac installation jobs to add it to the JOBLIB or STEPLIB DD statements.
- *OMVS address space active:* For ServerPac only (not SystemPac), an activated OMVS address space with z/OS UNIX kernel services operating in full function mode is required.
- *SMS active:* The Storage Management Subsystem (SMS) must be active to allocate HFS and PDSE data sets, whether they are SMS-managed or non-SMS-managed. Also, the use of HFS data sets is supported only when SMS is active in at least a null configuration, even when the data sets are not SMS-managed. Do either of the following:
  - To allocate non-SMS-managed HFS and PDSE data sets, you must activate SMS on the driving system in at least a null configuration. You must also activate SMS on the target system.
  - To allocate SMS-managed HFS and PDSE data sets, you must activate SMS on the driving system in at least a minimal configuration. Then you must define a storage group, create SMS-managed volumes, and write, translate, and activate a storage class ACS routine that allows the allocation of PDSE and HFS data sets with the names in the ALLOCDS job. You must also activate SMS on the target system.
- *SMP/E ++JARUPD Support:* If your ServerPac order contains any product that uses the ++JARUPD support introduced in SMP/E V3R2, then your driving system will require IBM SDK for z/OS, Java 2 Technology Edition. z/OS V1R12 itself does not use the ++JARUPD support.
- *zFS configuration requirements (optional):* If you will specify that you will use a zFS for ServerPac installation, then you must be sure that the zFS has been installed and configured, as described in *z/OS Distributed File Service zSeries File System Administration*.
- *Electronic delivery requirements (optional):* If you intend to receive your ServerPac order by way of the Internet, you need the following:
  - ICSF configured and active so that it can calculate SHA-1 hash values in order to verify the integrity of data being transmitted. If ICSF is not configured and active, SMP/E calculates the SHA-1 hash values using an SMP/E Java application class, provided that IBM SDK for z/OS, Java 2 Technology Edition, V1 (5655-I56) or later is installed. IBM recommends the ICSF method because it is likely to perform better than the SMP/E method. (To find out how to configure and activate ICSF, see *z/OS Cryptographic Services ICSF System Programmer's Guide*. For the required SMP/E setup, see *SMP/E User's Guide*.)
  - A download file system. Your order is provided in a compressed format and is saved in a download file system. The size of this file system should be approximately twice the compressed size of your order to accommodate the order and workspace to process it.
  - Firewall configuration. If your enterprise requires specific commands to allow the download of your order using FTP through a local firewall, you must identify these commands for later use in the CustomPac Installation Dialog, which manages the download of your order.



- Proper dialog level. If you are using a CustomPac Installation Dialog whose Package Version is less than 17.00.00, you must migrate the dialog to this level or later. You can determine if you have the correct dialog level by looking for the text "This dialog supports electronic delivery." at the bottom of panel CPPPPOLI. If your dialog is not at the minimum level, follow the migration scenarios and steps described in *ServerPac: Using the Installation Dialog*.
- *DVD requirements (optional)*: If you intend to receive your ServerPac or SystemPac dump-by-data-set order by way of DVD, you need the following:
  - Order available on z/OS host system. To make the order available on your z/OS host system, upload the order to the z/OS host from the DVD(s). Refer to readme.pdf on the first DVD to find the various methods for making your order available on your z/OS host system.
  - Space requirements on z/OS. Ensure you have the required space on your z/OS host system. To get the actual size of the order, refer to dialog.txt on the first DVD.
  - Space requirements on a workstation. If you chose to copy your order from the DVD(s) to a workstation before uploading the contents to your z/OS host system, ensure you have the required space available on your workstation.
- *Proper level for service*: In order for you to install service on the target system that you're building, your driving system must minimally meet the driving system requirements for CBPDO Wave 1 and must have the current (latest) levels of the program management binder, SMP/E, and HLASM. The service jobs generated by the CustomPac Installation Dialog use the target system's (and therefore current) level of the binder, SMP/E, and HLASM. If you choose to use your own jobs, model them after the jobs provided by ServerPac or dump-by-data-set SystemPac by adding STEPLIB DD statements to access MIGLIB (for the binder and SMP/E) and SASMMOD1 (for HLASM). Be sure that the SASMMOD1 and SYS1.MIGLIB data sets are APF authorized. Another way to install service is from a copy of your target system.

### Identifying Driving System Software Requirement for Servicing z/OS R12 (and Installing CBPDO)

After installing via ServerPac, you will eventually want to install service on your z/OS R12 system. The driving system to install service on your z/OS R12 ServerPac system are the same as to install with the CBPDO method. For servicing your ServerPac system, you must meet the driving system requirements for "Wave 1" below.

When you use the CBPDO method of installing z/OS you install in three stages called *waves*. (Wave 1, in order to be more manageable, is divided into several tasks called *ripples*.) This section describes the driving system requirements for each wave.

#### z/OS R12 CBPDO: Driving System Wave 0

In Wave 0 you install the program management binder (part of the BCP), the HLASM base element, and the SMP/E base element. These items must be installed on (available from) the driving system for subsequent wave installations.

You can use either of the following as the driving system for installing z/OS R12 Wave 0:

- z/OS R10 or later.
- The Customized Offerings Driver V3 (5751-COD).

#### z/OS R12 CBPDO: Driving System Wave 1 (and to service a ServerPac system)

In Wave 1 you install most of the elements and features. The driving system requirements for installing Wave 1 are:

- *An operating system*: Use any of the following:
  - z/OS R10, except that the **program binder**, **HLASM**, and **SMP/E** must be at the current (latest) levels. (The HLASM and SMP/E levels haven't changed since z/OS R10.) To satisfy the binder and SMP/E requirements, you can use a STEPLIB DD statement to access the z/OS V1R12 program binder and z/OS V1R12 SMP/E (V3R5) in the Wave 0 target system's SYS1.MIGLIB data set, and to access the z/OS V1R12 HLASM's (V1R6) ASM.SASMMOD1 data set. Ensure that the target system's SYS1.MIGLIB and ASM.SASMMOD1 data sets are APF authorized on the driving system.

- The Customized Offerings Driver V3 (5751-COD).
- *Proper security:* In order for you to install into the file system, the security definitions described previously for ServerPac are required.
- *Binder entry in SMP/E UTILITY:* The SMP/E UTILITY must have an entry for the binder. You can specify any of these program names in the UTILITY entry: IEWBLINK, HEWL, IEWL, LINKEDIT, or HEWLH096. (The linkage editor, which uses the names HEWLKED, HEWLF064, IEWLF440, IEWLF880, and IEWLF128, cannot be used.)
- *Language Environment:* You must add SCEERUN (the run-time library provided by Language Environment) to your program search order because many elements and features require it. If you wish, add SCEERUN to your LNKLST concatenation. If you don't add SCEERUN to your LNKLST, you must access SCEERUN by using STEPLIB DD statements in the individual element and feature procedures that require them. The BCP's Program Management Binder is one function that requires access to SCEERUN; it has been required since OS/390 R10. This means that you must make available SCEERUN (via the LNKLST or STEPLIB, for instance) to any JCL and procedures (such as SMP/E procedures) that invoke the binder. This ensures that processing, such as conversion of long names to short names, is successful.
- *OMVS address space active:* Before you install the elements and features in Wave 1, you must activate the OMVS address space in full function mode on the driving system. To activate OMVS, complete the required customization (for example, SMS and RACF setup) as described in *z/OS UNIX System Services Planning*.
- *Target system's file system mounted:* The target system's file system must be mounted.

## z/OS R12 CBPDO: Driving System Wave 2

In Wave 2 you install the z/OS V1R12 level of JES2 or JES3. Wave 2 is optional and can be combined with Wave 1. The driving system requirements for Wave 2 are the same as for Wave 1.



### **Migration Action for SMP/E APAR IO11698: Authorize use of SMP/E commands and services (Required, as of IO11698 on SMP/E V3R5 (level 35.27, RSU1004), for z/OS R10, R11, and R12)**

Beginning with SMP/E V3R5 (which is in z/OS V1R10, z/OS V1R11, and z/OS V1R12), with the PTF for APAR IO11698 applied, System Authorization Facility (SAF) checks are added to SMP/E. With this change, only users who have sufficient access authority are able to invoke SMP/E functions, including all SMP/E commands (for example, RECEIVE, APPLY, LIST), the GIMZIP and GIMUNZIP service routines, and the GIMIAP copy utility invocation program.

To ensure current users have the access authority to invoke SMP/E functions, you must define appropriate SAF facility class profiles in the active security manager and specify all user IDs that need to use SMP/E functions in the access lists of these profiles. These functions include:

- All SMP/E commands processed by program GIMSMP. For example, SET, RECEIVE, APPLY, ACCEPT, UCLIN, LIST, REPORT, and so on.
- The GIMZIP and GIMUNZIP service routines, used for packaging and file extraction.

The GIMIAP copy utility invocation program used in jobs created by the SMP/E GENERATE command.

**Migration action:** Authorize use of SMP/E commands and services **before** you apply the PTF for APAR IO11698. For further information see:

- "Authorizing use of SMP/E commands and services" in *SMP/E for z/OS User's Guide*.
- INFO APAR II14489 (which is the HOLD ACTION information included below).

### **SMP/E APAR IO11698 HOLD ACTION Information:**

SMP/E is adding Security Authorization Facility (SAF) checks to ensure only users that have sufficient access authority are allowed to invoke certain SMP/E functions. The functions to be protected are all SMP/E commands processed by program GIMSMP (for example, SET, RECEIVE, APPLY, ACCEPT, UCLIN, LIST, REPORT, etc.), the GIMZIP and GIMUNZIP service routines, and the GIMIAP copy utility invocation program.

To allow current SMP/E users to continue executing SMP/E functions, you must define the appropriate facility class resources in the active security manager and grant all userids that should be allowed to invoke the protected SMP/E functions read access to those resources.

The resource names are constructed in the following form:

- GIM.CMD.command for the SMP/E commands, where "command" is the name of the current SMP/E command being attempted. For example, GIM.CMD.APPLY for the APPLY command.
- GIM.PGM.program for the GIMZIP, GIMUNZIP or GIMIAP service routines, where "program" is the name of the service routine being processed. For example, GIM.PGM.GIMZIP for GIMZIP.

You may exploit the granularity of protection supported by SMP/E and define discrete resources to protect individual SMP/E functions, or you may choose to define generic resources. However, if the resources are not defined in the security manager, or a user does not have read authority to those resources, then SMP/E processing will stop.

A sample RACF command to define a single generic FACILITY class profile and to define a userid in the access list of that profile is as follows:

```
RDEFINE FACILITY GIM.* UACC(NONE)
PERMIT GIM.* CLASS(FACILITY) ID(userid) ACCESS(READ)
```


If you have activated SETROPTS RACLIST processing for the FACILITY class, you must also refresh SETROPTS RACLIST processing for the updates to take affect:

```
SETROPTS RACLIST(FACILITY) REFRESH
```

It may be difficult to identify and add all necessary userids to the access list for the subject profiles, whether using a single generic profile as in the example above, or multiple discrete profiles. With this in mind, although not recommended by IBM, it is possible to define the profiles with UACC(READ) and AUDIT(ALL(READ)) to help identify and log all userids that currently invoke SMP/E functions and will require eventual definition in the profiles' access list. After sufficient analysis has occurred and the access list has been updated, then profiles should be changed to UACC(NONE).

Note: The sample commands above to define a FACILITY class profile and to define a userid in the access list of that profile assume the use of RACF as the security manager. If you use a security manager other than RACF, see the appropriate documentation for equivalent commands.

## Target System Requirements for z/OS R12



### ▶ Hardware Requirements

- Processor Requirements:
  - IBM System z server: **z196, z10, z9, z990, z890, z900, or z800**
- Coupling Facility: see <http://www.ibm.com/eserver/zseries/psocftable.html>
- z196 ships with CFCC level 17
  - CFCC level 17 support requires coexistence on z/OS R10 and R11. These PTFs are identified with FIXCATs:
    - `IBM.Device.Server.z196-2817,`  
`IBM.Function.SYSPLEXDataSharing` and  
`IBM.Coexistence.z/OS.V1R12`
  - Larger CF structure sizes may be necessary for CFCC level 17. Use CFSIZER for planning structure sizes to get to the current CFCC level.

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### Target System Hardware Requirements

The minimal hardware requirements for z/OS, as well as additional hardware needed by specific z/OS elements and features, are documented in *z/OS Planning for Installation*. Remember, z/OS V1R12 runs only in z/Architecture mode.

### Identifying Processor Requirements

z/OS V1R12 runs on the following IBM System z or their equivalents:

- IBM zEnterprise 196 (z196)
- IBM System z10 Enterprise Class (z10 EC)
- IBM System z10 Business Class (z10 BC)
- IBM System z9 Enterprise Class (z9 EC), formerly the IBM System z9 109 (z9-109)
- IBM System z9 Business Class (z9 BC)
- IBM eServer zSeries 990 (z990)
- IBM eServer zSeries 890 (z890)
- IBM eServer zSeries 900 (z900)
- IBM eServer zSeries 800 (z800)

### Identifying Coupling Facility Requirements

There are hardware and software requirements related to coupling facility levels (CFLEVELs). See <http://www.ibm.com/eserver/zseries/psocftable.html>.

When you change coupling facility control code (CFCC) levels, your coupling facility structure sizes might change. The coupling facility structure sizer tool can size structures for you and takes into account the amount of space needed for the current CFCC levels. Access the tool at: <http://www.ibm.com/servers/eserver/zseries/cfsizer/>


z196 servers initially ship with CFCC level 17. If, as part of your migration to a z196 server, you change CFCC levels (either by placing a coupling facility on the z196 server or by moving the coupling facility to a z10 EC or z10 BC at a later CFCC level), you might have larger structure sizes than you did previously. If your CFCC levels are identical, structure sizes are not expected to change when you migrate from a previous server to a newer generation server.

The PTFs to support CF Level 17, have coexistence (or sysplex preconditioning) PTFs that are required to be installed on z/OS R11 and z/OS R10 throughout your sysplex prior to implementing CF Level 17. These PTFs have been identified with the SMP/E FIXCATs of IBM.Device.Server.z196-2817, IBM.Function.SYSPLEXDataSharing and IBM.Coexistence.z/OS.V1R12.

## Target System Requirements for z/OS R12

► **Software Requirements:**

- **Coexistence Software** (on other z/OS systems)
- **Target Software** (correct levels of IBM non-z/OS and non-IBM products on the z/OS system)
  - If the IBM products are still **service-supported**, they may be used on z/OS V1R12, **with some exceptions** found in z/OS V1R12 *Planning for Installation*, Appendix B.
- **Functional Requirements**
  - Some functions may need specific SW or HW levels for exploitation.
  - *Reminder:* Consult the appropriate exploitation documentation to understand the limitations on fallback.



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### Choosing IBM Products That You Want to Run with z/OS

The functional and minimal requirements are found in the *z/OS Planning for Installation* which is available on the Internet from <http://www.ibm.com/servers/eserver/zseries/zos/bkserv/>.

For a list of products available for ordering with z/OS, you can use the self-service Internet application ShopzSeries: <http://www.ibm.com/software/shopzseries>.

The minimum level IBM software products that run with z/OS, and which are documented in *z/OS V1R12 Planning for Installation* Appendix B, are documented slightly differently than they had been. Only the IBM software products levels **above the minimum service-supported level, or which need specific APARs or PTFs are documented**. Other IBM software products not documented in this Appendix, if they are still service-supported, are supported with z/OS R12.


Many of these products can be ordered as part of your z/OS ServerPac order, z/OS SystemPac order, separate CBPDO order, or separate ProductPac order. Note that there may be differences between what is minimally service supported, what is minimally supported with z/OS R12, and what is currently orderable.

If you're migrating to z/OS V1R12, you can find out which products have new levels by using ShopzSeries or by using the SMP/E base element's Planning and Migration Assistant. Both tools use data found on your system as well as the latest IBM software product catalog.

### Choosing ISV products that you want to run with z/OS

For a list of independent software vendors (ISVs) that support z/OS, as well as announcements, testimonials, and other information, see <http://www.ibm.com/systems/z/os/zos/software/isv112.html> for z/OS R12 support at z/OS R12 GA.

For a directory of IBM and IBM Business partners that provide z/OS applications, tools, and services, see the Global Solutions Directory: <http://www.ibm.com/software/solutions/isv>.



**Some IBM SW Target System Requirements for z/OS R12**

Product name	Minimum supported level
CICS TS	V3 R1 + PTFs UK29210, UK29407, and UK40130 (V2R2 was end of service: 4/30/08, V2R3 is end of service: 9/30/09)
DB2	V8 R1 (V7.1 was end of service: 6/30/08)
IMS	V9 R1 with PTF UK41224 (was end of service 11/7/10) (V7 R1 was end of service: 11/8/05; V8 R1 was end of service: 11/05/08)
WebSphere Application Server	V6.1 (V6.0.1 is end of service: 9/30/10; V5.0 was end of service: 9/30/08)
Tivoli OMEGAMON XE	V4.1 + PTFs described in XE Technotes (V3.1 is end of service: 4/30/11; V2.2 was end of service: 9/30/08)
Tivoli System Automation	V3.2 + PTFs UA43003, UA44993, UA47085, UA43533, and UA52313. (V3.1 will be end of service 9/30/10; V2.3 was end of service: 9/30/07)
IBM SDK Java Technology Edition (31-bit or 64-bit)	V5 R0 (V1R4 is end of service: 9/30/11. z/OS R11 was the last release for which SDK V1R4 was supported)
Tivoli Netview	V5 R2 with PTFs UA42145 and UA46832 (V5R1 is still in service)

→ Use FIXCAT IBM.TargetSystem-RequiredService.z/OS.V1R12  
 → Website <http://www-306.ibm.com/software/support/lifecycle/> can be helpful.

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### Selected IBM subsystem products that will run on z/OS R12

For the list of the IBM software products that run on z/OS R12 (above minimum service-supported levels, or those with specific PTF requirements), refer to Appendix B of *z/OS R12 Planning for Installation* and PSP buckets. This appendix also lists functions of z/OS that require specific z/OS optional features, IBM middleware products, or IBM application products.

A handy website for finding end of service dates for IBM products is <http://www.ibm.com/software/support/lifecycle/>.

## Using FIXCAT For z/OS R12 Target System PTF Verification



1. RECEIVE the latest HOLDDATA. (If you pull HOLDDATA from the ftp website, make sure you use FULL!)
  - HOLDDATA is produced to associate a particular PTF with a minimum or functional level for z/OS R12.

```
++HOLD(HWRE320) FIXCAT FMID(HWRE320) REASON(AA31274) RESOLVER(UA52313)
CATEGORY (IBM.TargetSystem-RequiredService.z/OS.V1R12,IBM.TargetSystem-
RequiredService.z/OS.V1R11) DATE(10104).
```

2. Run the REPORT MISSINGFIX command to see what is needed, but not yet installed.

```
SET BDY(GLOBAL). /* Your Tivoli System Automation global */
REPORT MISSINGFIX ZONES(TIVTGT)
FIXCAT (IBM.TargetSystem-RequiredService.z/OS.V1R12) .
```

Make sure they correspond!

### Programmatic Help with Target System PTF Verification for z/OS Release 12

*z/OS R12 Planning for Installation* Appendix B documents the PTFs that are required for minimum support on z/OS R12 and PTFs that are required to use specific functions. These PTFs (for both minimum and functional support) also will be identified with a FIXCAT called **IBM.TargetSystem-RequiredService.z/OS.V1R12**, in Enhanced HOLDDATA. You can use the SMP/E REPORT MISSINGFIX command to help identify those PTFs on your current system which would be needed for your upgrade to z/OS R12.

**Note:** Appendix B also documents minimum product release levels and release levels for functional requirements. This FIXCAT support is only for PTFs (not release levels) that are documented in this Appendix.



## Coexistence System Requirements for z/OS R12

- Use FIXCATs to verify coexistence PTFs are installed.
- FIXCATs you may be interested in using:
  - IBM.Coexistence.z/OS.V1R12
  - IBM.Coexistence.ICSF.z/OS\_V1R9-V1R11-HCR7770
  - IBM.Coexistence.ICSF.z/OS\_V1R10-V1R12-HCR7780
  - IBM.Coexistence.z/OSMF.V1R12
  - ...and there may be others!

Use the FIXCAT Explorer! \*

```

Session B - [24 x 80]
File Edit View Communication Actions Window Help
----- Fix Category Explorer ----- Row 1 to 13 of 52
==== SCROLL ==> HALF
====
Commands: FIND -Find a string, E -Expand all, C -Collapse all, U -Unselect all
Actions: E -Expand, C -Collapse, S -Select, U -Unselect, V -View patterns
NEW indicates a Fix Category is new since 2010/05/14.

Fix Categories                                     New Selected
-----
-IBM.*
-IBM.Coexistence.*                               SELECTED
-IBM.Coexistence.ICSF.*                          *
 IBM.Coexistence.ICSF.z/OS_V1R9-V1R11-HCR7770    *
-IBM.Coexistence.z/OS.*                          *
 IBM.Coexistence.z/OS.V1R10                       *
 IBM.Coexistence.z/OS.V1R11                       *
 IBM.Coexistence.z/OS.V1R12                       *
-IBM.Coexistence.z/OSMF.*                        *
 IBM.Coexistence.z/OSMF.V1R12                     *
-IBM.Device.*
+IBM.Device.CommunicationController.*
+IBM.Device.Disk.*
    
```

\* SMP/E panels: 1.1, global, 2 Options, select your options, 7, 2, YES for explore.

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### Coexistence Service Requirements for z/OS Release 12

As of z/OS R12, you must use SMP/E FIXCATs to identify the z/OS coexistence PTFs. The coexistence PTFs for z/OS R12 are not documented in *z/OS R12 Migration*, are not included in PSP buckets, and are not included in any handouts for conferences.

SMP/E FIXCATs allow you to have the most up to date and correct information about z/OS coexistence, and is the easiest way to quickly determine if you have all the necessary coexistence PTFs installed. Take into consideration other products that you may be migrating with z/OS R12 – for instance z/OSMF R12, or an ICSF Web deliverable – and use SMP/E FIXCATs to verify their coexistence requirements as well.

By using the SMP/E FIXCAT Explorer via the dialogs, you can quickly determine when new SMP/E FIXCATs have been introduced. Expand all the categories under IBM.Coexistence.\*, as shown in the screen shot above. Any new categories you haven't seen before will be identified with "NEW".

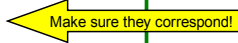
## Using FIXCAT For z/OS R12 Coexistence System PTF Verification



- 1. RECEIVE the latest HOLDDATA. (If you pull HOLDDATA from the ftp website, make sure you use FULL!)**
  - **HOLDDATA is produced to associate a particular PTF as coexistence between z/OS R10 or z/OS R11, with z/OS R12.**

```
++HOLD(HBB7750) FIXCAT FMID(HBB7750) REASON(AA32285)
RESOLVER(UA55012) CATEGORY(IBM.Coexistence.z/OS.V1R12) DATE(10188).
```
- 2. Run the REPORT MISSINGFIX command to see what is needed, but not yet installed.**

```
SET BDY(GLOBAL). /* Your z/OS R10 global */
REPORT MISSINGFIX ZONES(ZOSR10T)
FIXCAT(IBM.Coexistence.z/OS.V1R12).
```



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### Using FIXCAT for coexistence PTFs for z/OS R12

For coexistence verification for z/OS R12, the fix category of interest is **IBM.Coexistence.z/OS.V1R12**. You can use the FIXCAT of ++HOLD statement to identify APARs, their fix categories, and the PTF that resolves the APAR.


When FIXCAT HOLDDATA statements are received into a global zone, SMP/E assigns the fix category values as sourceids to the PTFs that resolve the APARs. These sourceids then simplify selecting and installing required fixes. During APPLY and ACCEPT command processing you can specify the assigned sourceids on the SOURCEID and EXSRCID operands to select the SYSMODs associated with a particular fix category.

In addition, for the APPLY and ACCEPT commands you can specify which Fix Categories are of interest using the new FIXCAT operand. This tells SMP/E to process only FIXCAT HOLDDATA for the categories you specify, and all others are ignored.

Finally, SMP/E uses the FIXCAT HOLDDATA to identify what required fixes are missing. The REPORT MISSINGFIX command analyzes the FIXCAT HOLDDATA and determine which fixes (APARs) identified by the HOLDDATA are not yet installed. Only the fixes associated with the fix categories of interest to you, specified by you, are analyzed and identified. For example, you can identify only the missing fixes associated with a particular hardware device or coexistence for a specific new software release.

Note that you can use wildcards in the FIXCAT name in the REPORT MISSINGFIX command. For example, if you wanted to verify coexistence for z/OSMF R12 as well as z/OS R12, your command could be:

```
REPORT MISSINGFIX ZONES(ZOSR10T) FIXCAT(IBM.Coexistence.z/OS*.V1R12).
```



## z/OS V1 R12 Install-Related Enhancements

- **ServerPac in z/OS R12:**
  - DVD delivery support.
  - Allows SDSF and JES SMP/E zones to be merged, without having to merge either into the z/OS BCP zone.
  - Propagation of your zone names into the mlq of the SMP/E CSI data set names in Modify System Layout.
  - A number of jobs, which are no longer needed, are removed.
  - Several z/OSMF setup improvements have been made, including new tasks for z/OSMF applications new in z/OSMF V1.12.
- **ServerPac in z/OS R11:**
  - File system default change from HFS to zFS
  - No more overallocated error on volumes with existing space after ALLOCDS has run! (That is, MSL changes are allowed.)
  - Archive files will be split into 500 MB segments to help alleviate bottlenecks.
  - Order Tivoli OMEGAMON and other Tivoli monitoring products by themselves, withOUT z/OS in group "IBM Tivoli Monitoring Products" on Shopz.

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### z/OS R12 Installation Enhancements in ServerPac

As of z/OS R12, these enhancements are planned for ServerPac and SystemPac:

- Concurrently with z/OS V1.12 availability, ServerPac and CBPDO; the SystemPac, ProductPac, and FunctionPac fee-based offerings; and selective follow-on Service (SFS) for the fee offerings will be orderable on DVD. DVD support can be used by installations that cannot use Internet delivery or require physical media. Installing software using DVD requires a workstation with a DVD drive that can read discs in DVD-5 (single-sided, single layer) format and a network connection to your z/OS system.
- The ServerPac installation dialog now allows SDSF and JES SMP/E zones to be merged, without having to merge either into the z/OS BCP zone.
- The Zones option in the dialog has been enhanced to propagate the zone names into the middle level qualifier (if found) of the SMP/E CSI data set names in Modify System Layout.
- A number of jobs, which are no longer needed, are removed.
- A file system mounted at /var/wbem is now created and delivered in ServerPac.
- Several z/OSMF setup improvements have been made, including new tasks for z/OSMF applications new in z/OSMF V1.12.

### z/OS R11 Installation Enhancements in ServerPac


As of z/OS R11, these enhancements are available for ServerPac and SystemPac:

- The default file system type is changed from HFS to zFS, because zFS is the strategic file system for the z/OS platform. The CustomPac Dialog continues to allow file system types to be changed between HFS and zFS.
- The default volume is changed from 3390-3 to 3390-9 to accommodate the increased sizes of product libraries and file systems. The installation dialog continues to support the use of larger and smaller volumes.
- The Modify System Layout dialog has been redesigned to make it easier for you to maintain ServerPac and SystemPac configurations after installation. This is intended to make them easier to reuse for later installations.
  - Specifically, the Modify System Layout (MSL) dialog has been changed to allow you to enter MSL if the ALLOCDS job has been run and the ServerPac order has been set to STARTED without triggering the volume overflow condition process. You may save your changes in MSL, however a new message will be issued to indicate that you have to re-run the Install jobs if you want your

changes to be used for that order. The new message is: CPP0605097W: - Your order is already started. To use the changes you made, rerun the installation jobs.

- SMP/E archive segmentation is now used for Internet delivery. Archive files will be split into 500 MB segments to help alleviate bottlenecks created by large archive files and to help avoid downloading a large percentage of large archives multiple times when downloads are restarted.
- Effective 4Q2009, Tivoli OMEGAMON and other Tivoli monitoring products can be ordered in ServerPac or SystemPac without having z/OS in the same order. When you order with ShopzSeries, you can locate these products in a display group called "IBM Tivoli Monitoring Products." You must select "IBM Tivoli Management Services on z/OS (5698-A79)" as the base product for a Tivoli ServerPac or SystemPac order.

## Some Migration Actions You Can Do NOW



- 1. Transition off of removed functions and elements:**
  - In R11: “old” LDAP, CS removals, ...
  - In R12: RFC4301 compliance, CSVRTLS removal, ...
  - Beyond R12: DCE removals, LE usermods, BIND 9.2.0, ...
- 2. Prepare Driving and Target Systems:**
  - Driving systems - Doing electronic delivery or doing DVD? Review requirements. Decide about SMP/E APAR IO11698.
  - Target systems -
    - Preparation for CFCC level 17?
    - DASD storage for z/OS R12 – position root on larger DASD??
    - IBM product level research: FIXCAT [IBM.TargetSystem-RequiredService.z/OS.V1R12](#)
    - ISV research for z/OS R12
  - Coexisting systems - FIXCAT [IBM.Coexistence.z/OS.V1R12](#) (and others)
- 3. Review documentation and PSP buckets.**
- 4. Use IBM Health Checker for z/OS!**

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### Prepare for your migration to z/OS R12!

In this presentation you’ve seen many things can you can do right now, on your current z/OS release to help make your z/OS R12 migration smooth. Listed above are the things that were shown in this presentation, but make sure to look at the *z/OS Migration* book so that you know a more complete migration picture.

## IBM Health Checker for z/OS *for MIGRATION!* Usage

1. Install all Migration Health Check PTFs on your current release. PTFs will be marked with FIXCAT `IBM.Function.HealthChecker`.
2. Activate the Migration Health Checks appropriate for your migration path, specifying releases you are migrating through and to. For example, one way is:
  - `F HZSPROC,ACTIVATE,CHECK=(IBM*,*MIG*)`

*Could also be IBM\*,ZOSMIG\* or other ways...*
3. Migration Health Checks will run on your current release.
4. Review output for exceptions to create planning items for your migration plan.

Note: some “Best Practice” health checks can also be useful for migration. These checks are shipped ACTIVE.



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## General System REXX Reminder!

- Some IBM Health Checker for z/OS checks are written in System REXX. Exploiters of System REXX (not just checks) require both of the following:
  - **Compiled REXX** needs either Alternate Library for REXX (available in z/OS since V1R9) or from the IBM Library for REXX on zSeries (5695-014). The runtime library will need to be available to the system:
    - REXX.SEAGALT can be put in the LNKLIST.
    - REXX.SEAGLPA can be put in the LPALST.
    - If you do not APF-authorize the library, you will get an abend when the runtime routines are requested by an APF-Authorized routine.
  - **System REXX** customization must be performed. Customization tasks are documented in "System REXX" in *z/OS MVS Programming: Authorized Assembler Services Guide*.



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## IBM Health Checker for z/OS Checks for Migration Assistance

1. ZOSMIGREC_ROOT_FS_SIZE	17. CSVTAM_VIT_DSPSIZE
2. XCF_SYSPLEX_CDS_CAPACITY	18. CATALOG_IMBED_REPLICATE
3. RSM_MEMLIMIT	19. ZOSMIGVIR11_RMM_VRSEL_OLD
4. ZOSMIGREC_SUP_TIMER_INUSE	20. ZOSMIGVIR11_RMM_DUPLICATE_GDG
5. SUP_HiperDispatchCPUConfig	21. ZOSMIGVIR11_RMM_REXX_STEM
6. XCF_SFM_ACTIVE	22. ZOSMIGVIR11_ZFS_RM_MULTIFS /
7. ZOSMIGVIR12_SUP_LCCA_ABOVE_16M	ZOSMIGREC_ZFS_RM_MULTIFS
8. ZOSMIGVIR12_RCF_PCCA_ABOVE_16M	23. ZOSMIGVIR11_ZFS_INTERFACELEVEL
9. CNZ_OBSOLETE_MSGFLD_AUTOMATION	24. ZOSMIGREC_SMB_RPC
10. VSM_SQA_THRESHOLD	25. INFOPRINT_PRINTWAY_MODE
11. ZOSMIGVIR11_CS_RFC4301	26. LDAP_USE_TDS
12. ZOSMIGVIR11_CS_BIND9	27. JES2_Z11_Upgrade_CK_JES2
13. ZOSMIGVIR10_CS_BIND4	28. CEE_USING_LE_PARMLIB
14. ZOSMIGVIR10_CS_NDB	29. SDSF_ISFPARMS_IN_USE
15. ZOSMIGVIR10_CS_BINL	30. SDSF_CLASS_SDSF_ACTIVE
16. ZOSMIGVIR10_CS_DHCP	31. USS_HFS_DETECTED

All these checks are cross-referenced for the associated migration action in z/OS R12 Migration!

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### Using IBM Health Checker for z/OS for migration purposes

Starting in z/OS V1R10, the Health Checker infrastructure is exploited for migration purposes. Health Checks that are helpful for determining migration action applicability are provided. These checks ("Migration Health Checks") should be used prior to your migration to the new z/OS release to assist with your migration planning, and re-run after your migration to verify that the migration action was successfully performed. As with any Health Check, no updates are performed to the system. Migration Health Checks only report on the applicability of a specific migration action on a system; and only report on the currently active system.

### System REXX health check considerations

All exploiters of the System REXX support in z/OS require that the System REXX customization be performed. Using the IBM Health Checker for z/OS health checks is one example of possible System REXX exploitation. In particular, any compiled REXX execs must have the proper runtime support available from the Alternate Library for REXX (available in z/OS since V1R9) or from the IBM Library for REXX on zSeries (5695-014). Several IBM Health Checker for z/OS migration health checks have been written in compiled System REXX. These health checks rely upon the System REXX customization and runtime activities being completed. If System REXX (and the security environment that System REXX requires) have not been properly customized, then System REXX health checks will not execute successfully.

- For System REXX customization activities, refer to "System REXX" in *z/OS MVS Programming: Authorized Assembler Services Guide*.
- For compiled REXX exec runtime availability, see "Alternate Library for REXX Customization Considerations" in *z/OS Program Directory*, or refer to product documentation accompanying IBM Library for REXX on zSeries.

### Migration Health Checks and Best Practice Health Checks

Migration Health Checks are not different from other Health Checks, but they do have some characteristics which allow them to be uniquely identified:

- the name of the check follows a convention. For z/OS, the convention is: **ZOSMIGVvRrr\_component\_program\_name** (and for the ICSF element, the convention is **ICSMIGnnnn\_component\_program\_name**). Notice the "MIG" characters, followed immediately by the release identifier. This tells you that the check helps with migration, and the migration action was

introduced in the release specified in the name. If the version and release where the change is occurring isn't announced yet, you may see **ZOSMIGREC\_component\_program\_name** (where **REC** indicates it is RECommended, and is not a requirement yet).

- the check has a status of **INACTIVE** by default. Because you may not want to know about migration actions during non-migration periods, Migration Health Checks will not automatically be active.

There are Best Practice Health Checks that can help with migration actions, and yet they do not have the Migration Health Check naming convention. That is because the component owners felt that the practice is recommended for reasons above and beyond migration purposes. All Health Checks (whether they are Migration Health Checks or Best Practice Health Checks) will be cross-referenced in the *z/OS Migration* book when they can assist with a specific migration action. *So be aware, your migration assistance is not just limited to the checks that follow the Migration Health Check naming convention!*

This table shows all the IBM Health Checks for z/OS referenced in the *z/OS R12 Migration* book. You can see the related migration action, the check name, where the check ships, the severity, and if it active (background in yellow) or inactive (background in white).


BCP: default locations for PCCA control blocks to retain 24-bit virtual storage location	ZOSMIGV1R12_RCF_PCCA_ABOVE_16M (OA32015)	INACTIVE LOW	For z/OS R10 and z/OS R11 only
BCP: default locations for LCCA control blocks to retain 24-bit virtual storage location	ZOSMIGV1R12_SUP_LCCA_ABOVE_16M (OA32015)	INACTIVE LOW	For z/OS R10 and z/OS R11 only
BCP: verify that HiperDispatch is enabled on a z196 system	SUP_HiperDispatchCPUConfig (OA30476)	ACTIVE LOW	For z/OS R10 and beyond.
z/OS UNIX: Migrate from HFS file systems to zFS file systems	USS_HFS_DETECTED (OA29947)	ACTIVE LOW	For z/OS R11 and beyond.
BCP: Migrate from a Sysplex Timer to STP	ZOSMIGREC_SUP_TIMER_INUSE (no APAR)	INACTIVE LOW	For z/OS R11 and beyond
BCP: Remove message flood automation exits	CNZ_OBSOLETE_MSGFLD_AUTOMATION (OA25602)	ACTIVE MEDIUM	For z/OS R11 and beyond
BCP: Resource Managers specified in IEAVTRML	RTM_IEAVTRML (no APAR)	ACTIVE LOW	For z/OS R11 and beyond
DFSMSdfp: Redefine catalogs with IMBED, REPLICATE, and KEYRANGE attributes	CATALOG_IMBED_REPLICATE (no APAR)	ACTIVE LOW	For z/OS R11 and beyond.
DFSMSrmm: Replace obsolete stem variables in REXX execs	ZOSMIGV1R11_RMM_REXX_STEM (OA26947)	INACTIVE MEDIUM	For z/OS R9 and z/OS R10
DFSMSrmm: Migrate from VRSEL(OLD) to VRSEL(NEW) in parmlib member EDGRMMxx	ZOSMIGV1R11_RMM_VRSEL_OLD (OA26947)	INACTIVE MEDIUM	For z/OS R9 and R10
DFSMSrmm: Use DFSMSrmm parmlib options instead of USERMOD to specify how VRSEL processing handles duplicate GDGs	ZOSMIGV1R11_RMM_DUPLICATE_GDG (OA26947)	INACTIVE MEDIUM	For z/OS R9 and R10
JES2: Verify z11 checkpoint level	JES2_Z11_UPGRADE_CK_JES2 (no APAR)	ACTIVE LOW	For z/OS R11 and beyond



ISS LDAP: Migrate from LDAP Server to IBM TDS	LDAP_USE_TDS (OA27843)	ACTIVE LOW	For z/OS R8, z/OS R9, and z/OS R10
SDSF: Check that the SAF class SDSF is active	SDSF_CLASS_SDSF_ACTIVE (PK68253)	ACTIVE LOW	For z/OS R9 and beyond.
Communications Server: Migrate from BIND DNS 4.9.3 function	ZOSMIGV1R10_CS_BIND4 (no APAR)	INACTIVE LOW	For z/OS R8, R9, and R10.
Communications Server: Migrate from BIND DNS 9.2.0 function	ZOSMIGV1R11_CS_DNSBIND9 (no APAR)	INACTIVE LOW	For z/OS R11 and beyond.
Communications Server: Update IP filter policy to filter IP fragments correctly for RFC 4301 compliance	ZOSMIGV1R11_CS_RFC4301 (OA28605)	INACTIVE LOW	For z/OS R10 and R11.
Communications Server: Migrate from NDB function	ZOSMIGV1R10_CS_NDB (no APAR)	INACTIVE LOW	For z/OS R8, R9, and R10.
Communications Server: Migrate from BINL function	ZOSMIGV1R10_CS_BINL (no APAR)	INACTIVE LOW	For z/OS R8, R9, and R10.
Communications Server: Migrate from DHCP	ZOSMIGV1R10_CS_DHCP (no APAR)	INACTIVE LOW	For z/OS R8, R9, and R10.
Communications Server: Dump data sets are large enough to include VTAM internal trace data space	CSVTAM_VIT_DSPSIZE (no APAR)	ACTIVE LOW	For z/OS R9 and beyond.
zFS: Using sysplex_admin_level=2 for z/OS R11 coexistence	ZOSMIGV1R11_ZFS_INTERFACELEVEL (OA27198)	INACTIVE LOW	For z/OS R9 and R10 only.
zFS: Discontinue use of multi-file system aggregates	ZOSMIGV1R11_ZFS_RM_MULTIFS (when sysplex) or ZOSMIGREC_ZFS_RM_MULTIFS (when not sysplex) (OA27198)	INACTIVE LOW	For z/OS R9 and beyond.
SMB: Determine if SMB is running with the Distributed Computing Environment (DCE) and DCE/DFS File Server	ZOSMIGREC_SMB_RPC (OA30117)	INACTIVE MEDIUM	For z/OS R11 and beyond.
BCP: Enough XCF groups in your CDS.	XCF_SYSPLEX_CDS_CAPACITY (no APAR)	ACTIVE MEDIUM	For z/OS R4 and beyond.
General: Version root has enough room on DASD	ZOSMIGREC_ROOT_FS_SIZE (OA28684 and OA28631)	INACTIVE LOW	For z/OS R9 and beyond.
Infoprint Server: Migrate from IP PrintWay basic to extended mode	INFOPRINT_PRINTWAY_MODE (OA26583)	ACTIVE LOW	For z/OS R8 and higher
ICSF: Detection of the existence of retained RSA private keys on a PCICC or PCIXCC/CEX2C cryptographic card	ICSFMIG7731_ICSF_RETAINED_RSAKEY (OA24221)	INACTIVE LOW	For HCR7731 (z/OS V1R8) and beyond.
SDSF: ISFPRMxx detection	SDSF_ISFPARMS_IN_USE (PK59629)	ACTIVE LOW	For z/OS R8 and beyond.

LE: CEEPRMxx detection	CEE_USING_LE_PARMLIB (PK62487)	ACTIVE LOW	For z/OS R8 and beyond.
BCP: Verify that virtual storage limits are set properly	RSM_MEMLIMIT (no APAR)	ACTIVE LOW	For z/OS R4 and beyond.
BCP: SFM is active and if it is active, whether the recommended settings are in use for the SFM policy.	XCF_SFM_ACTIVE (no APAR)	ACTIVE MEDIUM	For z/OS R4 and beyond.
BCP: Examine the ESQA in use percent and high water mark percent.	VSM_SQA_THRESHOLD (no APAR)	ACTIVE MEDIUM	For z/OS R4 and beyond

## Migrating to z/OS 1.12: Part 1 of 2 Summary



- ▶ **Content of z/OS R12**
  - Remember to order unpriced features: [z/OS Sec Lvl 3](#) and [CS Sec Lvl 3](#)
- ▶ **z/OS Ordering and Deliverables**
  - Crypto Support for R10-R12 (HCR7780) Web deliverable available on 9/1/10.
  - 34xx tape media is gone on 10/25/10. DVD is available on 9/10/10.
  - z/OSMF, Ported Tools (and all features), XML R9 and R10, 31-bit and 64-bit SDKs...
- ▶ **z/OS Policies**
  - z/OS R12 Coexistence-Migration-Fallback from [z/OS R11](#) or [z/OS R10](#).
  - The Lifecycle Extension can help you for corrective service, not extended coexistence.
- ▶ **Ensuring System Requirements are Satisfied**
  - Driving System Requirements - z/OS R10...
  - Target System Requirements
    - Minimum levels: CICS 3.1, DB2 8.1, SDK V5, WAS 6.1, Netview 5.2...with PTFs!
    - Use FIXCAT [IBM.TargetSystem-RequiredService.z/OS.V1R12](#)
- ▶ **Coexistence Requirements**
  - Use FIXCAT [IBM.Coexistence.z/OS.V1R12](#) (and maybe others)
- ▶ **Migration Actions You Can Do NOW:**
  - Replacements for removed functions and elements - and future removals.
  - Use IBM Health Checker for migration verification. Use FIXCAT [IBM.Function.HealthChecker](#)
  - ...and everything applicable in the next presentation: 203A at 4:30pm – 5:45pm (15 minutes longer!)

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**Appendix A: List of Base Elements and Optional Features for z/OS V1R12**

The following table lists the base elements and optional features in z/OS V1R12. The following table headings are used:

**Name**

What this document calls the element or feature. (To help you distinguish elements from features, element names in this column are highlighted.)

**Function level**

The most recent release in which the element or feature changed. ("Change" means that one or more of the element's or feature's FMIDs [function modification identifiers] was changed, or that the element or feature was added to the system. New function added in program temporary fixes [PTFs] is not considered change.) Also, for nonexclusive elements and features, the equivalent level of the separate product is listed in parentheses.

**Note:** The function level is expressed as a z/OS function level.

Do not confuse the function level with the product level. All elements and features are at the V1R12 product level but they are at various function levels. For example, the product level of z/OS BookManager READ is z/OS V1R12 but its function level is OS/390 V1R1 because OS/390 V1R1 was the last release in which it changed.

**Type and description**

- "Type" means the following:
  - Whether it's a base element or optional feature
  - Whether the base element or optional feature is exclusive (existing only within z/OS) or nonexclusive (also available as a separate product)
  - If an optional feature, whether it's priced or unpriced
  - If an optional feature, whether it supports dynamic enablement (note that all the priced features support dynamic enablement)
- "Description" is a brief description of the element or feature, and miscellaneous facts about it.

<a href="#">Base elements and optional features in z/OS V1R12</a>		
Name	Last time changed (and equivalent product if nonexclusive)	Type and description
<b>Alternate Library for REXX</b>	z/OS V1R9  (see description about equivalent programs)	Type: base element, nonexclusive.  Alternate Library for REXX enables users to run compiled REXX programs. This base element is nonexclusive to z/OS because the following programs provide equivalent functions: <ul style="list-style-type: none"> <li>• The Alternate Library portion of the priced product IBM Library for REXX on zSeries® V1R4 (5695-014). The Alternate Library consists of FMIDs HWJ9143 (ENU) and JWJ9144 (JPN). These are the same FMIDs that are in the z/OS base element.</li> <li>• The no-fee Web download Alternate Library for REXX on z/OS.</li> </ul> This base element was new in z/OS V1R9. Including it as a base element in z/OS is intended to make it easier to use than the functionally equivalent programs listed above.
<b>BCP</b>	z/OS V1R12	Type: base element, exclusive.  The Base Control Program (BCP) provides essential operating system services.

[Base elements and optional features in z/OS V1R12](#)

Name	Last time changed (and equivalent product if nonexclusive)	Type and description
		The BCP includes the I/O configuration program (IOCP), the workload manager (WLM), system management facilities (SMF), the z/OS UNIX® System Services (z/OS UNIX) kernel, the program management binder, IBM Health Checker for z/OS, and support for the Unicode™ Standard. As of z/OS V1R8, the BCP also includes z/OS XML System Services (z/OS XML). As of z/OS V1R9, the BCP also includes Capacity Provisioning (FMID HPV7740) and System REXX for z/OS Base.
<b>BDT</b>	OS/390 V1R2	<p>Type: base element, exclusive.</p> <p>Bulk Data Transfer (BDT) provides the base services that the optional BDT features (BDT File-to-File and BDT SNA NJE) need to transfer data from one computer system to another.</p> <p>You cannot activate any BDT functions until one or both of the optional BDT features is enabled.</p>
BDT File-to-File	OS/390 V1R2	<p>Type: optional feature, exclusive, priced, can be dynamically enabled.</p> <p>BDT File-to-File allows users at one z/OS system in a SNA network to copy data sets to or from another z/OS system in the network. This feature is related to the element BDT.</p>
BDT SNA NJE	OS/390 V1R2	<p>Type: optional feature, exclusive, priced, can be dynamically enabled.</p> <p>BDT SNA NJE allows JES3 users to transmit jobs, output, commands, and messages from one computer system to another within a SNA network. This feature is related to the element BDT and the feature JES3.</p>
BookManager BUILD	OS/390 V1R1 (BookManager BUILD/MVS V1R3, 5695-045)	<p>Type: optional feature, nonexclusive, priced, can be dynamically enabled.</p> <p>BookManager BUILD creates softcopy documents that can be used by any of the BookManager products, such as BookManager READ or Library Server.</p>
<b>BookManager READ</b>	OS/390 V1R1 (BookManager READ/MVS V1R3, 5695-046)	<p>Type: base element, nonexclusive.</p> <p>BookManager READ is used to display, search, and manage online documents and bookshelves. A related optional feature is BookManager BUILD.</p>
C/C++ without Debug Tool	z/OS V1R12	<p>Type: optional feature, exclusive, priced, can be dynamically enabled.</p> <p>C/C++ without Debug Tool consists of:</p> <ul style="list-style-type: none"> <li>• XL C/C++ compiler</li> <li>• XL C/C++ application development utilities</li> </ul>
<b>CIM</b>	z/OS V1R12	<p>Type: base element, exclusive.</p> <p>Common Information Model (CIM) is a standard data model for describing and accessing systems management data in heterogeneous environments. It allows system administrators to write applications that measure system resources in a network with different operating systems and hardware. To enable z/OS for cross platform management, a subset of resources and metrics of a z/OS system are mapped into the CIM standard data model.</p> <p>CIM was new in z/OS V1R7. In z/OS V1R9, a new component was added that contains a Java™ programming interface for CIM client applications. In z/OS</p>

<a href="#">Base elements and optional features in z/OS V1R12</a>		
Name	Last time changed (and equivalent product if nonexclusive)	Type and description
		<p>V1R10, all CIM components were consolidated under one single FMID, HPG7750.</p> <p>Transport layer security (TLS) encryption is performed for CIM by base element Communications Server. CIM does not implement any of its own encryption algorithms.</p>
<b>Communications Server</b>	z/OS V1R12	<p>Type: base element, exclusive, can be dynamically enabled.</p> <p>Communications Server supports secure TCP/IP, SNA, and UNIX networking throughout an enterprise. It gives you the ability to connect subsystems and applications to each other, and to connect network devices (such as terminals and printers) to the system.</p> <p>Communications Server consists of two components: IP Services and SNA Services.</p> <p>A related optional feature is Communications Server Security Level 3.</p> <p>For encryption, IP Services uses the SNMPv3 DES 56-bit and IP Sec DES 56-bit algorithms. IP Services also uses the System SSL component of Cryptographic Services for encryption services. SNA Services uses the limited DES algorithm for encryption.</p>
Communications Server Security Level 3	z/OS V1R12	<p>Type: optional feature, exclusive, unpriced, cannot be dynamically enabled.</p> <p>This feature works in conjunction with the Communications Server base element to provide stronger encryption (greater than 64 bits) than that available without this feature. This feature uses the TDES and AES algorithms for encryption. The actual level of encryption that takes place with this feature installed can be configured to be less than the maximum level enabled by this feature.</p> <p>This feature is worldwide exportable subject to U.S. export regulations.</p>
<b>Cryptographic Services</b>	z/OS V1R12	<p>Type: base element, exclusive.</p> <p>Cryptography is the transformation of data to conceal its meaning. In z/OS, the base element Cryptographic Services provides the following base cryptographic functions: data secrecy, data integrity, personal identification, digital signatures, and the management of cryptographic keys. Keys as long as 56 bits are supported by this base element. (Keys longer than 56 bits are supported by the optional feature z/OS Security Level 3.)</p> <p>Cryptographic Services consists of the following components:</p> <ul style="list-style-type: none"> <li>• <b>Integrated Cryptographic Service Facility (ICSF), which was last changed in z/OS V1R12.</b></li> <li>• Open Cryptographic Services Facility (OCSF), which was last changed in z/OS V1R9.</li> <li>• <b>PKI Services, which was last changed in z/OS V1R12.</b></li> <li>• <b>System Secure Sockets Layer (SSL), which was last changed in z/OS V1R12.</b></li> </ul> <p>For encryption:</p> <ul style="list-style-type: none"> <li>• OCSF uses the RC2/RC4/RC5 40-56 bit and DES 56-bit algorithms.</li> <li>• PKI Services uses the RACF® component of optional feature Security</li> </ul>

[Base elements and optional features in z/OS V1R12](#)

Name	Last time changed (and equivalent product if nonexclusive)	Type and description
		<p>Server, and the ICSF, OCSF, and System SSL components of base element Cryptographic Services. PKI Services uses the RSA, DSA, and DES 56-bit algorithms.</p> <ul style="list-style-type: none"> <li>System SSL uses the RC2/RC4, DES through 56-bit, Diffie-Hellman, RSA, and DSA algorithms.</li> </ul>
<b>DCE Base Services</b>	OS/390 V2R9	<p>Type: base element, exclusive.</p> <p>DCE Base Services provides services for developing and running client/server applications, including remote procedure call, directory, security, and distributed time services. This element is at the Open Group Open Software Foundation (OSF) DCE 1.1 level.</p> <p>DCE Base Services uses the limited DES algorithm for encryption.</p>
<b>DFSMSdfp</b>	z/OS V1R12	<p>Type: base element, exclusive.</p> <p>DFSMSdfp provides storage, data, program, and device management functions. Related optional features are DFSMSrmm, DFSMSdss, DFSMSshm, and DFSMStvs.</p> <p>In z/OS V1R9, the FMID for the English panels was eliminated and the panels were merged into the base FMID, which is HDZ1190.</p>
DFSMSdss	z/OS V1R12	<p>Type: optional feature, exclusive, priced, can be dynamically enabled.</p> <p>DFSMSdss copies and moves data for backup and recovery, and to reduce free-space fragmentation.</p>
DFSMSshm (and DFSMSdss)	z/OS V1R12	<p>Type: optional feature, exclusive, priced, can be dynamically enabled.</p> <p>DFSMSshm provides automated DASD storage management, including space management for low and inactive data, and availability management for accidental data loss caused by local and site disasters. DFSMSshm also lets you make effective use of tape media.</p> <p>DFSMSshm requires DFSMSdss. For this reason, DFSMSshm is not available by itself. If you want to use DFSMSshm, you must order the DFSMSshm/DFSMSdss combination. (DFSMSdss is also available by itself for those who do not want DFSMSshm.)</p>
DFSMSrmm	z/OS V1R12	<p>Type: optional feature, exclusive, priced, can be dynamically enabled.</p> <p>DFSMSrmm helps you manage your removable media as one enterprise-wide library across systems that can share DASD.</p>
DFSMStvs	z/OS V1R12	<p>Type: optional feature, exclusive, priced, can be dynamically enabled.</p> <p>DFSMS Transactional VSAM Services (DFSMStvs) enables batch jobs and CICS® online transactions to update shared VSAM data sets concurrently.</p>
DFSORT	z/OS V1R12	<p>Type: optional feature, exclusive, priced, can be dynamically enabled.</p> <p>DFSORT provides fast and easy sorting, merging, copying, reporting, and analysis of your business information, as well as versatile data handling at the record, field, and bit level. DFSORT also includes the high-performance ICEGENER facility, the versatile ICETOOL utility, Symbols, and multiple output capability with the powerful OUTFIL feature.</p>

[Base elements and optional features in z/OS V1R12](#)

Name	Last time changed (and equivalent product if nonexclusive)	Type and description
<b>Distributed File Service</b>	z/OS V1R12	<p>Type: base element, exclusive.</p> <p>Distributed File Service provides:</p> <ul style="list-style-type: none"> <li>• The DCE file serving (DFS) component of the Open Group Open Software Foundation (OSF) DCE. The file serving support (the DFS client and server) is at the OSF 1.2.2 level.</li> <li>• The zSeries File System (zFS). The zFS is a UNIX file system that can be used in addition to the hierarchical file system (HFS). zFS file systems contain files and directories that can be accessed with the z/OS hierarchical file system file APIs. zFS file systems can be mounted into the z/OS UNIX hierarchy along with other local (or remote) file system types (such as HFS, TFS, AUTOMNT, and NFS). The zFS does not replace the HFS; it is complementary to the HFS. As of z/OS V1R7, you can use any combination of HFS and zFS file systems. zFS can be used for the root file system. Because zFS has higher performance characteristics than HFS and is the strategic file system, HFS might no longer be supported in future releases and you will have to migrate the remaining HFS file systems to zFS.</li> </ul> <p>The zFS provides significant performance gains in most environments requiring files 8 KB in size or greater that are frequently accessed and updated. The access performance of smaller files is equivalent to that of the HFS. For all files, the zFS provides a reduced exposure to loss of updates. The zFS is a logging file system with a write pattern to disk that reduces the points of failure after a system outage. For additional information about the zFS, including how to migrate data from the HFS to the zFS, see <i>z/OS Distributed File Service zSeries File System Administration</i>.</p> <p>As of z/OS V1R11, zFS has the capability of running sysplex-aware for read/write mounted file systems.</p> <ul style="list-style-type: none"> <li>• Server message block (SMB) file/print serving support. The SMB support is based on the X/Open PC Interworking: SMB, Version 2. Included in the support is access to HFS, sequential, PDS, PDSE, and VSAM data sets from Windows® XP Professional, Windows Terminal Server on Windows 2003, SUSE Linux® with Samba, and Redhat Linux with Samba. Windows workstation users can also exploit z/OS printer capabilities using the SMB file/print server interface to the z/OS Infoprint Server feature.</li> </ul> <p>The DFS and SMB support use the DES 56-bit algorithm for encryption.</p>
<b>EREP</b>	OS/390 V1R1  (EREP MVS™ V3R5, 5658-260)	<p>Type: base element, nonexclusive.</p> <p>The Environmental Record Editing and Printing Program (EREP) edits and prints reports for the records placed in the error recording data set (ERDS), helping IBM service representatives fix problems.</p>
<b>ESCON® Director Support</b>	OS/390 V1R1	<p>Type: base element, exclusive.</p> <p>ESCON Director Support enables the reporting of ESCON director device errors to z/OS.</p>
<b>FFST™</b>	OS/390 V1R2	<p>Type: base element, exclusive.</p> <p>First Failure Support Technology™ (FFST) provides immediate notification and first failure data capture for software events.</p>



[Base elements and optional features in z/OS V1R12](#)

Name	Last time changed (and equivalent product if nonexclusive)	Type and description
<b>GDDM®</b>	OS/390 V1R2  (GDDM/MVS V3R2, 5695-167)	Type: base element, nonexclusive.  GDDM provides presentation services and device-driving capability. It includes PCLK and REXX code. Related optional features are GDDM-Presentation Graphics Feature and GDDM-REXX. Other GDDM-associated products (IVU, GKS, IMD) are not in z/OS, but are separately orderable with z/OS.
GDDM-PGF	OS/390 V1R2  (GDDM/PGF V2R1.3, 5668-812)	Type: optional feature, nonexclusive, priced, can be dynamically enabled.  GDDM-Presentation Graphics Feature (PGF) is a set of programs for creating presentation material in a variety of styles.  This feature is related to the base element GDDM.
GDDM-REXX	OS/390 V1R2  (GDDM-REXX/MVS V3R2, 5664-336)	Type: optional feature, nonexclusive, priced, can be dynamically enabled.  GDDM-REXX is a productivity tool that enables programmers to prototype GDDM applications and to create small routines and utility programs quickly and easily.  This feature is related to the base element GDDM.
<b>HCD</b>	z/OS V1R12	Type: base element, exclusive.  Hardware Configuration Definition (HCD) defines both the operating system configuration and the processor hardware configuration for a system. A related optional feature is HCM.
HCM	z/OS V1R12	Type: optional feature, exclusive, priced, can be dynamically enabled.  Hardware Configuration Manager (HCM) is a workstation-based graphical user interface to the base element HCD.
<b>HLASM</b>	z/OS V1R10  (HLASM for z/OS and z/VM® and z/VSE™ V1R6, 5696-234)	Type: base element, nonexclusive.  High Level Assembler (HLASM) integrates almost all functions of past assemblers and provides extensions and improvements. A related optional feature is the HLASM Toolkit.
HLASM Toolkit	z/OS V1R10  (Toolkit feature of HLASM for z/OS and z/VM and z/VSE V1R6, 5696-234)	Type: optional feature, nonexclusive, priced, can be dynamically enabled.  HLASM Toolkit provides tools to improve application development, debugging, and recovery. It is related to the base element HLASM.
<b>IBM HTTP Server</b>	OS/390 V2R10 (but see description)	Type: base element, exclusive.  IBM HTTP Server is the Web server for z/OS. It provides scalable, high performance Web serving for critical e-business applications. It supports Secure Sockets Layer (SSL) secure connections, dynamic caching using the Fast Response Cache Accelerator, multiple IP addresses, proxy authentication, and double-byte character set characters.  IBM HTTP Server NA Secure is now a component of IBM HTTP Server. Before V1R6, it was an optional feature of z/OS. This packaging change was the only change to IBM HTTP Server in V1R6; there was no functional change.
<b>IBM TDS</b>	z/OS V1R12	Type: base element, exclusive.  IBM Tivoli® Directory Server for z/OS (IBM TDS) provides client access to an

<a href="#">Base elements and optional features in z/OS V1R12</a>		
Name	Last time changed (and equivalent product if nonexclusive)	Type and description
		<p>LDAP server. It consists of an LDAP server, an LDAP client, and LDAP client utilities.</p> <p>For encryption, IBM TDS uses the DES (56-bit) and MD5 encryption algorithms.</p>
<b>ICKDSF</b>	<p>z/OS V1R4 z990 Compatibility Support feature</p> <p>(ICKDSF for z/OS, z/OS.e, and OS/390 R17, 5655-257)</p>	<p>Type: base element, nonexclusive.</p> <p>The Device Support Facility (ICKDSF) enables you to perform functions needed for the installation and use of IBM DASD.</p> <p>ICKDSF was last changed in the z/OS V1R4 z990 Compatibility Support feature. This level was carried forward to the z/OS V1R4 z990 Exploitation Support feature and then to z/OS V1R5 and later, and is functionally equivalent to the R17 level of the ICKDSF product.</p>
Infoprint Server	z/OS V1R12	<p>Type: optional feature, exclusive, priced, can be dynamically enabled.</p> <p>Infoprint Server allows you to print files on z/OS printers from any workstation that has TCP/IP access. This feature consists of the following components:</p> <ul style="list-style-type: none"> <li>• IP PrintWay™</li> <li>• NetSpool</li> <li>• Print Interface</li> <li>• Printer Inventory Manager</li> <li>• Transform Interface</li> <li>• z/OS Infoprint Central</li> </ul> <p>IBM recommends that you use the Infoprint Server feature's IP PrintWay component rather than the Communications Server base element's Network Print Facility (NPF) to reroute print data to an IP network. IP PrintWay provides improved function, capacity, performance, and usability over NPF.</p>
<b>Integrated Security Services</b>	z/OS V1R12	<p>Type: base element, exclusive.</p> <p>Integrated Security Services provides base security functions for z/OS. Its components are:</p> <ul style="list-style-type: none"> <li>• DCE Security Server, which was last changed in OS/390 V2R9. This component is at the OSF DCE 1.2.2 level. This component uses the limited DES algorithm for encryption.</li> <li>• Enterprise Identity Mapping (EIM), which was last changed in z/OS V1R10. This component allows you to map a user's identity on one system to the user's identity on another system.</li> <li>• <span style="color: green;">Network Authentication Service, which was last changed in z/OS V1R12. Network Authentication Service uses the DES algorithm for encryption.</span></li> <li>• Open Cryptographic Enhanced Plug-ins (OCEP), which was last changed in z/OS V1R9.</li> </ul> <p>As of z/OS V1R11, LDAP Server is no longer a component of Integrated Security Services. IBM TDS, a base element introduced in z/OS V1R8, contains a rewritten LDAP Server.</p>
<b>ISPF</b>	z/OS V1R11	<p>Type: base element, exclusive.</p> <p>ISPF provides facilities for all aspects of host-based software development.</p>

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Name	Last time changed (and equivalent product if nonexclusive)	Type and description
		<p>ISPF has four major components:</p> <ul style="list-style-type: none"> <li>• Dialog Manager (DM). The Dialog Manager provides services to dialogs and end users. These services include display, variable services, input and output, user and application profiles, table management, system interface services, and dialog testing and debugging aids.</li> <li>• Program Development Facility (PDF). PDF provides services to assist dialog or application developers. These include edit and browse functions, a wide range of foreground and batch compilers, data set and catalog utilities, TSO command interfaces, and data set search and compare functions.</li> <li>• Software Configuration and Library Manager (SCLM). SCLM is a tool that controls, maintains, and tracks all of the software components of the application throughout the development cycle.</li> <li>• Client/Server component. The Client/Server component provides users who have a workstation running Windows or UNIX with a graphical user interface to ISPF application panels.</li> </ul>
<b>JES2</b>	z/OS V1R12	<p>Type: base element, exclusive.</p> <p>JES2 accepts the submission of work for the BCP. JES2 exercises independent control over its job processing functions, whereas JES3 exercises centralized control.</p>
JES3	z/OS V1R12	<p>Type: optional feature, exclusive, priced, can be dynamically enabled.</p> <p>JES3 accepts the submission of work for the BCP. JES3 exercises centralized control over its job processing functions, whereas JES2 exercises independent control.</p>
<b>Language Environment®</b>	z/OS V1R12	<p>Type: base element, exclusive.</p> <p>Language Environment provides the run-time environment for programs generated with C, C++, COBOL, Fortran, and PL/I.</p> <p>Inclusion of Language Environment as a base element in z/OS does not replace the need for separate compilers.</p> <p>Language Environment uses the limited DES algorithm for encryption.</p>
<b>Library Server</b>	z/OS V1R12	<p>Type: base element, exclusive.</p> <p>Library Server converts BookManager and InfoCenter documents to HTML for display through a Web browser, and provides unified organization and searching of BookManager, PDF, and InfoCenter documents.</p>
<b>Metal C Runtime Library</b>	z/OS V1R11	<p>Type: base element, exclusive.</p> <p>The Metal C Runtime Library is a set of LPA-resident C functions that can be called from a C program created using the z/OS XL C compiler METAL option.</p> <p>This base element was new in z/OS V1R9.</p>
<b>MICR/OCR</b>	OS/390 V1R1	<p>Type: base element, exclusive.</p> <p>This element provides the device support code for various magnetic and optical devices.</p>

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Name	Last time changed (and equivalent product if nonexclusive)	Type and description
NFS	z/OS V1R12	<p>Type: base element, exclusive.</p> <p>Network File System (NFS) acts as a file server to workstations, personal computers, or other authorized systems in a TCP/IP network. It consists of a client and a server. It supports Berkeley sockets but not TCP/IP sockets.</p> <p>NFS uses the Network Authentication Service component of Integrated Security Services for encryption.</p> <p>NFS is always enabled, even when the alternate base configuration is ordered.</p> <p>In z/OS V1R8, the NFS server and client FMIDs were merged into one FMID.</p>
OSA/SF	z/OS V1R4 z990 Compatibility Support feature	<p>Type: base element, exclusive.</p> <p>Open Systems Adapter/Support Facility (OSA/SF) provides a user-friendly interface for monitoring and controlling the zSeries Open Systems Adapter feature, which provides network connectivity directly to local area networks (LANs) and wide area networks (WANs) that support IP and SNA protocols. OSA/SF supports Gigabit, Token Ring, Fast Ethernet, 1000Base-T Ethernet, 10 Gigabit Ethernet, and ATM features depending on the server on which z/OS runs. For details, see <i>System z10, System z9 and zSeries OSA-Express Customer's Guide and Reference, SA22-7935</i>.</p> <p>OSA/SF was last changed in the z/OS V1R4 z990 Compatibility Support feature. This level was carried forward to the z/OS V1R4 z990 Exploitation Support feature and then to z/OS V1R5 and later.</p> <p>OSA/SF became exclusive with the introduction of the z/OS V1R4 z990 Compatibility Support feature.</p>
RMF™	z/OS V1R12	<p>Type: optional feature, exclusive, priced, can be dynamically enabled.</p> <p>Resource Measurement Facility™ (RMF) gathers data about z/OS resource usage and performance, and provides reports on any system in a sysplex.</p>
Run-Time Library Extensions	z/OS V1R12	<p>Type: base element, exclusive.</p> <p>Run-Time Library Extensions extends the run-time support provided by the Language Environment base element. It consists of :</p> <ul style="list-style-type: none"> <li>• Common Debug Architecture (CDA) libraries</li> <li>• Utilities</li> <li>• UNIX System Laboratories (USL) I/O Stream Library and USL Complex Mathematics Library</li> </ul>
SDSF	z/OS V1R12	<p>Type: optional feature, exclusive, priced, can be dynamically enabled.</p> <p>System Display and Search Facility (SDSF) provides you with information to monitor, manage, and control your z/OS system.</p> <p>If you use a prior release of JES2 or JES3 with z/OS V1R12, you must use the same prior release of SDSF with z/OS V1R12.</p>
Security Server	z/OS V1R12	<p>Type: optional feature, exclusive, priced, can be dynamically enabled.</p> <p>Security Server lets you control access to protected resources. Security Server</p>

[Base elements and optional features in z/OS V1R12](#)

Name	Last time changed (and equivalent product if nonexclusive)	Type and description
		<p>contains one component, RACF.</p> <p>Security Server uses the limited DES, CDMF, RC 40-bit, RSA, and DSA algorithms for encryption.</p>
SMP/E	<p>z/OS V1R10</p> <p>(SMP/E for z/OS V3R5, 5655-G44)</p>	<p>Type: base element, nonexclusive.</p> <p>SMP/E is a tool for installing and maintaining software, and for managing the inventory of software that has been installed.</p> <p>The SMP/E product allows customers who are currently licensed for an earlier level of z/OS to order and install the latest level of SMP/E without having to upgrade their entire operating system. This allows products that run on z/OS to exploit the packaging and installation enhancements of SMP/E without requiring a later level of the operating system. This also allows customers to exploit new electronic delivery and installation technologies in SMP/E sooner. The SMP/E product is available at no additional charge to customers.</p> <p>The Planning and Migration Assistant (PMA), a component of SMP/E, can help you maintain, plan for, and order new releases of z/OS and other products. It provides reports that use IBM-supplied data, your SMP/E consolidated software inventory (CSI) data set, and a CustomPac inventory file. The PMA Web site is <a href="http://www.ibm.com/systems/z/os/zos/smpe/pma/">http://www.ibm.com/systems/z/os/zos/smpe/pma/</a>.</p>
TIOC	OS/390 V1R1	<p>Type: base element, exclusive.</p> <p>TIOC allows console services and TSO/E to communicate with the terminal hardware.</p>
TSO/E	z/OS V1R12	<p>Type: base element, exclusive.</p> <p>Time Sharing Option/Extensions (TSO/E) provides an interactive terminal interface. As in prior releases of TSO/E, this element includes CLISTs and REXX, but does not include a REXX compiler.</p>
z/OS Security Level 3	z/OS V1R12	<p>Type: optional feature, exclusive, unpriced, cannot be dynamically enabled.</p> <p>z/OS Security Level 3 provides strong encryption for z/OS.</p> <p>The components in this feature are:</p> <ul style="list-style-type: none"> <li>• IBM TDS Security Level 3, which was last changed in z/OS V1R12. This component works in conjunction with the IBM TDS base element to provide stronger encryption (greater than 64 bits) than that available without the z/OS Security Level 3 feature. This component uses the RC4, TDES, and Advanced Encryption Standard (AES) algorithms for encryption.</li> <li>• Network Authentication Service Level 3, which was last changed in z/OS V1R12. This component works in conjunction with the Network Authentication Service component of the Integrated Security Services base element to provide stronger encryption (greater than 64 bits) than that available without the z/OS Security Level 3 feature. This component uses the TDES and AES algorithms for encryption.</li> <li>• OCSF Security Level 3, which was last changed in z/OS V1R9. This component works in conjunction with the OCSF component of the Cryptographic Services base element to provide stronger encryption (greater than 64 bits) than that available without the z/OS Security Level 3 feature. This component uses the TDES, DES, and RC2/RC4/RC5 algorithms for encryption.</li> </ul>

<a href="#">Base elements and optional features in z/OS V1R12</a>		
Name	Last time changed (and equivalent product if nonexclusive)	Type and description
		<ul style="list-style-type: none"> <li>System Secure Sockets Layer (SSL) Security Level 3, which was last changed in z/OS V1R12. This component works in conjunction with the System SSL component of the Cryptographic Services base element to provide stronger encryption (greater than 64 bits) than that available without the z/OS Security Level 3 feature. This component uses the RC2/RC4, TDES, and AES algorithms for encryption.</li> </ul> <p>This feature is worldwide exportable subject to U.S. export regulations.</p>
z/OS UNIX	z/OS V1R12	<p>Type: base element, exclusive.</p> <p>z/OS UNIX System Services (z/OS UNIX) provides the standard command interface familiar to interactive UNIX users. This base element is made up of four components:</p> <ul style="list-style-type: none"> <li>Application Services, which was last changed in z/OS V1R12. This component includes the Shell and Utilities, Debugger, and Parallel Environment.</li> <li>Connection Manager, which was last changed in OS/390 V2R7.</li> <li>Integrated Call Level Interface (ICLI), which was last changed in z/OS V1R6.</li> <li>Process Manager, which was last changed in OS/390 V2R7.</li> </ul>
3270 PC File Transfer Program	OS/390 V1R2  (3270 PC File Transfer Program V1R1.1, 5665-311)	<p>Type: base element, nonexclusive.</p> <p>3270 PC File Transfer Program transfers files from the host to the workstation for offline data manipulation, updating, or correction or for the transfer and storage of local data in the host system.</p>