



Migrating to z/OS R7

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Migrating to z/OS R7

Come to this session to learn about what you should know when migrating to z/OS R7. Included will be coexistence information, highlights of some important migration tasks (BCP, C/C++, DFSMS, HCD, JES2), positioning for removal of future functions, and a couple of system programmer enhancements in z/OS R7 which will make your life easier. A smooth migration to z/OS R7 begins here!

The general availability date for z/OS V1 R7 was September 30, 2005.



Trademarks

e - logo	DFSMSdftp	IBMLink	ProductPac
e-business	DFSMSdss	IMS	RACF
z/Architecture	DFSMSHsm	IP PrintWay	RMF
z/OS	DFSMSrmm DFSMStvs	Language Environment	RS/6000
z/VM	Encina	Multiprise	S/390
zSeries	DFSORT	MVS	S/390 Parallel Enterprise Server
AnyNet	ESCON	MVS/ESA	SecureWay
AD/Cycle	First Failure Support Technology	Net.Data	System/390
BookManager	FunctionPac	NetSpool	SOM
C/370	FFST	Open Class	SOMobjects
CICS	FICON	OpenEdition	SP
COBOL/370	GDDM	OS/2	VisualAge
DB2	Hiperspace	OS/390	VM/ESA
DB2 Universal Database	Infoprint	Parallel Sysplex	VSE/ESA
DFS	Intelligent Miner	Processor Resource/Systems	VTAM
DFSMS/MVS	IBM	Manager	WebSphere

Domino (Lotus Development Corporation)
 Java (Sun Microsystems, Inc.)
 JDBC (Sun Microsystems, Inc.)
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 Lotus (Lotus Development Corporation)
 Notes (Lotus Development Corporation)
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 Tivoli (Tivoli Systems Inc.)
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Migrating to z/OS R7 Agenda

▶ Removed Content of z/OS R7

- Before z/OS R7
- Planned for after z/OS R7

▶ z/OS Policies

- z/OS Coexistence-Migration-Fallback

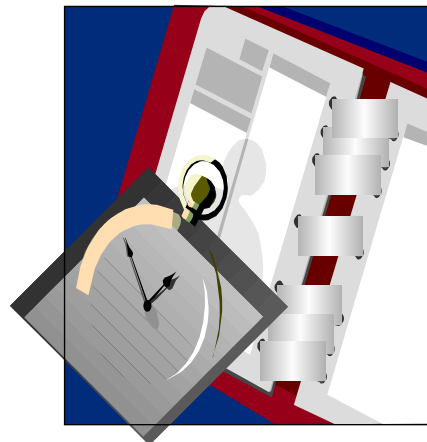
▶ System Requirements for z/OS R7

▶ Selected Migration Actions for:

- General
- BCP,
- C/C++
- DFSMS
- HCD
- JES2

▶ Two System Programmer Enhancements in R7

▶ Summary



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Related Publications

- *z/OS and z/OS.e Planning for Installation* (GA22-7504)
- *z/OS Introduction and Release Guide* (GA22-7502)
- *z/OS Program Directory* (n/a)
- *zSeries Platform Test Report for z/OS and Linux Virtual Servers* (formerly, the *z/OS Parallel Sysplex Test Report*)
- *z/OS License Program Specifications* (GA22-7503)
- *z/OS Migration* (GA22-7499)
- *z/OS Summary of Interface and Message Changes* (SA22-7505)
- *z/OS MVS Planning: Operation* (SA22-7601)
- *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)

Internet Web Pages

URL	DESCRIPTION
http://www.ibm.com/servers/eserver/zseries/zos	IBM z/OS home page
http://www.ibm.com/servers/eserver/zseries/zos/servicetst/	Consolidated Service Test (CST) home page
http://www.ibm.com/servers/eserver/zseries/zos/installation/	z/OS Installation
http://www.ibm.com/servers/eserver/zseries/zos/support/zos_eos_dates.html	End of Service dates for z/OS releases
http://www.ibm.com/servers/eserver/zseries/zos/integst/	z/OS Integration Test web page
http://www.ibm.com/servers/eserver/zseries/zos/bkserv/	z/OS Library web page
http://www.redbooks.ibm.com/	IBM Redbooks web page
http://www.ibm.com/support/techdocs/atmastr.nsf/Web/Flashes	IBM Systems Center Flashes
http://www.ibm.com/servers/eserver/zseries/zos/support/	z/OS Technical Support
http://www.ibm.com/servers/eserver/zseries/zos/wizards/	z/OS Wizards
http://www.ibm.com/ibmlink.ibm.com/	IBMLink web page
http://www.ibm.com/servers/eserver/zseries/software/swinfo/	US Packaged Offerings web page
http://service.boulder.ibm.com/390hdmvsinst.html	ESO Overview
http://service.boulder.ibm.com/390holddata.html	Enhanced HOLDDATA web page
http://www.ibm.com/servers/eserver/zseries/software/swinfo/pdo.htm	CBPDO web page
http://www.can.ibm.com/custompac or http://www.ibm.com/ca/custompac	CustomPac (including SystemPac) web page
http://www.ibm.com/software/shopzseries	ShopzSeries home page
http://service.boulder.ibm.com/software_order_status/	IBM Order Status homepage
http://www.ibm.com/servers/eserver/zseries/zos/software/isv16.html	Software Dev. Supporting z/OS V1.6 web page
http://www.ibm.com/servers/eserver/zseries/wlc_lm	zSeries Software Pricing web page
http://www.ibm.com/servers/eserver/zseries/library/whitepapers	z/OS Technical white papers
http://www.ibm.com/eserver/zseries/zos/rmf/rmfhtmls/rmftools.htm	RMF Tools web page
http://www.ibm.com/s390/java	z/OS Java 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/> .

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Elements and Functions Withdrawn from z/OS R7		
JES2 "compatibility" R4 mode (from JES2)	Base Element - to avoid a cold start, you must \$ACTIVATE to convert the JES2 checkpoint to z2 mode before installing z/OS R7	as of z/OS R7
JOBCAT and STEPCAT facilities (from DFSMSdfp)	Base Element - any remaining JCL that use JOBCAT or STEPCAT must change	as of z/OS R7
Support for ISAM data sets (from DFSMS)	Base Element - ISAM Compatibility Interface will still be provided (which allows you to run an ISAM program against a VSAM KSDS data set)	as of z/OS R7
OS/390 R10 level of the C/C++ compilers (from C/C++)	Priced Feature - move to the ISO 1998 Standard level of the compilers (introduced in z/OS R2)	as of z/OS R7
ECMB=NO circumvention in IEAOPTxx (from BCP)	Base Element - ECMB must be used, as the bypass will be removed.	as of z/OS R7
One-byte console IDs on macro interfaces and operator commands (and TRACK, ... commands) (from BCP)	Base Element - Use console names, instead of one-byte IDs. Use Console ID Tracking Facility to identify one-byte ID usage, supplied as of z/OS R4 Consoles Enhancement feature.	as of z/OS R7
z/OS Optional Source media feature	(not an element, an z/OS orderable feature)	as of z/OS R7

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Withdrawn in z/OS V1.7 (last delivered in z/OS V1.6)

This section lists items that were withdrawn in z/OS V1.7. You should take this into account as you plan your migration to z/OS R7. The removal of these functions may have migration actions which you can perform now, in preparation for z/OS R7.


- From base element JES2, IBM removes support for JES2 compatibility mode (R4). As of z/OS R7, JES2 will no longer support compatibility with pre-z/OS V1.2 systems. The \$ACTIVATE command, which converts the JES2 checkpoint from z2 mode to R4 mode (compatibility mode), will be removed. Before installing z/OS R7, you must do one of the following:
 - Use the \$ACTIVATE command to convert the JES2 checkpoint to z2 mode
 - Offload the SPOOL, cold start JES2 z/OS R7, and reload the jobs on the new SPOOL
- From base element DFSMSdfp, IBM removes the DFSMSdfp JOBCAT and STEPCAT facilities as of z/OS R7. The JOBCAT and STEPCAT facilities have been in existence for many years, predating the introduction of ICF (integrated catalog facility) catalogs. JOBCAT and STEPCAT were designed to address some of the functional shortcomings of VSAM catalogs, such as:
 - VSAM volume ownership, that is, all data sets on a volume having to be in the same VSAM catalog. Multiple catalogs could not point to data sets on the same volume.
 - Performance problems resulting from no multilevel alias support, as well as lack of ability to subset catalog data for recovery purposes.
 - Restrictions in the definition of the catalog SVC interface. The introduction of ICF catalogs in the mid-1980s and other catalog enhancements (such as the multilevel alias support) directly addressed those problems. In addition, processes were developed for system build to use system specific aliases instead of JOBCAT or STEPCAT. CBIPO introduced these processes and they are used today by offerings such as ServerPac to create data set entries in the new master catalog of the system being built. At the time ICF catalogs were introduced, the JOBCAT and STEPCAT facilities were functionally stabilized. Neither SMS-managed data sets nor UCBs above the 16 megabyte line may be used with JOBCAT or STEPCAT. ICF

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catalogs contain sufficient functional capabilities that all functions that previously could only be performed with JOBCAT or STEPCAT can now be done without them.


Furthermore, the use of JOBCAT and STEPCAT can actually cause significant problems. Data sets are generally not cataloged according to the normal predictable search order when JOBCAT or STEPCAT is used. This impacts the ability to do comprehensive installation storage management and can increase staff requirements. For example, interval migration and recall using DFSMSHsm is effectively unusable when the data sets cannot be found using the standard catalog search order. The use of JOBCAT and STEPCAT can also result in noticeable increases in the time required to perform catalog requests.

- Due to ISAM's limited functionality and the capabilities of VSAM, particularly VSAM data sets in extended format, z/OS V1.6 was the last release in which DFSMS ISAM and the utility program, IEABISAM, was available. IBM has provided the ISAM Compatibility Interface (ISAM CI) which allows users to run an ISAM program against a VSAM KSDS data set. Details on using this interface and procedures for converting ISAM data sets to VSAM data sets can be found in Appendix E of *Using Data Sets*. This compatibility interface program continues to be provided as part of DFSMS and is **not** discontinued with the ISAM removal from DFSMS.
- From optional feature C/C++ without Debug Tool, IBM has removed the OS/390 R10 level of the C/C++ compilers from z/OS R7. The OS/390 R10 C/C++ compilers were shipped as an aid to migration to the C/C++ compilers that were introduced in z/OS V1R2. The z/OS V1R2 level of the C++ compiler supports the ISO 1998 Standard level of C++. For information about migrating from the older to the newer level of the compilers, see *z/OS C/C++ Compiler and Run-Time Migration Guide*.
- Previously, the CMB= parameter specified the I/O device classes for which measurement data was to be collected, in addition to the DASD and tape device classes. It also allowed you to specify the number of channel measurement block (CMB) slots to reserve for adding more devices with an ACTIVATE. As of the z990 Exploitation feature on z/OS R4, the system ignores the CMB and uses instead the measurement data in the extended channel measurement block (ECMB). As a migration action since then, you must convert user-written programs that make use of the CMB to make use of the ECMB, and contact ISVs to obtain updates to ISV programs that use the CMB. The type of programs especially likely to use the CMB are monitor programs. If ISV support is not available, you could have specified ECMB=NO in parmlib member IEAOPT.xx as a circumvention until the ISV support is available. See APAR OA06164 for additional details. The ECMB=NO circumvention has been removed in z/OS R7, so have plans in place to discontinue this usage before migrating to z/OS R7.
- One-byte console IDs are removed from macro interfaces and operator commands in z/OS R7. You are not allowed to specify one-byte console IDs on macros (such as WTO/WTOR), or on such operator commands as D C,CN= or D PFK,CN= . You should use console names instead. A service called the Console ID Tracking Facility is available to help you identify one-byte ID usage. The use of console names is already a best practice on OS/390 and z/OS. For information about Console ID Tracking facility, see *z/OS MVS Planning: Operations*. In addition, the TRACK command, as well as the commands STOPTR, CONTROL T, CONTROL D,U, CONTROL D,H, and MSGRT TR=A are removed in z/OS R7.
- The z/OS Optional Source media feature is not offered in z/OS R7. The last release offering these materials was z/OS R6. These features contain macros and source code for some programs in the z/OS BCP, BDT base, BDT SNA NJE, BDT File-to-File, DFSMS, MICR/OCR, BCP JPN, and Security Server RACF elements.



Functions Planned to be Withdrawn *in the release after R7...*

zFS multi-file system aggregate shared across a sysplex (from Distributed File Service)	Base Element - zFS compatibility mode aggregates (which have a single file system per data set) will continue to be supported in all environments.	Planned for release after R7
Firewall Technologies (from Integrated Security Services)	Base Element - Many Firewall Technologies functions have been stabilized and can be replaced w/ Comm Server functions. Some functions won't have replacements.	Planned for release after R7
Some Communications Server functions	Base Element - TCP/IP Configuration profile block definitions, PAGTSNMP subagent, EE TGs definition by specifying multiple SAP addrs, and AnyNet	Planned for release after R7
Any remaining one-byte console ID support (from BCP)	Base Element - Use console names instead of one-byte console IDs	Planned for release after R7
Certain plug-ins for msys for Setup: TCP/IP Services, z/OS UNIX System Services, Language Environment, Parallel Sysplex, ISPF, and RMF	Base Element - TCP/IP plug-in available from web and won't require msys for Setup. Improvements for setup and configuration are planned in the future.	Planned for release after R7
msys for Operations	Base Element - IBM plans to transition many of the current msys for Operations functions to a new user interface and infrastructure in a future release of z/OS.	Planned for release after R7



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Planned for removal in the release following z/OS R7

This section lists items that IBM has announced it intends to remove in the release following z/OS R7. 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 V1.7 is planned to be the last release to allow mounting zFS file systems contained in multi-file system aggregates that are to be shared across systems in a sysplex. IBM has previously recommended that these multi-file system aggregates not be shared in a sysplex environment. Once this support has been removed, attempts to mount zFS file systems contained in multi-file system aggregates will fail in a z/OS UNIX shared file system environment. Mounting zFS compatibility mode aggregates, which have a single file system per data set, will continue to be supported in all environments.
- z/OS V1.7 is planned to be the last release to include the Firewall Technologies component of the Integrated Security Services element. Many Firewall Technologies functions have been stabilized for some time and can be replaced using comparable or better functions provided by or planned for Communications Server, notably, IPSecurity. In addition, a functionally rich downloadable tool is planned to replace the IPSecurity and IP Filtering configuration GUI support. The following functions will be removed without replacement:
 - FTP Proxy services
 - Socks V4 services
 - Network Address Translation (NAT)
 - RealAudio (TM) support
- z/OS V1.7 is planned to be the last release in which z/OS Communications Server will support the following functions, after which they will be removed from the product:
 - TCP/IP configuration profile block definition statements:
 - ASSORTEDPARMS
 - ENDASSORTEDPARMS
 - KEEPALIVEOPTIONS,
 - ENDKEEPALIVEOPTIONS

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Equivalent capability is provided for the ASSORTEDPARMS statements by the GLOBALCONFIG, IPCONFIG, TCPCONFIG, and UDPCONFIG statements. Equivalent capability is provided for the KEEPALIVEOPTIONS statements by INTERVAL and SENDGARBAGE on the TCPCONFIG statement. For information on TCP profile and configuration statements, refer to *z/OS Communications Server IP Configuration Reference*.

- The SNMP Service Level Agreement (SLA) Version 1 MIB and the PAGTSNMP subagent. In z/OS V1.5, Communications Server provided a new SNMP SLA Version 2 MIB and NSLAPM2 subagent. IBM recommends that you migrate to the new Version 2 MIB and NSLAPM2.
- The option of defining parallel Enterprise Extender TGs by specifying multiple SAP addresses. Beginning in z/OS V1.5, parallel EE TGs may be defined by using different EE VIPAs on one (or both) of the endpoints.
- AnyNet. You may implement other IBM solutions such as Enterprise Extender (EE) as a replacement for AnyNet.
- In the release following z/OS V1.7, the remaining support for one-byte console IDs will be removed from control blocks CIB, CSCB, ORE, WQE, XSA. This completes the removal of one-byte console IDs in z/OS. Instead of using one-byte console IDs, console names should be used.
- Support for the following plug-ins for msys for setup will be withdrawn in the release following z/OS V1.7: TCP/IP Services, z/OS UNIX System Services, Language Environment, Parallel Sysplex, ISPF, and RMF. When this support is withdrawn, you will not be able to use msys for Setup for function enablement, setup, or configuration of these areas of z/OS. The DB2 V8 msys for Setup plug-in is unaffected and remains available for setup and configuration of DB2. The TCP/IP plug-in will continue to be available for download via the Web and will no longer require msys for Setup. IBM intends to continue to deliver improvements to help with z/OS setup and configuration in the future.
- z/OS V1.7 is planned to be the last release to support the z/OS msys for Operations element. It is IBM's intent to remove the z/OS msys for Operations element from the release following z/OS V1.7. IBM plans to transition many of the current msys for Operations functions to a new user interface and infrastructure in a future release of z/OS.

For more information, and for all previously announced statements of direction affecting z/OS V1.7 and future releases, visit http://www.ibm.com/servers/eserver/zseries/zos/zos_sods.html



Functions Planned to be Withdrawn *in the future*...

BIND DNS 4.9.3 (from Communications Server)	Base Element - implement BIND 9.2.0 as a replacement (available since z/OS R4)	Future
OROUTED (from Communications Server)	Base Element - use OMPROUTE as the dynamic routing daemon	Future
English and Japanese panels from DFSORT	Priced Feature - no replacement offered	Future
Support for VSAM data sets with IMBED, REPLICATE, or KEYRANGE attributes (from DFSMS)	Base Element - plan to redefine any affected VSAM data sets. Use tool to assist in identifying affected VSAM data sets.	Future 
zFS multi-file system aggregates (from Distributed File Service)	Base Element - zFS compatibility mode aggregates will still be supported	Future

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Planned for removal in a future z/OS release

This section lists items that IBM has announced it intends to remove in a future z/OS release. 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.

- In a future release the support for BIND DNS 4.9.3 will be removed from Communications Server. Customers should implement BIND DNS 9.2.0 as a replacement. BIND DNS 9.2.0 is included in the product beginning with z/OS V1.4. Customers exploiting the Connection Optimization (DNS/WLM) feature of BIND 4.9.3 should investigate alternative solutions, such as the Sysplex Distributor function.
- In a future release the support for OROUTED will be removed from Communications Server. Customers should use OMPROUTE as their dynamic routing daemon.
- The English and Japanese ISPF panels will be removed from DFSORT in a future release. This limited function interactive facility will no longer be provided, and there will be no replacement.
- From DFSMS, support for the VSAM IMBED, REPLICATE, and KEYRANGE attributes will be withdrawn in a future release. No supported release of z/OS allows you to define new VSAM data sets with these attributes. Using them for existing data sets can waste DASD space and can often degrade performance. When this support is withdrawn, you will not be able to process data sets with these attributes. It is best to plan for this removal now, with the aid of a tool that will help you identified affected data sets.

A tool is available for download to help identify VSAM data sets that contain the obsolete attributes IMBED, REPLICATE, or KEYRANGE. It is available from the software server (<ftp://software.ibm.com>) in the s390/mvs/tools directory as IMBDSHIP.JCL.TRSD. This will need to be downloaded in binary format and untarsed using TRSMMAIN. Note that this tool is provided as is. Instructions for use of the tool are included in the downloaded JCL.

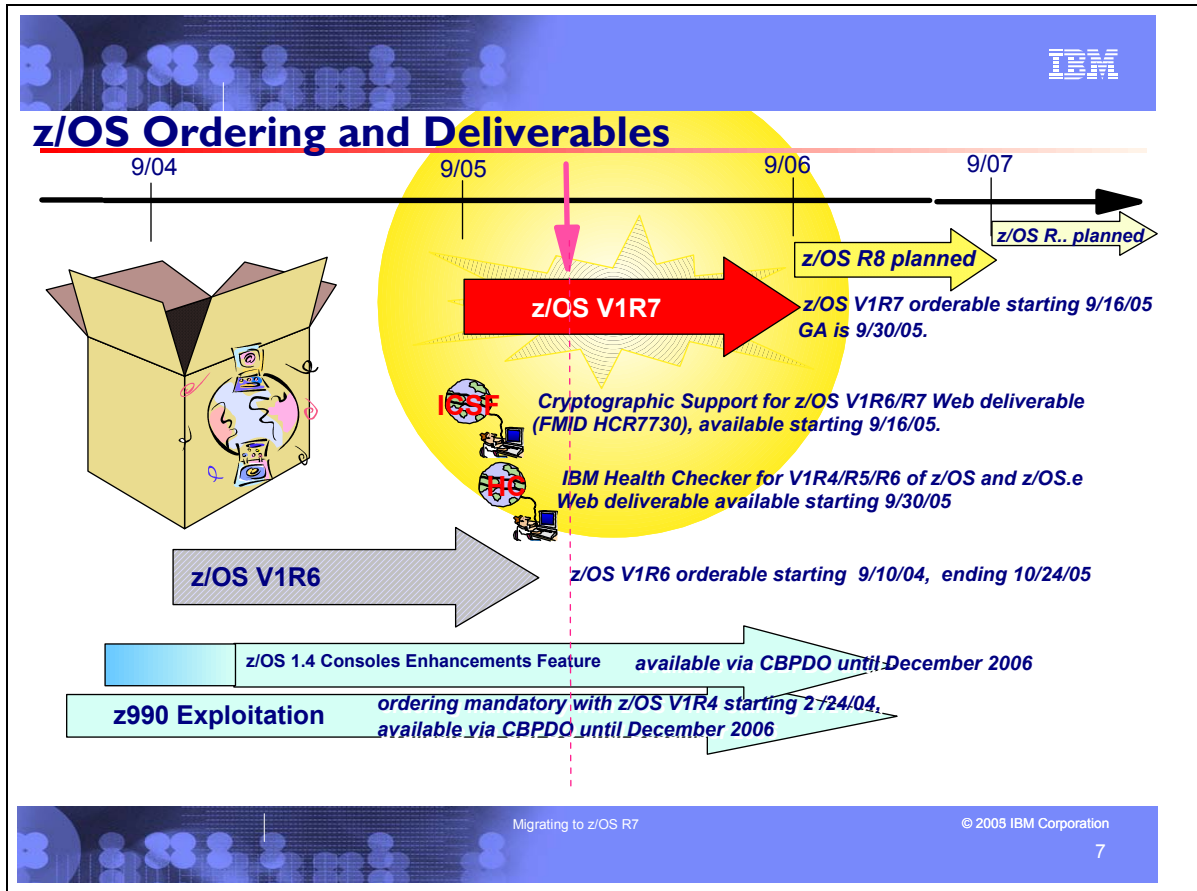
Note that while no announcement has been made of the specific date or release that data sets with these attributes will no longer be able to be opened, it would be prudent to use this tool to identify the data sets in your installation and begin converting them to versions that do NOT contain these attributes. IMBED and REPLICATE were intended as

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performance improvements which have been obsoleted by newer cached DASD devices. Striped data sets provide much better performance than KEYRANGE, and should be viewed as a candidate for any existing KEYRANGE data sets.

- In a future release, IBM plans to withdraw support for zFS multi-file system aggregates. When this support is withdrawn, only zFS compatibility mode aggregates will be supported. (A zFS compatibility mode aggregate has a single file system per data set.)

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z/OS Ordering and Deliverable Key Dates

Key Dates for z/OS R6 and z/OS R7:

- **September 10, 2004:** First date for ordering z/OS V1.6 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 24, 2004:** z/OS V1.6 general availability via ServerPac, CBPDO and SystemPac.
- **September 24, 2004:** General availability of z990 and z890 Enhancements to Cryptographic Support Web Deliverable for z/OS V1.6 and z/OS.e V1.6. This support is in addition to the previously available support for z/OS V1R2/R3/R4/R5, z/OS.e V1R3/R4/R5, and OS/390 V2.10, which became generally available on May 28, 2004.
- **December 17, 2004:** General availability of ICSF 64-bit Virtual Support for z/OS V1R6 and z/OS.e V1R6 Web deliverable.
- **July 26, 2005:** z/OS V1.7 CFSW configurator support for stand-alone path (5694-A01) and price proposal support.
- **September 15, 2005:** Last date for Web download of the ICSF 64-bit Virtual Support for z/OS and z/OS.e V1R6 Web deliverable. It is being replaced by the Cryptographic Support for z/OS V1R6/R7 and z/OS.e V1R6/R7 Web deliverable.
- **September 16, 2005:** Planned general availability of Cryptographic Support for z/OS V1R6/R7 and z/OS.e V1R6/R7 Web deliverable. This Web deliverable will support z/OS and z/OS.e V1.6 and V1.7.
- **September 16, 2005:** First date for ordering z/OS V1.7 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 16, 2005:** Withdrawal of the 4mm media feature code support and the z/OS V1.6 Optional Source Code features.
- **September 30, 2005:** z/OS V1.7 planned general availability via ServerPac, CBPDO and SystemPac.
- **September 30, 2005:** Planned general availability of IBM Health Checker for V1R4/R5/R6 of z/OS and z/OS.e Web deliverable. This Web deliverable will support z/OS and z/OS.e V1.4, V1.5, and V1.6.

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- **September 30, 2005:** Planned removal of z/OS and z/OS.e Text Search Web deliverable. For more information, refer to the DB2 UDB Text Extender Web support site:
<http://www.ibm.com/software/data/db2/extendertext/te390/support.html>
- **October 11, 2005:** Recommended last date for submitting z/OS V1.6 orders for ServerPac, SystemPac and CBPDO. This date will allow for adequate order processing time.
- **October 24, 2005:** Last date for ordering z/OS V1.6 via ServerPac, SystemPac and CBPDO.
- **December 2006:** Last date for ordering z/OS V1R4 z990 Exploitation Support feature and z/OS V1R4 Consoles Enhancements feature.

Typically, when one z/OS release becomes orderable in ServerPac, SystemPac, and CBPDO, the previous release is no longer orderable. Since each release of z/OS can normally be ordered only until the next release of z/OS becomes orderable, it is very important that you order the z/OS release you need for migration and coexistence while still available.

z/OS R7 Coexistence

z/OS
R3


z/OS
R4

z/OS
R5

z/OS
R6

z/OS
R7

z/OS
R8



- **Starting with z/OS R6, IBM has aligned the coexistence, fallback, and migration policy with the service policy.**
 - z/OS R4, z/OS R5, z/OS R6, and z/OS R7 are supported for coexistence, migration, and fallback
 - Prepare now! The lowest release planned for coexistence, migration, and fallback support on z/OS R8 is z/OS R5. If you are on z/OS R4 you should be planning for your migration to z/OS R7!
- **Only JES2/JES3 that can coexist with the shipped JES can be "staged" on z/OS. This is enforced in z/OS V1 R7. That means:**
 - z/OS R4 JES2 thru z/OS R7 JES2 are supported for coexistence, migration, and fallback
 - z/OS R4 JES3 thru z/OS R7 JES3 are supported for coexistence, migration, and 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.

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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 R7 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 V1R7 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 V1R7 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.

Migrating to z/OS R7

- 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 V1R7 is coexistence, fallback, and migration supported with the following four z/OS releases: V1R6, V1R5, and V1R4.** This means that:

- Coexistence of a V1R7 system with a V1R6, V1R5, or V1R4 system is supported.
- Fallback *from* V1R7 to V1R6, V1R5, or V1R4 is supported.
- Migration *to* V1R7 *from* V1R6, V1R5, or V1R4 is supported.

For JES2 and JES3, the way in which four 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 V1R7 JES2 and JES3 are coexistence, fallback, and migration supported with the following JES releases: V1R6-V1R5 (both are functionally equivalent), and V1R4.**

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 V1R4 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)
R4	R4, R3, R2, R1, and OS/390 R10	According to the old policy, four consecutive releases are supported for coexistence, fallback, and migration. Also, OS/390 R10 and z/OS R1 count as one release.
R5	R5, R4, R3, R2	According to the old policy, four consecutive releases are supported for coexistence, fallback, and migration.
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 is 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.

Migrating to z/OS VR7

R8	R8, R7, R6, R5	Planned general availability of R8 is September 2006. R4 is planned to be 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. However, R4 is not planned to be coexistence, fallback, and migration supported with R8. Therefore, R5 becomes the oldest release that is coexistence, fallback, and migration supported with R8.
R9	R9, R8, R7	Planned general availability of R9 is September 2007. R7 is planned to be the oldest release that is service supported at that time and therefore the oldest release that is coexistence, fallback, and migration supported with R9.


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.

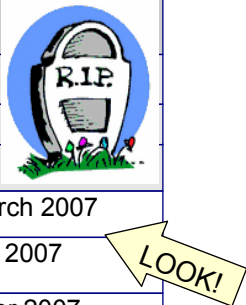


z/OS Service Policy

- ▶ Release serviceable for three years following GA
- ▶ Service on last release of a version might be extended
- ▶ At least 12 months notice before withdrawing service
- ▶ Handy website: http://www.ibm.com/servers/eserver/zseries/zos/support/zos_eos_dates.html



	General Availability	Service Expiration
OS/390 V2 R10	29 September 2000	30 September 2004
z/OS V1 R1	30 March 2001	31 March 2004
z/OS V1 R2	26 October 2001	31 October 2004
z/OS V1 R3	29 March 2002	31 March 2005
z/OS V1R4	27 September 2002	Announced to be 31 March 2007
z/OS V1R5	26 March 2004	Planned to be 31 March 2007
z/OS V1R6	24 September 2004	Planned to be September 2007
z/OS V1R7	30 September 2005	Planned to be September 2008



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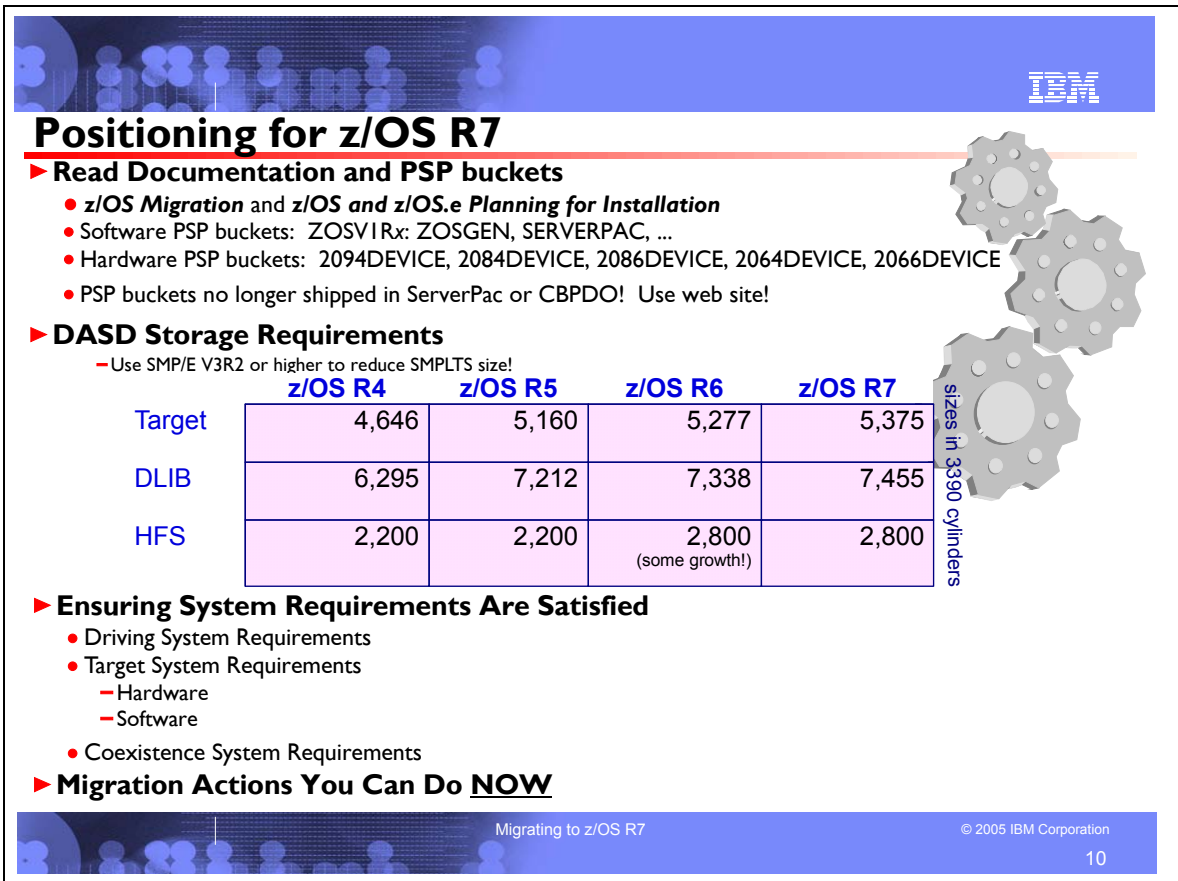
Service Policy

IBM's current policy is to provide maintenance (service) for each release of z/OS for three years following their 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, such as the z/OS V1R4 enhancements that were provided to support the z990 server.

See the table below for expiration dates for service support. Planned EOS 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	31 March 2007 (announced) Note: This is 18 months longer than the normal three-year service period.
z/OS V1R5	26 March 2004	31 March 2007 (planned)
z/OS V1R6	24 September 2004	September 2007 (planned)
z/OS V1R7	30 September 2005	September 2008 (planned)

Check out http://www.ibm.com/servers/eserver/zseries/zos/support/zos_eos_dates.html for a handy list of all end of service dates (back to MVS/ESA V4!).



Positioning for z/OS R7

- ▶ **Read Documentation and PSP buckets**
 - *z/OS Migration* and *z/OS and z/OS.e Planning for Installation*
 - Software PSP buckets: ZOSV1Rx: ZOSGEN, SERVERPAC, ...
 - Hardware PSP buckets: 2094DEVICE, 2084DEVICE, 2086DEVICE, 2064DEVICE, 2066DEVICE
 - PSP buckets no longer shipped in ServerPac or CBPDO! Use web site!
- ▶ **DASD Storage Requirements**
 - Use SMP/E V3R2 or higher to reduce SEMPLTS size!

	z/OS R4	z/OS R5	z/OS R6	z/OS R7
Target	4,646	5,160	5,277	5,375
DLIB	6,295	7,212	7,338	7,455
HFS	2,200	2,200	2,800 (some growth!)	2,800

sizes in 3390 cylinders
- ▶ **Ensuring System Requirements Are Satisfied**
 - Driving System Requirements
 - Target System Requirements
 - Hardware
 - 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 V1 R7.0 Introduction and Release Guide (GA22-7502)*
- *z/OS and z/OS.e V1R7 Planning for Installation (GA22-7504)*
- *zSeries Platform Test Report for z/OS and Linux Virtual Servers* (formerly, the *z/OS Parallel Sysplex Test Report*)

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

- ServerPac (if using ServerPac to install)
- z/OS and individual elements
- Hardware

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).

Migrating to z/OS R7

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 R7 PSP bucket is ZOSV1R7. 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 ZOSV1R7 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:


- 2094DEVICE for the z9-109 server
- 2084DEVICE for the z990 server
- 2086DEVICE for the z890 server
- 2064DEVICE for the z900 server
- 2066DEVICE for the z800 server

DASD Storage Requirements


If you are migrating to z/OS R7 from z/OS R4 or you will have a different product set than your previous release, you will see increased need for DASD. How much more depends on what levels of products you are running. Keep in mind the DASD required for your z/OS system includes (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.


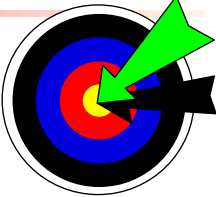
The total storage required for z/OS data sets is listed in the space table in the *z/OS Program Directory* and *z/OS and z/OS.e Planning for Installation*.

For z/OS R7: The total storage required for all the target data sets is 5,375 cylinders on a 3390 device. The total storage required for all the distribution data sets listed in the space table is 7,455 cylinders on a 3390 device. The total HFS storage is 2,800 cylinders on a 3390 device for the ROOT HFS and 50 cylinders for the /etc HFS. The total storage required for the SMP/E SMPLTS is 0 3390 cylinders (there are no load modules in z/OS R7 that are both cross-zone and use CALLLIBs, thus the SMPLTS is not needed for permanent storage).



Target System Requirements for z/OS R7

- ▶ **Software Requirements**
 - Coexistence Software (on Other Target Systems)
 - Correct Levels of IBM Non-z/OS and Non-IBM Products
 - Functional Requirements
 - z/OS R7 must run in z/Architecture mode (...since z/OS R6)
 - Some functions (like zAAP) require z990 or z890 at least
 - VM Guest considerations
 - **Only on z800 or z890: cannot IPL z/OS under an LPAR named ZOSExxxx (includes as a VM guest).**
 - (z/OS R6's Dynamic LPAR Rename function on z890 can help here!)
- ▶ **Hardware Requirements**
 - Processor Requirements:
 **an IBM @server zSeries z9-109, z990, z890, z900, or z800**
 - Coupling Facility: see <http://www.ibm.com/eserver/zseries/psocftable.html>



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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 and z/OS.e 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 do any of the following:

- Use the self-service Internet application ShopzSeries: <http://www.ibm.com/software/shopzseries>
- Use the product catalogs (order checklists). For z/OS <http://www.ibm.com/eserver/zseries/software/swinfo/os390.htm>
- Access the software configurator used in your country, select the z/OS environment, and then select ServerPac, CBPDO, or SystemPac.
- Refer to *z/OS and z/OS.e Planning for Installation Appendix C, Minimum Releases of IBM Software Products That Run with z/OS and z/OS.e*

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.

If you're migrating to z/OS V1R7, 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/eserver/zseries/solutions/s390da/>

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>

Note that you can use SystemPac to get some ISV products on system delivery vehicles with IBM products. For a list of selectable ISVs with SystemPac, see: <http://www.ibm.com/ca/custompac/>

VM Guest Considerations

Migrating to z/OS R7

z/OS can run as a VM guest. Requirements are:

- Must be on a z9-109, z990, z890, z900, or z800 server: VM must be z/VM (not VM/ESA). Furthermore,
 - if a z9-109 or z990 server, the z/VM PTF for APAR VM63124 must be installed.
 - If a z800 or z890 server, then z/OS.e can run as a VM guest. The server must be a z800 or z890, VM must be z/VM, z/VM and z/OS.e must operate in z/Architecture (64-bit) mode, z/VM and z/OS.e must run in a logical partition (LPAR), and the LPAR must be named ZOSExxxx (where xxxx is any valid combination of zero to four characters). The LPAR name restriction ensures compliance with z/OS.e license terms, which prohibit z/OS and OS/390 from running in a z800 or z890 LPAR named ZOSExxxx. (Linux for S/390 and Linux for IBM @server zSeries are the only other operating systems that may run as a guest under z/VM in an LPAR named ZOSExxxx.) z/OS.e licensees are required to submit data to IBM that shows LPAR names. (The ZOSExxxx LPAR name restriction is only applicable to z800 and z890 servers, not other servers. The Dynamic LPAR Rename function available on z890 can assist you with this requirement.)

Target System Hardware Requirements

The minimal hardware requirements for z/OS, as well as additional hardware needed by specific z/OS elements and features is documented in *z/OS and z/OS.e Planning for Installation*. **Remember, z/OS V1R7 runs only in z/Architecture mode, and only on z9-109, z990, z890, z900 or z800 servers.**




Identifying Processor Requirements

z/OS V1R7 runs on the following IBM @server zSeries servers (or their equivalents):

- IBM @server zSeries 9109 (z9-109)
- IBM @server zSeries 990 (z990).
- IBM @server zSeries 890 (z890).
- IBM @server zSeries 900 (z900).
- IBM @server 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/psa/cftable.html>.



Migrating to z/Architecture

- ▶ **This will allow you to exploit:**
 - 64-bit architecture (z/Architecture), Intelligent Resource Director, HiperSockets, ...
- ★ **Bimodal Migration accommodation allows you to use a "safety net" to z/Architecture, when coming from z/OS R4**
- ▶ **Recommended scenarios follow, based on:**
 - need to exploit new architecture
 - level of existing hardware and level of existing software
 - migration flexibility
 - ★ *minimizing change (hardware, software, and architecture) is recommended*
- ▶ **Typical Migration Paths to z/OS R7 from z/OS R4:**
 - Hardware First (**recommended!**)
 - Software First from G5/G6/MP3000 (**disallowed!**)

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Deciding Which to Migrate First - SW (from z/OS R4 to R7) or HW (to z9-109, z990, z890, z900, or z800)

The IBM @server z9-109, z990, z890, z900, and z800 servers support the 64-bit architecture, z/Architecture. When you run z/OS on a z9-109, z990, z890, z900, or z800 server in z/Architecture mode you can take advantage of all that this software/hardware combination has to offer, such as:

- Intelligent Resource Director (IRD), which dynamically manages processor and channel resource utilization across LPARs based on workload priorities. IRD combines the strengths of LPARs, Parallel Sysplex, and workload manager (WLM).
- HiperSockets, which allows high-speed connectivity between LPARs without any physical cabling (providing a "TCP/IP network in the system").
- 64-bit real and virtual storage support, which provides relief from the constraint of the 2 GB real and virtual storage limit of ESA/390 architecture and eliminates the overhead of page movement from central storage to expanded storage.

Depending on your current environment, a migration can involve a software upgrade to z/OS R7, a hardware upgrade to a z9-109, z990, z890, z900, or z800 server, and a change in architecture from ESA/390 to z/Architecture. In addition, you might choose to change your terms and conditions -- from Parallel Sysplex License Charges (PSLC) pricing to Workload License Charges (WLC) pricing. Factors to consider when deciding whether to upgrade your software or hardware first are:

- Existing plans and commitments.
- Architectural level set requirement since z/OS R6, to run on z9-109, z990, z890, z900, or z800 in z/Architecture mode.
- Timing of capacity requirements and new functions (hardware and software).
- Once a z9-109, z990, z890, z900, or z800 server is installed, how soon you want to exploit the new architecture and how prepared you are for WLC pricing. (Refer to *z/OS Planning for Workload License Charges*.)
- The level of existing software.
- The level of existing hardware.
- Your test environment.
- Your disaster recovery environment.

Also consider how much change (and risk) you want to make (or accept) at any given upgrade. Some factors are:

Migrating to z/OS R7

- The ability to schedule multiple upgrade windows. If scheduling upgrades is not a problem for your applications, you might want to minimize the amount of change (risk) and make several small hardware or software changes. However, if because of testing, application availability, or other factors you get only two upgrade opportunities a year, you might want to limit those to one hardware and one software change.
- The ability to back out from a given change. While it is normal to plan for backout from a processor change, architecture change, or a new operating system level, you might not want to do more than one at a time.
- How important it is to you to have similar test and production environments, and a similar disaster recovery environment (for example, in terms of hardware, software, and architecture levels). Disaster recovery environments should mirror as closely as possible their associated production environments. Therefore, plans for your disaster recovery systems should include upgrading the hardware to support z/Architecture once your production environment supports it.

As you will see, you have some flexibility when migrating to z/OS R7 on a z9-109, z990, z890, z900, or z800 server. The optimal migration path will not be the same for every customer. The topics that follow will help you determine the best migration path for you.


Recommended Migration Paths to z/OS R7: Hardware First

Use the following general outline for migrating from z/OS V1R4 on a G5, G6, or Multiprise 3000 server to z/OS V1R7 on a z9-109, z990, z890, z900, or z800 server:

1. Download and install the z/OS V1R2/3/4 Bimodal Migration Accommodation on your old system. Your old system will still run in ESA/390 (31-bit) mode.
2. Install (if necessary) the appropriate software support for your server. Refer to the corresponding PSP bucket for any newly identified required service.
3. Upgrade to a z9-109, z990, z890, z900, or z800 server. When you IPL your old system (z/OS V1R4) on the new server, your system will still run in ESA/390 mode if you specify ARCHLVL 1 in parmlib member LOADxx.
4. Migrate to z/Architecture mode within the terms and conditions of the Bimodal Migration Accommodation (that is, within 6 months of licensing z/OS to that new server), first by specifying ARCHLVL 2, then by removing ARCHLVL and allowing it to default.
5. Install z/OS V1R7 using ServerPac, CBPDO, or SystemPac. When you IPL z/OS V1R7, your system will come up in z/Architecture (64-bit) mode.

Disallowed Migration Path to z/OS R7: Software First from G5/G6/MP3000

You **cannot** use this path for migrating from z/OS V1R4 on a G5, G6, or Multiprise 3000 server to z/OS V1R7 on a z9-109, z990, z890, z900, or z800 server. The reason is that z/OS V1R7 will not IPL on a G5, G6, or MP3000 server. Thus, the Hardware First Migration Path is recommended when migrating from a G5, G6, or MP3000 server.

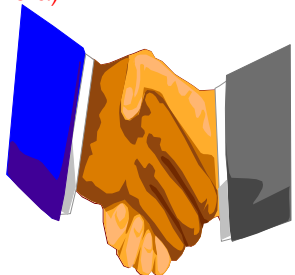


Coexistence System Requirements for z/OS R7 from z/OS R4

► Documented in z/OS Migration

► **From z/OS R4 Coexistence PTFs for z/OS R7:**

- ◆ **BCP** - GRS, RRS, Console, Program Binder, XCF, z990, System Logger, Allocation
- ◆ **Communications Server** - z990
- ◆ **DFSMS** - dfp, hsm, and rmm, and ICKDSF support
- ◆ **Distributed File Service** - zFS (*Notice, OAI 1573 didn't make the book, is in PSPs!*)
- ◆ **HCD** - V5 IODF sharing support,
- ◆ **JES2** - for MAS support down to z/OS R4 JES2
- ◆ **JES3** - for multisystem complex support down to z/OS R4 JES3
- ◆ **Language Environment** - downward compatibility
- ◆ **NFS** - SMF records, mount handle data set coexistence
- ◆ **RMF** - z990
- ◆ **SDSF** - Console
- ◆ **SMP/E** - toleration of z/OS R7 (SMP/E V3R4) enhancements



◆ **From z/OS R5 or R6 Coexistence PTFs for z/OS R7:**

- ◆ Found in the Appendix of your handout...

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Coexistence Service Requirements for z/OS Release 7

To understand the Coexistence-Fallback-Migration policy for z/OS, and which releases are supported with z/OS V1 R7, see the Coexistence section of this presentation. Listed below are the coexistence and fallback service, for installation on an z/OS V1R4 system for z/OS V1R7. For a list of the coexistence service on z/OS V1R5 and z/OS V1R6 for z/OS V1R7, see Appendix B of this presentation.

Apply on z/OS V1R4, the coexistence and fallback service (PTFs) listed in the table below:

Element or feature, and reason PTFs are needed	z/OS V1R4 PTFs
BCP, Communications Server, RMF: Allows a z/OS V1R4 system to coexist with a z/OS V1R5 or later system that runs on a z9-109, z990, or z890 server.	UA01785, UA02025, UA02173, UA02178, UA90002 (if Japanese), UA90003, UQ74992
BCP, SDSF: In z/OS V1R5, a console enhancement minimizes the possibility of outages due to exhaustion of system resources used for messaging. The PTFs allow back-level systems to tolerate the enhancement.	BCP PTFs UA05642 and UA06654, SDSF PTF UQ79592
BCP: Prevents the depletion of private storage in the console address space on a receiving system when a large number of WTO/R messages are received on that system from other members of a sysplex.	UA07959, UA07962 (if the Consoles Enhancements feature is installed)
BCP: Increased CPU utilization in the console address space might be reported on all systems in a sysplex after introducing a z/OS V1R4 system with the z/OS V1R4 Consoles Enhancements feature, or later-level system, into the sysplex. The coexistence PTFs prevent heavy message traffic on the z/OS V1R7 system from impacting the other systems in the sysplex.	UA16509, UA16511 (if the Consoles Enhancements feature is installed)
BCP: A lower-level system in a sysplex can receive messages from a z/OS V1R6 or later system with a console ID of 0 and an area ID specified. The coexistence PTFs allow the lower-level receiving system to handle the messages correctly.	UA09332, UA09334 (if the Consoles Enhancements feature is installed)

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BCP: Allows a z/OS V1R4 system with the Consoles Enhancement feature installed to correctly handle blank WTOs issued to another system.	UA09963
BCP: Produces an informative message when the z/OS V1R4 or earlier version of the program management binder is used to try to rebind incompatible program objects created in z/OS V1R5 or later. The PTF detects when the program object level of the V1R5 object is incompatible with back-level capabilities and produces an error message. Without the PTF, there might be a misleading error message or abend.	UA02566
BCP: APARs OA05025 (PTF UA07360) and OA05391 together provide corrective service for XCF recovery from partial writes to couple data sets. APAR OA05391 introduces a new format for couple data set multi-subrecord check records (MSRCRs), which is required for recovery from partial writes to certain types of couple data set records. APAR OA05025 includes coexistence support that enables systems on which it is installed to interpret the new MSRCR format. Because both APARs have been incorporated into z/OS V1R6 and later, all other systems in the sysplex must be capable of interpreting the new MSRCR format before any V1R6 or later system can be IPLed into the sysplex. V1R5 systems include support for interpreting the new MSRCR format and do not require installation of additional maintenance to provide this capability. You must IPL all other systems in the sysplex with the appropriate PTF for APAR OA05025 (PTF UA07360 for V1R4) before IPLing any V1R6 or later system into the sysplex. Rolling IPLs are sufficient to install the PTFs for APARs OA05025 and OA05391. Note that the recovery provided by these two PTFs is not completely effective until all systems in the sysplex, including z/OS V1R5 systems, have been IPLed with both PTFs or with V1R6 or later.	UA07360 and, if Japanese, UW95504
BCP: z/OS V1R6 has a new 64-bit global resource serialization (GRS) ISGQUERY application programming interface (API). The PTF allows a z/OS V1R4 system to tolerate ISGQUERY requests from a z/OS V1R6 or later system.	UA09225
BCP: GRS APAR OA11383 provides compatibility support for the corrected GRS ISGLOCK structure rebuild processing in APAR OA11147 which is contained in z/OS V1R7. OA11383 MUST be installed and IPLed on EVERY system in the sysplex before installing and IPLing z/OS V1R7 on ANY system in the SYSPLEX.	UA18540
BCP: Allows a z/OS V1R4 system to tolerate new resource recovery services (RRS) restart function in z/OS V1R6 (and later).	UA09402, UA09424
BCP: Starting in z/OS V1R6, the sysplex couple data set (CDS) can be expanded to allow up to 2047 members in a cross-system coupling facility (XCF) group. This is an increase from the previous maximum of 1023 members per XCF group. Formatting a couple data set for more than 1023 members per group creates a Version 4 CDS. The PTF rolls back this function to z/OS V1R4. In terms of coexistence, it provides support for Version 4 sysplex CDSs on z/OS V1R4. This is important because all systems in a sysplex must support Version 4 sysplex CDSs to bring a Version 4 sysplex CDS into use, and once a sysplex is using a Version 4 sysplex CDS, a system that does not support Version 4 sysplex CDSs cannot join the sysplex.	UA09966
BCP: A z/OS V1R7 system cannot join a sysplex of lower-level systems, and a lower-level system cannot join a sysplex of z/OS V1R7 systems, without this PTF.	UA16035, UA16037 (if the Consoles Enhancements feature is installed)
BCP: z/OS V1R7 introduces the logger log stream DUPLEXMODE(DRXRC) specification. If DUPLEXMODE(DRXRC) is specified in a z/OS V1R7 system in a sysplex, and prior releases are running in the same sysplex, the PTF must be installed. If DUPLEXMODE(DRXRC) is not specified, installing the PTF is not required but is nevertheless recommended to avoid any complications if the configuration changes.	UA17177
BCP: Allows a pre-z/OS V1R7 system to use an IODF that was created using z/OS V1R7 HCD.	UA17026
BCP: DSNTYPE=LARGE data sets are only supported by z/OS V1R7. The coexistence PTF causes z/OS to detect the accidental specification of such a data set for stand-alone dump output and to reject its use, as has been previously done for such data set organizations as a PDS.	UA18497

Migrating to z/OS VR7


Communications Server: Allows a z/OS V1R4 system to coexist with a V1R7 system.	UA11849
BCP, DFSMSdftp, DFSMSdsss, DFSMSShsm, DFSMSRmm: In z/OS V1R6, a new function introduced by PTF UA90124 enables DFSMS software support for IBM TotalStorage Enterprise Tape System 3592 and the media types MEDIA6, MEDIA7, and MEDIA8. Coexistence PTFs listed here allow a V1R4 system to coexist with a V1R6 or later system that uses this function.	UA90083, UA90089, UA90093, UA90098, UA90099
DFSMSdftp: Before z/OS V1R5, a striped, extended-format sequential data set could be allocated with a maximum of 16 stripes, which limited the maximum data set size to 16 volumes. Beginning with z/OS V1R5, an extended-format sequential data set can have a maximum of 59 stripes and, thus, a maximum of 59 volumes. This PTF allows a back-level system to read or write to an extended-format sequential data set with more than 16 stripes. However, the back-level system cannot allocate a data set with more than 16 stripes.	UW87192
DFSMSdftp: Allows users on z/OS V1R4 systems to read and write non-VSAM extended format data sets with more than 16 stripes. Although such data sets can only be allocated with more than 16 stripes on z/OS V1R5 or later, they can be accessed for read and write on back-level systems.	UA09049
DFSMSdftp: Object Access Method (OAM) now expires object tape volumes and expires tape and optical volumes that belong to object backup storage groups. This function significantly reduces the amount of private storage that the OAM address space uses at larger installations. This PTF enables back-level OAMs to coexist in an OAMplex with OAMs at the z/OS V1R5 level.	UW94336
DFSMSdftp: Allows DFSMSdftp to tolerate the support in ICKDSF R17 and DFSMS for reindexing online volumes.	UA03391
DFSMSdftp: z/OS V1R6 has a new PDSE address space, SMSPDSE1, which is restartable. The coexistence PTFs allow a z/OS V1R4 system to coexist with a z/OS V1R6 or later system that is exploiting the new address space.	UA09832, UA10775
DFSMSdftp: ICKDSF R17 (equivalent to the level in the z/OS V1R4 z990 Compatibility Support feature) removed the requirement to have volumes varied offline to all other OS/390 or z/OS systems sharing the volumes when building indexes or refreshing, extending, or building new VTOCs. However, before implementing this function, you must apply these coexistence PTFs to all sharing z/OS V1R4 systems.	UA01753, UA03391, UW95817
DFSMSdftp: Allows a z/OS V1R4 system to tolerate the 64-bit POSIX time support in z/OS V1R6 and later by converting values to the 32-bit format.	UW85576
DFSMSdftp: An enhancement in the z/OS V1R7 Object Access Method (OAM) component introduces a new valid value ("R") for the object location in the object directory to indicate that the object resides on DB2 disk in recalled status. This PTF enables pre-z/OS V1R7 OAMs to coexist in an OAMplex with OAMs at the z/OS V1R7 level.	UA16993
DFSMSdftp: As part of VSAM extent constraint removal in z/OS V1R7, these PTFs prevent pre-z/OS V1R7 systems from opening data sets that have more than 255 extents. Also, if a data set is open and a z/OS V1R7 job extends it past 255 extents, the close on the pre-z/OS V1R7 system fails. Finally, these PTFs prevent conversion of a data set having more than 255 extents from being converted by DFSMSdsss to a non-SMS managed data set on pre-z/OS V1R7 releases.	UA14882, UA16223, UA16796
DFSMSdftp: z/OS V1R7 supports new QNAME and RNAME parameters for VSAM RLS. The coexistence PTFs prevent serialization problems from occurring when the new parameters are used in a GRS complex that includes a pre-z/OS V1R7 system.	UA16633, UA16922, UA17234
DFSMSdftp, DFSMSShsm, DFSMSRmm: In z/OS V1R5, the maximum value of the file sequence number for a data set on a tape volume increased from 9999 to 65 535 for IBM standard label (SL) tapes, unlabeled (NL) tapes, and bypass label processing (BLP). This PTF causes a message and abend if a tape data set with file sequence number greater than 9999 is attempted to be opened on a back-level system.	UW88886
DFSMSdftp, DFSMSShsm: In z/OS V1R5, DFSMSShsm was enhanced to use volume-level fast replication to create backup versions for sets of storage groups. A set of storage	UA07442, UW95453

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groups is defined through an SMS construct termed "copy pool". The coexistence PTFs prevent back-level versions of DFSMSHsm from processing target volumes in the copy pool backup storage group. The DFSMSHsm recovery of fast replication backups is not available on systems before V1R5. If you must back out of V1R5 to an earlier release, you can use the DFSMSdss COPY command to recover individual volumes.	
DFSMSdfp: z/OS V1R7 supports large format sequential data sets. These PTFs cause pre-z/OS V1R7 systems to issue ABEND 213-14 or 213-16 if a program attempts to open data sets that cannot work on those systems.	UA15869, UA16550
DFSMSdss: z/OS V1R7 supports large format sequential data sets. These PTFs cause pre-z/OS V1R7 systems to issue ABEND213-14 for any large format dump data sets that are provided as input to RESTORE or COPYDUMP, or output for DUMP and COPYDUMP. If DFSMSdss encounters any large format sequential data sets as input to logical data set COPY, logical and physical data set DUMP and RESTORE, data set print, or logical and physical data set RELEASE, the data set will fail with ADR878E rsn 17.	UA16796
DFSMSHsm: z/OS V1R7 supports large format sequential data sets. The PTFs cause pre-z/OS V1R7 systems that might potentially recall, recover, or ARECOVER a data set to first verify that the data set is not a large format data set. If it is, an error message is issued describing the reason for the failure.	UA16796, UA16951
DFSMSHsm: z/OS V1R7 supports large format sequential data sets. In an HSMplex with more than one DFSMSHsm host, take care when migrating the journal to a large format sequential data set. All DFSMSHsm hosts within an HSMplex must be at z/OS V1R7 before you can migrate the journal to a large format sequential data set. With the PTFs, when a pre-z/OS V1R7 DFSMSHsm host attempts to open a journal, if the journal is a standard format data set, DFSMSHsm initialization continues. If the journal is a large format data set, message MSGARC0509E with the "LARGE" text in the message is issued and DFSMSHsm is stopped. If the journal is a striped data set, message MSGARC0509E with the "STRIPED" text in the message is issued and DFSMSHsm is stopped. If the ARCBJRN utility attempts to use a large format journal data set, it is ended with return code RC40, which indicates an OPEN error.	UA15869, UA16550, UA16954
DFSMSHsm: z/OS V1R6 and later allow multiple secondary space management (SSM) tasks to run concurrently. The PTF allows a z/OS V1R4 system to tolerate this SSM multitasking.	UA09618
DFSMSHsm: z/OS V1R7 supports fast subsequent migration (FSM) of data sets. The PTFs cause DFSMSHsm to set the appropriate flags during recall processing so that if the data set is later opened for output by either z/OS V1R7 systems or pre-z/OS V1R7 systems, the flags used for reconnection determination are set appropriately.	UA16849, UA16857, UA16860, UA16944
DFSMSHsm: z/OS V1R7 increases the number of data set names supported in a tape table of contents (TTOC). If a system that has the coexistence PTF installed finds that the OCDS RECORDSIZE is 6144 bytes, which indicates that some instances of DFSMSHsm in the HSMplex might be using the extended TTOC, then tape operations on that level of DFSMSHsm are inhibited.	UA16947
DFSMSrmm: Backup at anytime is an enhancement in z/OS V1R5. Coexistence service prevents the failure of inventory management when a backup that uses this enhancement starts on a lower-level system.	UA03299, UA90010, UA90011, UA90012 (if Japanese), UW92622, UW92623 (if Japanese), UW94636, UW95741
Distributed File Service: Allows pre-z/OS V1R7 systems to tolerate new characters (@#)\$ allowed in z/OS V1R7 for zFS file systems and aggregates.	UA14531
Distributed File Service: Allows releases to correctly access the new structure in z/OS V1R7 (version 1.4) for zFS aggregates. If you do not install toleration APAR OA11573 on prior releases, prior releases will not be able to correctly access the new structure.	PTF for APAR OA11573
HCD: Provides support for HCD users who share IODF data sets between pre-z/OS V1R7 systems and z/OS V1R7 systems.	PTF for APAR OA07875
JES2: Allows z/OS V1R4 JES2 to run with z/OS V1R7 JES2 in a multi-access spool	UA03828, UA09500,

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(MAS).	UA90160
JES2: Fixes a problem on a receiving z/OS V1R4 node that can occur in a rare situation with a large scheduler work block text unit (SWBTU). Data sets have a large SWBTU when MAILTO, MAILCC, and MAILBCC keywords are used in addition to other keywords on OUTPUT JCL statements. The problem is caused by APAR OA09152 (PTF UA16213 on z/OS V1R4 JES). This is a network-specific problem, not a MAS-specific problem.	UA16216
JES3: Allows z/OS V1R4 JES3 to run with z/OS V1R7 JES3 in a multisystem complex.	UA04010, UA07715
Language Environment: Detects attempts to use a new suboption on back-level releases that do not support it. This coexistence service is necessary to support downward compatibility for Language Environment.	UQ78072
Language Environment: The /etc/utmpx file contains a user accounting database. In z/OS V1R6, the format of the records in the file was extended to support longer remote host names, 64-bit timestamp structures, and a version indicator. The coexistence PTF prevents the standard interfaces in pre-V1R6 releases from accessing /etc/utmpx databases that use the new format, avoiding confusion and possible data corruption. Attempts to access a /etc/utmpx database in the new format from an earlier release return a null pointer. Applications can use perror() to print the error message.	UQ85891
NFS: Allows a pre-z/OS V1R7 NFS SMF report generator to process an SMF file that includes NFS V1R7 SMF records. Any records containing TCP/IP version 6 IP addresses will be ignored.	UA16682
NFS: Allows a pre-z/OS V1R7 NFS server to read a mount handle data set written by NFS V1R7.	UA19506
SMP/E: Allows back-level SMP/E to tolerate enhancements introduced in z/OS V1R5 SMP/E (which is equivalent to SMP/E V3R2).	UR53977, UR54450, UR54453 (if Japanese)
SMP/E: Provides support for SMP/E users who share SMPCSI data sets between pre-z/OS V1R7 systems and z/OS V1R7 systems.	UO00114

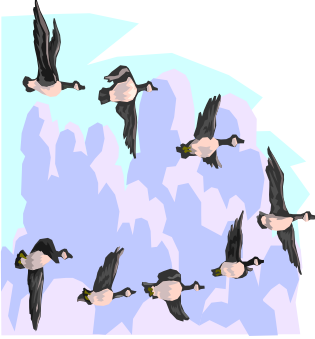


Elements with Migration Actions from z/OS R4 to z/OS R7

- ▶ **Documented in z/OS Migration**
 - For complete migration tasks for z/OS R7, see this book!
 - from R4 to R7, and R5 to R7, and R6 to R7
 - "When behaviors aren't the same anymore, migration actions are called for."

- ▶ **From z/OS R4 to z/OS R7:**

<ul style="list-style-type: none">– BCP◆ Communications Server◆ Cryptographic Services– DFSMS◆ DFSORT– HCD◆ HLASM◆ ICKDSF◆ Infoprint Server◆ Integrated Security Services◆ ISPF	<ul style="list-style-type: none">→ JES2◆ JES3◆ Language Environment◆ Library Server◆ NFS (new!)◆ OSA/SF◆ RMF◆ SDSF◆ Security Server (RACF)◆ SMP/E◆ TSO/E→ XL C/C++◆ z/OS UNIX System Services
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- ▶ **Migration Actions that follow are divided by :**
 - ◆ **ELEMENT**, and then
 - ◆ **WHEN** you can do the action: Now, Pre-First IPL, or Post-First IPL

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Migration Actions for Elements Between z/OS V1 R4 and z/OS V1 R7

When migrating from z/OS V1 R4 to z/OS V1 R7, the specified elements have required migration actions. Refer to *z/OS Migration* for complete information on the required migration actions for all elements. Selected element migration actions follow in this presentation.

Migration Actions for z9-109, z990, and z890 Servers


For details on the migration actions required when running on, or in a sysplex with a system or CF image on a z9-109, z990 or z890 server, refer to the *z/OS Migration* book.



General Migration Actions from z/OS R4 to z/OS R7

► **Migration Actions You Can Do NOW:**


- Apply coexistence and fallback fixes **(Required)**
- Use SOFTCAP to identify the effect of capacity changes **(Recommended)**
- Find alternatives to removed elements and features **(Required-IF)**
- Upgrade Windows 95, 98, and NT clients **(Required)**
- Migrate from discontinued service delivery options **(Required-IF)** and Use SMP/E Internet Service Retrieval or ShopzSeries instead of SUF **(Required-IF)** - Refer session ZS130!
- Verify that you have enough XCF groups in your sysplex CDS and enough XCF members in your XCF groups **(Required-IF, as of R7)** - In z/OS R7, one add'l XCF group is used: IOEZFS. Reformat if you need to.

 **Update the CustomPac Installation Dialog **(Required-IF ServerPac)****
 - One time only! Follow instructions, and run the UPDATE job. Failure to do this will cause RECEIVE errors

- Update local invocations of the CustomPac Installation Dialog **(Required-IF ServerPac)**
 - Edit CPPCISF from local CLISTS to remove the ISPF4X(N) parameter


► **Migration Actions Pre-First IPL:**

- Set up your IPCS environment **(Required)**
 - Don't forget about new data set SYS1.SIEAMIGE, for SYSLIB, like SYS1.MIGLIB.
- Use IBM-supplied PARMLIB and PROCLIB **(Required)**
- Migrate /etc and /var system control files **(Required)** - NFS obsoletes some /etc files.
- Updated items affected by changed interfaces **(Required-IF)**
 - Example: IEASYSxx PAGTOTL default has changed from 5 to 40 in z/OS R5.
- Verify that virtual storage limits are set properly **(Required)** - Use MEMLIMIT parameter in SMFPRMxx for system-wide default above the bar (zero, if not specified). Can be overridden by specifying REGION= or MEMLIMIT on JOB or EXEC in JCL Use IEFUSI to set limits on virtual storage above the bar



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General Migration Actions from z/OS R4 to z/OS R7

► Continued from previous foil...

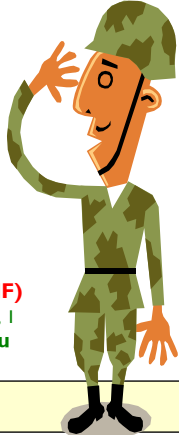
► **Migration Actions Pre-First IPL:**

- Back virtual storage with real and auxiliary storage **(Required)**
 - Review real storage concentration indicators, and evaluate if additional real or aux storage needed
- Remove references to deleted data sets and path **(Required)**
- Add references to new data sets and paths **(Required)**
 - New in R6, PDSE linklist data set SYS1.SIEALNKE.
 - New in R7, PDSE linklist data sets SYS1.SIEAMIGE and SYS1.SHASLNKE. New APF list PDSE SYS1.NFSLIBE to replace SYS1.NFSLIB.
- Accommodate new address spaces **(Recommended)**
 - New in R6, SMSPDSEI, restartable PDSE address space that allows you to recover from some PDSE problems without having to re-IPL. And TN3270E. By default, not created during IPL.
 - New in R7:, DEVMAN, HZFPROC, JES2S001 for JES2 NJE over TCP/IP
- Rework and install user modifications **(Required-IF)** - For one less use new LE parm!
- Reconnect subsystems and non-IBM products **(Required-IF)**
- Update operational and other procedures **(Required)**
- Accommodate new SCOPE=COMMON data spaces in IEASYSxx MAXCAD **(Required-IF)**
 - In R7: 1 for JES2WTO, 1 or more for XES connections to serialized structures, 3 for R4 Consoles Enhancements, 1 for z990 support in R4 z990 Exploitation Support feature. **IBM Health Checker for z/OS can help you determine what to specify for the MAXCAD value**

 **Make z/Architecture changes **(Required)****

► **Migration Actions Post-First IPL:**

- <none>



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Migrating to z/OS R7

General Migration Actions Between z/OS V1 R4 and z/OS V1 R7

These migration actions were taken from *z/OS Migration*. Some descriptions and actions have been shortened for inclusion in this presentation. For the complete descriptions and actions, refer to *z/OS Migration*.

General Migration Actions You Can Do Now

Apply coexistence and fallback fixes (Required)

Migration action: Install coexistence and fallback PTFs on your z/OS R4 systems to allow those systems to coexist with z/OS V1R7 systems during your migration, and allow backout from z/OS V1R7 to z/OS V1R4 if necessary. See *z/OS Migration* (and the PSP buckets) for a list of required coexistence PTFs.

Use SOFTCAP to identify the effect of capacity changes (Recommended)

Not required, but is recommended to help in assessing processor capacity and available resources when migrating to new software levels.

Migration action:

- Download SoftCap from one of the following Web sites:
 - Customers: <http://www.ibm.com/support/techdocs/atmastr.nsf/WebIndex/PRS268>
 - Business partners: <http://www.ibm.com/partnerworld/sales/systems>
- Run SoftCap to determine your expected increase in CPU utilization (if any) and to identify your storage requirements, such as how much storage is needed to IPL.

Reference information: *SoftCap User's Guide*, which is provided with the tool.

Find alternatives to removed elements and features (Required-IF)

Required if you use any of the removed elements and features.

Several base elements and optional features have been removed from the operating system and therefore can no longer be used. The following elements have been removed:

- IBM License Manager (in z/OS R5)
- C/C++ IBM Open Class Library (in z/OS R5)
- C/C++ with Debug Tool (in z/OS R5)
- DCE Application Support (in z/OS R6)
- Encina Toolkit Executive (in z/OS R6)
- Text Search (in z/OS R6, but is still available as a Web deliverable if needed for limited use)

In addition, you should prepare for elements and functions that will be removed in future z/OS releases. For alternatives to the removed elements and features, see *z/OS Migration*.

Upgrade Windows 95, 98, and NT clients (Required)

Required if you have clients running Windows 95, Windows 98, or Windows NT Workstation.

z/OS no longer supports service for client operating systems whose service is withdrawn by the operating system manufacturer. As a result, IBM no longer supports service for clients running Windows 95, Windows 98, or Windows NT Workstation 4.xx.

Migration action: Use a supported follow-on to Windows 95, Windows 98, or Windows NT Workstation 4.xx..

Reference information: For client software supported with z/OS V1R5, see *z/OS and z/OS.e Planning for Installation*.

Verify that you have enough XCF groups in your CDS and enough XCF members in your XCF group (Required-IF, as of R7)

Required if you have an inadequate number of XCF groups and members formatted in your sysplex couple data sets, and functions that you are using need additional XCF groups or members.

Over time, as various z/OS functions and applications exploit XCF services, you must ensure that there is enough space in the sysplex couple data set for all the XCF groups and members that are to be defined by the exploiters. It is possible that your sysplex couple data set could contain an inadequate number of XCF groups or members.

Migration action:

1. Issue the DISPLAY XCF,COUPLE command on your current system. Notice the values of MAXGROUP and PEAK for your sysplex couple data sets. These values show you the maximum number of XCF groups that the couple data sets can support, and the peak number of XCF groups ever in use in the sysplex. Also notice the values of MAXMEMBER and PEAK for your sysplex couple data sets. These values show you the maximum number of members that the couple data set can support in one group, and the greatest number of members ever in use in the largest group in the sysplex.

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2. In z/OS V1R7, one additional XCF group is used. Its name is IOEZFS and it is used by base element Distributed File Service to provide zFS support. If you do not have enough groups formatted to support this additional XCF group, reformat your sysplex data sets with a larger number of groups.
3. If your peak member value is close to the maximum member value, you might want to reformat your sysplex couple data sets to support a larger maximum number of members to be used by any one group.

Reference information: For information about formatting sysplex couple data sets with the MAXGROUP and MAXMEMBER parameters, see *z/OS MVS Setting Up a Sysplex*. For information about the DISPLAY XCF command, see *z/OS MVS System Commands*.

Update the CustomPac Installation Dialog (Required-IF, as of R6)

Required if you use ServerPac, and have not yet performed this migration action.

Migration action: If this is the first time you will install a ServerPac using the level of the CustomPac Installation Dialog supplied with z/OS V1R6 or higher, you must update the dialog before receiving your ServerPac order. Determine whether you need to update the CustomPac Installation Dialog by starting the dialog and looking at the bottom of the first panel displayed (CPPPPOLI) for the text “This dialog supports electronic delivery”. Then:

- If the panel contains the text, no migration action is required.
- If the panel does not contain the text, follow the instructions for getting and running the UPDATE or EUPDATE job in *ServerPac: Using the Installation Dialog*.

Note: If you are installing an older order and want to run UPDATE or EUPDATE, use the CPPCINV sample job to convert some of the older order’s data sets to VSAM before finishing its installation.

Failure to perform the update will cause an ABEND 813 during ServerPac RECEIVE processing! You'll see:

```
IEC149I 813-04,IFG0195H,myjobname,STEP01,INPUT7,tape_unit,tape_volser,SYS1.orderid.LOADLIB
```

Reference information: *ServerPac: Using the Installation Dialog*

Update local panels, CLISTs, and execs that invoke the CustomPac Installation Dialog (Required-IF)

Required if you use ServerPac, and have not yet performed this migration action.

Migration action: If this is the first time you will install a ServerPac using the level of the CustomPac Installation Dialog supplied with z/OS V1R6 or higher, you might need to update local panels, CLISTs, and execs used to start it. Determine whether you need to update the CustomPac Installation Dialog by starting the dialog and looking at the bottom of the first panel displayed (CPPPPOLI) for the text “This dialog supports electronic delivery”. Then:

- If the panel contains the text, no migration action is required.
- If the panel does not contain the text, remove the ISPF4X parameter from the CPPCISPF command in local CLISTs, execs, and panels. For example, change:

```
PROC 1 CPPMHLQ ISPF4X(N)
CONTROL NOMSG NOFLUSH /* LIST SYMLIST CONLIST
SET COMMAND = CPPCISPF /* COMMAND NAME, DO NOT DELETE */
to:
```

```
PROC 1 CPPMHLQ
CONTROL NOMSG NOFLUSH /* LIST SYMLIST CONLIST
SET COMMAND = CPPCISPF /* COMMAND NAME, DO NOT DELETE */
```

Also, if you have added recovery code to a local CLIST or exec to restore a user’s PROFILE PREFIX in case of abnormal dialog termination, remove it. The CustomPac Installation Dialog no longer runs with NOPREFIX set.

Reference information: *ServerPac: Using the Installation Dialog*

General Migration Actions Pre-First IPL

Set up your IPCS environment (Required)

Migration action: Set up an IPCS environment. For guidance, use the documents listed in the reference information below. During setup, ensure that your logon procedure points to the target system’s level of IPCS data sets, which are shown in *z/OS Migration*.

Note: Starting with z/OS V1R7, a new data set, SYS1.SIEAMIGE, has been added. It is a PDSE data set that complements SYS1.MIGLIB. This data set needs to be used along with SYS1.MIGLIB, when necessary, for IPCS.

Reference information: For more information about IPCS, see *z/OS MVS IPCS Customization*. For more information about the correct logon procedure updates, see the *z/OS Program Directory*. For information about setting up the JES2 IPCS environment, see *z/OS JES2 Diagnosis*. For information about setting up the JES3 IPCS environment, see *z/OS JES3 Diagnosis*.

Migrating to z/OS R7

Use IBM-supplied PARMLIB and PROCLIB (Required)

Migration action: For parmlib, add the data set pointed to by the z/OS V1R7 PARMLIB DDDEF to your parmlib concatenation. The data set should generally be added last in the concatenation, and you should make sure that the other data sets in the concatenation don't have members with the same names as IBM-supplied members. If you place the data set on the system residence volume and use an indirect catalog entry, future migrations won't require this particular migration step.

- For proclib:
 1. Ensure that the default proclib members have been copied to your default proclib to pick up the new and changed members.
 2. Update individual sample members provided and ensure they are accessible to the system, as shown in the table of proclib member updates in *z/OS Program Directory*.
 3. Ensure that the procedure libraries listed in the table of libraries to be added to the proclib concatenation in *z/OS Program Directory* have been placed in the necessary procedure library concatenations and are available to the system.

Reference information: For lists of parmlib and proclib members that are shipped, see *z/OS Program Directory*.

Migrate /etc and /var system control files (Required)

Migration action: The /etc and /var directories contain system control files: the /etc directory contains customization data that you maintain and the /var directory contains customization data that IBM maintains. During installation, subdirectories of /etc and /var are created. If you install z/OS using ServerPac, some files are loaded into /etc and /var due to the customization performed in ServerPac. You have to merge the files in /etc and /var with those on your previous system. If you install z/OS using CBPDO, you should copy the files from your old system to the z/OS V1R7 /etc and /var subdirectories.

Copy files from your old system to the z/OS V1R7 /etc and /var subdirectories, and then modify the files as necessary to reflect z/OS V1R7 requirements. If you have other files under your existing /var directory, then you will have to merge the old and new files under /var. The easiest way to do this is to create a copy of your current /var HFS and then copy the new /var files into the copy.

The following z/OS V1R7 elements and features use /etc:

- Communications Server – IP
- Cryptographic Services – PKI Services and System SSL
- DCE Base Services
- Distributed File Service. The SMB server uses /etc/dfs.
- IBM HTTP Server
- Infoprint Server uses /etc/Printsrv.
- Integrated Security Services - Firewall Technologies, LDAP Server, and Network Authentication Service
- Library Server
- z/OS UNIX System Services

The following z/OS V1R7 elements and features use /var:

- Cryptographic Services - OCSF
- Infoprint Server
- Integrated Security Services - Network Authentication Service uses /var/skrb.

In z/OS R7, NFS will no longer use the /etc directory for lock files, it will use VSAM data sets instead.

Reference information: For information about copying your existing /etc and /var directories, see *z/OS Migration*.

Update items affected by changed interfaces (Required-IF)

Required if any of the interface changes impact your installation.

Interfaces in z/OS are parts of the system that allow people, application programs, execs, or procedures to interact with the system. Examples of interfaces are commands, macros, panels, exit routines, callable services, data areas, the parameter library (SYS1.PARMLIB), the procedure library (SYS1.PROCLIB), the sample library (SYS1.SAMPLIB), configuration files, and environment variables. Various changes have been made to interfaces since z/OS R4.

One such example: the PAGTOTL default specification in IEASYSxx has been changed from 5 to 40 in z/OS R5. This may mean that you can eliminate your specification of PAGTOTL, and use the default.

Migrating to z/OS R7

In order for your application programs and resources to work the same way on your new system as they did on your old one, you'll probably have to make updates due to the interface changes. In addition, you'll probably have to notify people such as operators and end users about interface changes that affect tasks that they perform.

Migration action: Review the book *z/OS Summary or Interface and Message Changes* and *z/OS MVS Init and Tuning Reference*. Update application programs, execs, procedures, and system parameters (in parmlib) appropriately.

Verify that virtual storage is set properly (Required)

Migration action: Determine how much virtual storage use to allow above the 2 GB bar. While there is no practical limit to the number of virtual addresses an address space can request above the bar, the system can limit the amount of virtual storage above the bar that an address space is allowed to use. The amount of virtual storage above the bar is determined as follows. The MEMLIMIT parameter in parmlib member SMFPRMxx sets the default system-wide limit, which defaults to zero (nothing) if it is not specified. However, the system-wide default MEMLIMIT can be overridden by specifying REGION=0 or MEMLIMIT on JOB or EXEC statements in JCL. To set a limit on the use of virtual storage above the bar, use the SMF exit IEFUSI. For more information, see the topic about limiting the use of memory objects in *z/OS MVS Programming: Extended Addressability Guide*.

If you want to control the use of virtual storage above the 2 GB bar, do one or more of the following:

- For MEMLIMIT, you must specify a nonzero MEMLIMIT in an active SMFPRMxx member of parmlib to establish a system default other than zero for available virtual storage above 2 GB. (The default MEMLIMIT is zero.)
- You can specify MEMLIMIT explicitly in JCL to override the system default that was set (or allowed to default) in SMFPRMxx.
- You can specify REGION=0 on the job statement in JCL to implicitly set MEMLIMIT to NOLIMIT, which also overrides the system default (from SMFPRMxx).
- You can use IEFUSI both to establish a system default MEMLIMIT for different classes of work (for example, job, TSO, STC) and limit the amount of virtual storage that can be used above the bar, provided that an explicit or implicit nonzero MEMLIMIT is in effect from JCL or SMFPRMxx.

Reference information: Information about how to evaluate the central storage configuration can be found in the Washington Systems Center white paper *z/OS Performance: Managing Processor Storage in a 64-bit Environment - V1* at <http://www.ibm.com/support/techdocs> (Search for "WP100269".)

Back virtual storage with real and auxiliary storage (Required)

Migration action: As you exploit additional virtual storage by defining additional address spaces or by exploiting memory objects, ensure that you have defined sufficient real and auxiliary storage. Review real storage concentration indicators via an RMF report to evaluate if additional real or auxiliary storage is needed:

- Check UIC and average available frames.
- Check demand page rates.
- Check the percentage of auxiliary slots in use.

Reference information: For more information about memory objects, see *z/OS MVS Programming: Extended Addressability Guide* and Washington Systems Center flash 10165 at <http://www.ibm.com/support/techdocs>. (Search for "flash10165".)

Remove references to deleted data sets and path (Required)

Migration action: Using the table in *z/OS Migration*, "Data sets and paths deleted from z/OS V1R7, R6, and R5" as a guide, remove references to data sets and paths that no longer exist. Remove the references from the following places:

- Parmlib
- Proclib
- Logon procedures
- Catalogs
- Security definitions, including program control definitions
- DFSMS ACS routines
- /etc/profile
- SMP/E DDDEF entry
- Backup and recovery procedures, as well as any references to them In the table, the high-level qualifiers in the data set names are the default qualifiers.

Reference information: *z/OS Migration* contains the list of all removed data sets and paths in z/OS R7, R6, and R5.

Add references to new data sets (Required)

Migrating to z/OS R7

Migration action: Using the lists that are found in *z/OS Migration* as a guide, add references in the following places for data sets that have been added to z/OS:

- Parmlib
- Proclib
- Logon procedures
- Catalogs
- Security definitions, including program control definitions
- DFSMS ACS routines
- Any backup and recovery procedures.

Of special note are the data sets:

- **SYS1.SIEALNKE**, which is a PDSE data set introduced in z/OS V1R6 for use by multiple elements and features. It provides a common location to store program objects that are eligible for the link list. You should add SYS1.SIEALNKE to the link list. When SYS1.SIEALNKE is added to the link list, by default it is APF authorized and does not need to be specified on a STEPLIB DD statement.
- **SYS1.SHASLNKE**, which is a PDSE introduced in z/OS V1R7 and used by JES2. It replaces the data set SYS1.SHASLINK. When SYS1.SHASLNKE is added to the link list, by default it is APF authorized and does not need to be specified on a STEPLIB DD statement.
- **SYS1.SIEAMIGE**, which is a PDSE introduced in z/OS V1R7 to be used by multiple elements. It is a PDSE data set that complements SYS1.MIGLIB. This data set needs to be used along with SYS1.MIGLIB, when necessary.
- **SYS1.NFSLIBE**, which is a PDSE introduced in z/OS V1R7 and used by NFS. It replaces the data set SYS1.NFSLIB. Be sure to update your APF list in parmli with the new name.

Reference information: *z/OS Migration* contains the list of all new data sets and paths in z/OS R7, R6, and R5.

Accommodate new address spaces (Recommended)

Not required, but recommended if you use the CVAFTR procedure. If you don't use it, the migration action is not required but is recommended so that you take advantage of the benefits afforded by the new address spaces. Also recommended to use the TN3270E address space for enhanced availability (see the Communications Server portion of this presentation).

The following address spaces are new:

- **DEVMAN:** This DFSMSdfp address space is new in z/OS V1R7. z/OS uses this device manager address space to provide various kinds of device support. In z/OS V1R7, this support includes component trace information for DADSM creation and CVAF events. These new component trace records are formatted when viewed by IPCS using CTRACE COMP(SYSDMO). Component tracing for DADSM creation and CVAF events are activated and deactivated by DEVMAN modify commands. The CVAF trace events to GTF formerly provided by the CVAFTR procedure have been removed. The debug/trap options of CVAFTR, however, are still available.
- **HZSPROC:** This address space, new in z/OS V1R7, is for the IBM Health Checker for z/OS. IBM recommends the use of the IBM Health Checker for z/OS because it can identify potential problems before they impact your availability or cause outages. It checks the current active z/OS and sysplex settings and definitions for a system and compares the values to those suggested by IBM or defined by you. The open architecture of the framework supports checks written by IBM, ISVs, and users. The default ServerPac configuration provides the setup and starts the HZSPROC address space. If you do not want to start this address space, update the ServerPac generated jobs and supplied samples accordingly.
- **JES2 NJE over TCP/IP:** As of z/OS V1R7 JES2, NJE over TCP/IP runs in a new address space. The address space is responsible for sending data to, and receiving data from, TCP/IP. This move of processing from the JES2 main task to the user environment is expected to improve reliability, availability, and serviceability by isolating the moved function from processing in the JES2 main task, and to improve performance by taking advantage of multiple CPUs to do the work (so that not all work is done under the single JES2 main task). One address space is created for each active JES2 NETSERV. The format of the name of the address space is *jjjjSnnn*, where *jjjj* is the owning JES2 subsystem name and *nnn* is the subscript of the owning NETSERV. For example, for NETSERV(1) owned by subsystem JES2, the name would be JES2S001. This address space is started and stopped using the \$S NETSERV and \$P NETSERV JES2 commands. No special definitions are required. However, if desired, the characteristics of the TCP/IP connection associated with the address space can be altered in the TCP/IP profile data set.
- **SMSPDSE1:** This DFSMSdfp address space was new in z/OS V1R6. It is a restartable PDSE address space that allows you to recover from a PDSE problem (hang, deadlock, or out-of-storage condition) without having to re-IPL the system or sysplex, and to determine which systems require a re-IPL or repair to eliminate PDSE hangs and failures. SMSPDSE1 is related to SMSPDSE. SMSPDSE is a nonrestartable address space for PDSEs that are in the link list

Migrating to z/OS R7

concatenation. SMSPDSE was introduced in z/OS V1R4 through the service stream (and rolled back to prior releases) to relieve extended common service area (ECSA) usage. SMSPDSE cannot be restarted because global connections cannot handle the interruption and reconnection that are part of an address space restart. SMSPDSE is the only PDSE address space for z/OS systems when the following conditions exist:

- The IGDSMSxx initialization parameter, PDSESHARING, is set to NORMAL.
- The IGDSMSxx initialization parameters in a sysplex coupled systems environment are set as follows:
 - PDSESHARING(EXTENDED)
 - PDSE_RESTARTABLE_AS(NO)

If these conditions do not apply, the z/OS system has both the SMSPDSE and SMSPDSE1 address spaces. The SMSPDSE1 address space provides connections to, and processes requests for, PDSE data sets that are not part of the link list concatenation.

- *TN3270E Telnet server*: This Communications Server address space was new in z/OS V1R6. It allows the TN3270E server to run in a separate address space from the TCP/IP stack address space.

Rework and install user modifications (Required-IF)

Required if you have made any user modifications that necessitate changes.

Migration action: Use the z/OS SMP/E Planning Migration Assistant to help determine which user modifications need to be reworked and which just have to be reinstalled. The Top or New Intermediate Product Migration Changes Report uses data found on your system, combined with IBM-supplied information from the Software Information Base, to show you the current levels of products available as well as product migration and functional changes using a comparison of FMIDs.

You can use this report to determine the product migration impacts by reviewing the “changed” FMIDs. This can help you assess how many user modifications have to be reworked if you issued the LIST SYSMOD USERMOD FORFMID (listing the “changed” FMIDs) command. All other user modifications can be reinstalled without having to be reworked.

Note: IBM recommends using exit routines for any user modifications where possible, and installing the exit routines with SMP/E. By using SMP/E, it is easier to bring forward desired modifications to the z/OS release you are installing.

Several elements and features have their default options set by assembling and link editing one or more modules. These include:

- XL C/C++
- DFSORT
- HLASM
- Language Environment. Investigate using CEEROPT, which can be used to specify run-time options for CICS, IMS LRR, and other LRR users. Even better, consider using the function added in z/OS R7 to eliminate your assembler language run-time option modules in CEEPRMxx parmlib member!

Reference information: For information about C/C++ customization, see *z/OS C/C++ Compiler and Run-Time Migration Guide*. For information about DFSORT customization, see *DFSORT Installation and Customization Guide*. For information about HLASM customization, see *HLASM Installation and Customization Guide*. For information about Language Environment customization, see *z/OS Language Environment Customization*.

Reconnect subsystems and non-IBM products (Required-IF)

Required if you use any ISV products and need to reconnect them after performing a ServerPac installation, or if you intend to use any subsystems with your z/OS system.

Migration action: Follow the instructions for each ISV product that you use to reconnect it to your z/OS V1R7 ServerPac.

Ensure that any required coexistence service is installed prior to using the subsystem with the new z/OS V1R7 system, as well as any required SVCs, system modifications, parmlib setup, and proclib setup. Follow the instructions for the subsystem that you need to reconnect.

Reference information: 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/eserver/zseries/solutions/s390da/>. For a directory of ISV products that support z/OS, see the Global Solutions Directory at <http://www.ibm.com/software/solutions/isv>.

Update operational and other procedures (Required)

Migration action: Review your operation, automation, administration, security, backup, and recovery procedures, and make any necessary changes depending on how you installed and which functions you plan to exploit. Some possible changes are:

- Allowing applicable users access to new high-level qualifiers that you may have. There are no new default high-level qualifiers introduced in z/OS R7, z/OS R6, or z/OS R5 with the new target data sets.
- Updating and testing your backup and recovery procedures to accommodate the new target system.
- Updating and testing any disaster recovery procedures.

Migrating to z/OS R7

- Updating and testing any automation procedures to take advantage of new functions.
- Updating security system definitions, such as defining new users and resources, permitting users to use new resources, and defining new profiles in the RACF FACILITY class.

Reference information: For information about the new functions incorporated into z/OS V1R7, see *z/OS Introduction and Release Guide*.

Accommodate new SCOPE=COMMON data spaces (Required-IF)

Required if you use the MAXCAD parameter of parmlib member IEASYSxx and the value you specified is inadequate for your z/OS R7 system.

Since z/OS V1R4, several new SCOPE=COMMON data spaces have been added. Your MAXCAD setting must be adequate to accommodate these new data spaces. The SCOPE=COMMON data spaces that have been added since z/OS V1R4 are:

- Added in z/OS V1R7:
 - One data space named *xxxx*WTO (where *xxxx* is the JES2 name), for example, JES2WTO.
 - One or more data spaces for XES connections to serialized structures. For details, see the BCP migration action that follows in this presentation.
- Added in z/OS V1R4 by the Consoles Enhancements feature: three data spaces for this feature
- Added in z/OS V1R4 by the z/OS V1R4 z990 Exploitation Support feature: one data space for z990 support

Migration Action: Increase the limit for the number of SCOPE=COMMON data spaces defined on the MAXCAD parameter if your specification is not adequate to cover the new data spaces that have been added. Note that in z/OS V1R6, the MAXCAD default was increased from 25 to 50. If this default is acceptable for your environment, you might want to remove your MAXCAD specification and allow it to default.

Tip: The IBM Health Checker for z/OS can help you determine what to specify for the MAXCAD value. Use the check IBMRSM,RSM_MAXCADS. This check is available in z/OS V1R7 and also in APAR OA09366 back to z/OS V1R4. By running this check, you can find out:

- The MAXCAD value you specified during IPL
- The number of SCOPE=COMMON data spaces currently in use
- The high water mark, which is the highest usage of SCOPE=COMMON data spaces used during this IPL

Use this information to help you set your MAXCAD specification in IEASYSxx.

Make z/Architecture changes (Required-IF)

Required if you have not already migrated to z/Architecture.

See the next section of this presentation.

General Migration Actions Post-First IPL

<none>

BCP Migration Actions from z/OS R4 to z/OS R7



► Migration Actions You Can Do NOW:

- Evaluate your stand-alone dump data set allocations and your IPCS processing of them (Recommended)
 - R6 introduced support for ext format ds >64k trks/volume, install OA08339, ...
- Remove ECMB=NO from IEAOPTxx (Required-IF, as of R7)
 - Affected programs (monitor programs) must use the Extended Channel Measurement Block.
- Prepare to use synchronous reserves in GRSCNFxx (Recommended)
 - Default value for SYNCHRES was NO, in R6 it's YES. For preventing deadlocks between systems sharing DASD.
- ➔ Decide on the number of CPUs to bring online at IPL (Required, via OA09649)
 - If you want # CPUs/IFAs brought online at IPL = # defined in the initial processor counts for the LPAR, do nothing.
 - If you want #CPUs/IFAs brought online at IPL = same CPUs/IFAs that were online at end of last IPL, instal OA09649 and PRESCPU parameter in IEASYSxx.

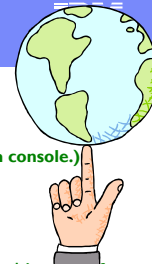


Modify code that uses I-byte console IDs (Required-IF, as of R7)

- I-byte console IDs for macro interfaces and commands are removed in z/OS R7.
- (I-byte console IDs will be completely removed in the release after z/OS R7.)
- Use Console ID Tracking facility to identify I-byte console ID usage.
- Modify code to use console names instead of the I-byte IDs. Contact ISVs for identified I-byte console ID usage

► Continued on next foil...

BCP Migration Actions from z/OS R4 to z/OS R7




➔ Make updates for consoles enhancements (Required)

- Check in each CONSOLxx that each CONSOLE statement has a NAME parameter. (Not necessary for system console.)
- Check in each CONSOLxx that each CONSOLE statement uses ALTGRP rather than ALTERNATE.
- Remove UD (undelivered messages) option from CONSOLxx's CONSOLE statement
- Use syslog, operlog, or both instead of a device for hardcopy
- Do not use the R (reroute message queue) option on the CONTROL Q command.
- Note: MSCOPE parameter on the CONSOLE statement for the system console in CONSOLxx now defaults to * instead of *ALL. (* means a console only receives messages from the local system. *ALL means that a console receives messages from local and other systems in the sysplex.) IBM recommends using the new default setting.

► Migration Actions Pre-First IPL:

- Create IPL text (Required)
- Reassemble the stand-alone dump program (Required)
- Update programs that use SMF record type 88, subtype I (Required-IF, as of R7)
- Update programs that use SMF record type 90, subtypes 5,9,13, and 15 (Required-IF, as of R6)
- ➔ Discontinue use of the TRACK, STOPTR and related commands (Required-IF, as of R7)
 - These commands were used to display job information on an MCS or SMCS console. Also, UTME value (interval in seconds for updating dynamic displays) for an MCS or SMCS console in CONSOLExx is no longer accepted. Remove it.
- Update ENF listen exits that make use of logger ENF48 signals (Required-IF, as of R7)
 - Change to additional listen for new ENF information.
- Accommodate changes for coupling facility lock structures with record data (Required-IF you have not yet installed UW92530 on your R4 system)

► Continued on next foil...



BCP Migration Actions from z/OS R4 to z/OS R7

- ➔ Evaluate the MAXMSG value in COUPLExx, default is now 2000. (Required-IF, as of R7)
 - Health Checker will warn you if your MAXMSG value is less than the default.
- ➔ Migrate to, or start using the IBM Health Checker for z/OS (Recommended)
 - Set up has been performed for you in ServerPac.
- Update JCL that refers to the AMSDADD utility in SAMPLIB to point to SBLSCLI0 (Required-IF, as of R7)


► **Migration Actions Post-First IPL:**

- ➔ Check the maximum number of XES connectors per AS (Required-IF, as of R7 w/ rollback)
 - ➔ Review the use of serialized CF structures per AS. If # connectors to lock structure from any one AS > about 6, reduce the # of connectors. If the connectors are associated with your application, restructure application to connect from multiple AS. If vendor applications, contact vendor.
- ➔ Accept the UCB overlay detection default change (Recommended, as of R7)
 - For detecting UCB overlays before they happen. Can be disabled if you need to: SETIOS CAPTUCB,PROTECT=NO or in IECIOSxx CAPTUCB,PROTECT=NO.
- Review the IXLLOCK hash algorithm, if you use CF lock structures (Required-IF, as of R7 w/ rollback)
 - Prior to R7, # of XES connections to serialized CF structures (lock and serialized list) was 64 structures per AS. As of R7, add'l data spaces are obtained for each CF lock structure and resource information is spread across the data spaces based on the lock hash value specified on IXLLOCK requests.
 - Review the hash algorithm used by your application to ensure that it produces hash values that are evenly distributed on the low-order digit of the result.
- Update IPCS subcommands that require the ERROR criterion to select ASIDs (Required-IF, as of R7)

Continued on next foil...

Migrating to z/OS R7 © 2005 IBM Corporation

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BCP Migration Actions from z/OS R4 to z/OS R7

► **Migration Actions Post-First IPL ... continued:**

- ➔ Update operator procedures for some changed commands: START DEALLOC, VARY OFFLINE, and UNLOAD (Required-IF, as of R7)
 - Different results now occur in z/OS R7
 - Also, prior to R7, IEF238D was issued and no VARY OFFLINE processing for a device could take place until the operator responded. Device entered a pending offline state, with msg IEF524I (dev{, VOLUME ser} PENDING OFFLINE) and perhaps msg IEF525E (dev{, VOLUME ser} STILL PENDING OFFLINE).
 - As of R7, when IEF238D is issued, no VARY OFFLINE processing occurs until after msg IEF238D is reponded to. Msgs IEF524I and IEF525E aren't issued until the VARY OFFLINE processing is started.
- ➔ Correct programs that issue erroneous WTO or WTOR messages (Recommended)
 - Previously, you could create WTO and WTOR parameter lists that were invalid, and they would be accepted with a zero return code and no abend
 - Now, WTO and WTOR services provide stronger parameter list checking to prevent errors.
 - In most cases, errors now are recorded as symptom records in the logrec ds and issue a D23 abend for diagnostic purposes. If affected, likely that your program will get different rc that it did previously.
 - Correct programs that issue erroneous WTO and WTOR messages.
- ➔ Adjust accounting practices for changed WTO and WTOR processing (Required-IF)
 - WTO and WTOR processing now occurs in the WTO/R path (SVC 35), instead of being performed asynchronously as before.
 - Results in additional processing occurring under the unit of work of the WTO or WTOR issuer.
 - Adjust accounting practices if applications are heavy WTO and WTOR users. (Subsystems are typically the most heavy users.)

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Migrating to z/OS R7

BCP Migration Actions Between z/OS R4 and z/OS R7

These migration actions were taken from *z/OS Migration*. Some descriptions and actions have been shortened for inclusion in this presentation. For the complete descriptions and actions, refer to *z/OS Migration*.

BCP Migration Actions You Can Do Now

Evaluate your stand-alone dump data set allocations and your IPCS processing of them

(Recommended)

Not required, but recommended because of changes to stand-alone dump processing (that reorder dump records with the intent of recording more important data early), and especially recommended if you deploy any LPARs with significantly more main storage than previously used.

Migration action:

- Use multi-volume stand-alone dump data sets. Adjust the number of volumes and their separation to achieve tolerable stand-alone dump capture times.
- Use extended format data sets with more than 64 K tracks per volume (after first IPL on z/OS V1R6 or later). Copy their contents to an extended format, compressed, striped data set using the IPCS COPYDUMP subcommand prior to analysis. Use the same or a larger striping factor than you used for your stand-alone dump data sets.
- Install the PTF for APAR OA08339 for performance enhancements and an enhanced COPYDUMP subcommand.
- Use a large CISIZE and striping for IPCS dump directories, and blocking, striping, and compression for the stand-alone dump data set. Very large stand-alone dumps might require that you define your directory with the extended addressing attribute, allowing it to hold more than 4 GB.

Remove ECMB=NO from parmlib member IEAOPTxx (Required, as of R7)

Required if you use the ECMB=NO parameter of parmlib member IEAOPTxx.

Migration action: If you have ECMB=NO specified in parmlib member IEAOPTxx, convert user-written programs that use the CMB to use the ECMB, and contact ISVs to obtain updates to ISV programs that use the CMB. The type of programs that are most likely to use the CMB are monitor programs. Finally, remove your ECMB=NO specification.

Prepare to use synchronous reserver for GRSCNFxx (Recommended, as of R6)

Not required, but recommended to prevent deadlocks when reserving volumes.

Prior to z/OS V1R6, the default value for the SYNCHRES (synchronous reserve) statement on the GRSCNFxx (global resource serialization configuration) parmlib member was NO. Beginning with z/OS V1R6, the SYNCHRES statement defaults to YES to ensure that synchronous processing is activated at all times. This new default prevents deadlocks between systems sharing DASD, which could occur when there is a delay between the time a request is made to reserve a volume and the time when the reserve of the volume is obtained. Because of the importance of synchronous reserve processing, a check for SYNCHRES=YES has been added to the current level of IBM Health Checker for z/OS and Sysplex to warn you if the default is not used.

Migration action: Examine your current settings to determine what is specified in the GRSCNFxx parmlib member, then take the following action:

- If SYNCHRES=YES is specified, remove it because YES is now the default.
- If SYNCHRES=NO is specified, determine why and take the necessary action to use the new default of YES.
 - If it was the prior default, remove the SYNCHRES statement so the system defaults to YES.
 - If it was specified for an application's performance purposes in a STAR environment, convert the application's RESERVE requests to global ENQs. For RESERVE conversion, see *z/OS MVS Planning: Global Resource Serialization*.
 - If it was specified for an application's performance purposes in a RING environment, remove SYNCHRES=NO because the synchronous reserve overhead is minimal. For RESERVE conversion, see *z/OS MVS Planning: Global Resource Serialization*.
 - If it was specified for other application purposes, change the application to use ISGENQ SYNCHRES=NO. This affects only the RESERVE requests for this application. For more information about ISGENQ, see *z/OS MVS Programming: Assembler Services Reference IAR-XCT*.

To change the default for all systems before migrating to z/OS V1R6, use the SETGRS operator command. Specify SYNCHRES=YES and then update shared parmlib member GRSCNFxx to specify SYNCHRES=YES.

Decide on the number of CPUs to bring online at IPL (Required, as of OA09649)

Migrating to z/OS R7

Before z/OS V1R7, the number of CPUs and IFAs brought online at IPL was the number defined in the initial processor counts for the logical partition profile. This was the case in z/OS V1R6 and z/OS V1R5, and in z/OS V1R4 with PTF UA03339 installed (for APAR OA03335), when running on z990, z890, z900 (GA-3), and z800 servers.

As of z/OS V1R7, you have the option of bringing online at IPL all CPUs and IFAs that were online at the end of the prior IPL (provided that specific actions are taken, as described below). This option is also furnished back to z/OS V1R4 by APAR OA09649.

Migration action: If you want the number of CPUs and IFAs brought online at IPL to be the number defined in the initial processor counts for the logical partition profile, no action is required.

If you want the CPUs and IFAs brought online at IPL to be the same CPUs and IFAs that were online at the end of the last IPL, then install the PTF for OA09649 (which is integrated into z/OS V1R7) and use the PRESCPU parameter for parmlib member IEASYSxx. The PRESCPU parameter causes the system to ignore the number of initial CPUs and IFAs that PR/SM provides and bring logically online all CPUs and IFAs that the machine presents as physically online.

Modify code that uses 1-byte console IDs (Required, as of R7)

Required if you use any commands or APIs that reference 1-byte console IDs.

1-byte console IDs in macro interfaces (such as WTO and WTOR) and operator commands (such as D C,CN= and D PFK,CN=) are removed in z/OS R7. Programs compiled using older versions of the macros will continue to work on z/OS R7. In the release after z/OS R7, it is planned that 1-byte console IDs will be completely removed from z/OS. You will have to use console names instead. A service called the Console ID Tracking Facility is available to help you identify 1-byte ID usage.

Migration action: Use the Console ID Tracking facility to identify 1-byte console ID usage, and then modify your code to use console names instead of the 1-byte IDs. The Console ID Tracking facility provides the following functions:

- The SETCON operator command, which is used to activate and deactivate the Console ID Tracking facility.
- The DISPLAY OPDATA,TRACKING operator command, which is used to display the current status of the Console ID Tracking facility, along with any recorded instances of violations.
- The CNIDTRxx parmlib member (a sample of which is provided in SAMPLIB), which is used to list violations that have already been identified in order to prevent them from being recorded again.
- The CNZTRKR macro, which is used to invoke the Console ID Tracking facility.

Reference information: For information about Console ID Tracking facility, see *z/OS MVS Planning: Operations*.

Make updates for console enhancements (Required, as of z/OS R4 Consoles Enhancements feature)

The z/OS V1R4 Consoles Enhancements feature was the first deliverable in the new zSeries console strategy, which is intended to enhance the operator messaging architecture of z/OS. The feature will focus on minimizing the possibility of outages due to exhaustion of system resources used for messaging. As of z/OS R5, the function is rolled into the base product and is no longer an optional feature. Several tasks that were formerly best practices are now required, and some functions are no longer relevant.

Migration action:

- Name your consoles. Check your CONSOLxx parmlib members to ensure that each of the CONSOLE statements specifies a NAME parameter. (Naming is not necessary for the system console.)
- Check your CONSOLxx members to ensure that each of the CONSOLE statements specifies the ALTGRP keyword rather than the ALTERNATE keyword. Console switch ALTERNATE processing is no longer supported.
- Remove the UD (undelivered messages) keyword from the CONSOLE statement in member CONSOLxx; it is no longer supported. This keyword will not be honored on system commands.
- Instead of using a device for hardcopy, use the system log (SYSLOG), the operations log (OPERLOG), or both, because hardcopy can no longer be directed to a device. Also, remove the DEVNUM (device number) and HCPYGRP (hardcopy group) keywords from the HARDCOPY statement in member CONSOLxx; they are no longer supported.
- Do not use the R (reroute message queue) parameter on the CONTROL Q command; it is no longer supported. The command will remove a message backlog from the target console only. You cannot redirect messages to another console.
- Make sure that the MAXCAD value that you have defined (or defaulted to) in IEASYSxx is large enough to accommodate the three new common area dataspace (CADs) created by the Consoles Enhancements. Note that the default number for MAXCAD changed in z/OS R6 from 25 to 50. This default may be sufficient for your usage. Refer to the MAXCAD migration action previously in this presentation.
- **Note:** The MSCOPE parameter on the CONSOLE statement for the system console in CONSOLxx now defaults to * instead of *ALL. (* means that a console only receives messages from the local system. *ALL means that a console receives messages from local and other systems in the sysplex.) IBM recommends that you use the new default

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setting. However, while this change is related to consoles, it is not part of the new console strategy, so accepting the new default is not a requirement.

Reference information: *z/OS MVS Planning: Operations*.

BCP Migration Actions Pre-First IPL

Create IPL text (Required)

Migration action: Update and run the IPLTEXT job to write a new copy of the IPL text. If you install z/OS V1R7 with a ServerPac, an installation dialog job is provided to perform this action. If you install z/OS V1R7 with a CBPDO, instructions to perform this action are provided in *z/OS Program Directory*.

Reference information: For a sample IPLTEXT job, see *z/OS Program Directory*. ServerPac provides a similar job for accomplishing this task; see *ServerPac: Installing Your Order*.

Reassemble the stand-alone dump program (Required)

Migration action: Reassemble the stand-alone dump program. If you install z/OS V1R7 with a ServerPac, an installation dialog job is provided to perform this action. If you install z/OS V1R7 with a CBPDO, instructions to perform this action are provided in *z/OS Program Directory*. Once the stand-alone dump program is properly created on a DASD residence volume, it resides in the SYS1.PAGEDUMP.Vvolser data set.

Reference information: *ServerPac: Installing Your Order*, *z/OS Program Directory*, and *z/OS MVS Diagnosis: Tools and Service Aids*

Update programs that use SMF record type 88, subtype 1 (Required-IF, as of R7)

Required if you run any programs that use explicit offsets from the beginning of the SMF88 record to the section in the table below.

Migration action: Because the Events section (SMF88ESD) of SMF record type 88, subtype 1 has increased in size, offset values to some sections have changed. Any programs that use an explicit offset from the beginning of the SMF88 record to a field in the following section might need to be updated:

Section	Related offset	Related DSECT
Structure (interim storage)	SMF88SOF	SMF88SSD

Check any programs that use the section listed above to determine if you must make any changes. If necessary, modify the programs using the updated offsets.

Update programs that use SMF record type 90, subtypes 5,9,13, and 15 (Required-IF, as of R6)

Required if you run any programs that use explicit offsets from the beginning of the SMF90 record to any of the sections affected.

Migration action: Because the "IPL SMF/SET SMF/SETSMF" section of SMF record type 90, subtypes 5, 9, 13, and 15 has increased in size, offset values to some sections have changed. Any programs that use an explicit offset from the beginning of the SMF90 record to a field in any of the following sections might need to be updated:

Section	Related offset	Related DSECT
SMF data set	SMF90ODA	SMF90DSE
Subsystem record	SMF90OWK	SMF90WCH
Subsystem parameter	SMF90OOT	SMF90SUB

Check any programs that use any of the sections listed above to determine if you must make any changes. If necessary, modify the programs using the updated offsets.

Discontinue use of the TRACK and related commands (Required-IF, as of R7)

Required if you use the TRACK command or any of the related commands listed below.

Migration action: As of z/OS V1R7, the TRACK command has been removed from z/OS. Operators can no longer issue the TRACK command to display job information on an MCS or SMCS console. In addition, other commands that deal exclusively with the TRACK command have also been removed. These commands are:

- TRACK
- STOPTR
- CONTROL T (K T)
- CONTROL D,H (K D,H)
- CONTROL D,U (K D,U)
- MR TR={a,name-a}

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Because CONTROL T was removed, there is no longer a need to specify the UTME value for an MCS or SMCS console in CONSOLxx. Therefore, the UTME keyword is no longer accepted in CONSOLxx.

Update ENF listen exits that make use of logger ENF48 signals (Required-IF, as of R7)

Required if you use IXGENF mapping or listen for ENF signal 48.

Installation programs and ISVs that exploit the following system services are impacted if they need to process logger ENF48 log stream events.

Migration action: Programs that listen to ENF signal 48 (ENFPC048) for any of the following logger events need to be changed to additionally listen for the new ENF information:

- *Background:* After the last disconnect to a logstream on a system that is not disconnected due to other reasons (such as Force or XES recommendation), an IxgenfLogStreamConnDisc event is issued with new event reason IxgEnfSystemLevelDisc, and the connection count of remaining systems connected to the logstream is given (IxgEnfConnDiscCount). The affected logstream no longer has connections on this system.
What to do: Change programs to take into account new event reason IxgenfSystemLevelDisc and the connection count IxgenfConnDiscCount.
- *Background:* After a successful SETLOGR FORCE,DISCONNECT command operation, existing event IxgEnfLogstreamsNotAvailable is issued with new event reason IxgEnfSetLogrForceDisconnect along with existing event specific information IxgEnfLogstreamDisconnected. This means that the affected logstream has lost all of its connections on this system.
What to do: Change programs to take into account new event reason IxgenfSetLogrForceDisconnect for specific reason IxgenfLogstreamDisconnected.
- *Background:* After a successful SETLOGR FORCE,DELETE command operation, existing event IxgenfLogStreamDelete is issued with new event reason IxgEnfSetLogrForceDelete. This means that the logstream referred to by field IxgenfInventoryDelLogStreamName has been deleted from the LOGR couple data set as a result of the command request.
What to do: Change programs to take into account new event reason IxgenfSetLogrForceDelete.

Accommodate changes for coupling facility lock structures with record data (Required-if you do not have z/OS R4 PTF UW92530 installed)

Required if you allocate lock structures with record data in your coupling facility and if you installed the PTFs for APAR OW52437, regardless of whether you are using, or intend to use, coupling facility duplexing. If you install PTFs for APAR OW52437, you must first install the coexistence PTFs for APAR OW52266 on all systems in your sysplex, regardless of whether you are using, or intend to use, coupling facility duplexing.

Migration action: To provide coexistence (by APAR OW52266) for the performance improvements by APAR OW52437 and incorporated into z/OS R5 and R6, take the following steps. Note that these steps might already have been performed if PTF UW92486 has been installed on your z/OS R4 systems:

1. Apply the PTFs for APAR OW52266 on all systems in the sysplex.
2. Use the CFSIZER tool to determine the appropriate size for all lock structures except ISGLOCK. (The ISGLOCK structure cannot exploit the new performance enhancements because the structure does not contain record data.) You can find the CFSIZER tool at <http://www.ibm.com/servers/eserver/zseries/cfsizer/>.
3. Update the CFRM policy to specify the new lock structure size requirements.

To enable the functions provided in APAR OW52437 and incorporated into z/OS R5 and R6, take the following steps. Note that these steps can only be performed once the PTF for APAR OW52437 has been installed:

1. Install z/OS R5, R6, or the z/OS R4 PTF UW92530.
2. IPL the z/OS R5, R6, or z/OS R4 system with UW92530 installed, after the PTFs for APAR OW52266 are installed and active on all systems in the sysplex.
3. Initiate a rebuild of all lock structures except ISGLOCK to activate the performance enhancements with multiple record data lists.
4. When the rebuild completes, issue the DISPLAY XCF,STR command to verify that the structure has been allocated with multiple record data lists and is ready for system-managed coupling facility structure duplexing. If the result is successful, message IXC360I will contain the insert: NUMBER OF RECORD DATA LISTS PER CONNECTION: nnn. If this message insert does not appear, the structure was allocated by a system that does not have the support provided by APAR OW52437 and incorporated into z/OS R5 and R6.

Reference information: *z/OS MVS Setting Up a Sysplex, z/OS MVS System Messages, Vol 10 (IXC-IZP)*

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Evaluate the MAXMSG value in COUPLExx (Required-IF, as of R7)

Required if you specified a value for MAXMSG that is less than the default value of 2000.

The MAXMSG parameter in parmlib member COUPLExx specifies a value that XCF uses to determine the allotment of message buffers when the MAXMSG parameter is not specified on any one of following:

- The CLASSDEF statement
- The PATHIN statement
- The SETXCF START,CLASSDEF command
- The SETXCF START,PATHIN command

Before z/OS V1R7, the default value for MAXMSG was 750. As of z/OS V1R7, the default value for MAXMSG has been increased to 2000.

Migration action: Examine the MAXMSG setting in the COUPLExx parmlib member. If a value of less than 2000 is specified, either change it to a value greater than 2000 or accept the default value. A check for the value of MAXMSG has been added to the IBM Health Checker for z/OS to warn you if the MAXMSG value is less than the default.

Migrate to, or start using, the IBM Health Checker for z/OS (Recommended)

Not required, but is recommended in order to prevent potential problems that could impact system availability and cause outages.

Migration action:

- If you are currently using the prototype, you should migrate to the IBM Health Checker for z/OS that is integrated in z/OS V1R7. There are no incompatibilities between the prototype and the IBM Health Checker for z/OS framework; they can run in parallel. However, implementation of the IBM Health Checker for z/OS is strongly recommended and provides significant improvements in functionality compared to the prototype. For instructions on migrating from the prototype to the IBM Health Checker for z/OS, see *IBM Health Checker for z/OS: User's Guide*.
- If you did not use the prototype, it is recommended that you use the IBM Health Checker for z/OS that has been integrated in z/OS V1R7. If you install with ServerPac, the setup is performed for you. If you do not install with ServerPac, you must perform all the setup steps. See *IBM Health Checker for z/OS: User's Guide* for instructions on setting up IBM Health Checker for z/OS.
- If you choose not to use the IBM Health Checker for z/OS, review the ServerPac-supplied jobs and procedures to remove the COM='START hzspoc' statement from the sample COMMNDxx member provided with your order.

Update JCL that refers to the AMDSADDD utility (Required-IF, as of R7)

Required if you have any JCL that refers to the AMDSADDD utility.

In z/OS V1R7, as part of the enhancement to the IPCS 3.6 option that helps you create stand-alone dump data sets, AMDSADDD (the utility that allocates and initializes stand-alone dump data sets) has been moved to SYS1.SBLSCLI0.

Migration action: Update JCL that points to the AMDSADDD utility in SYS1.SAMPLIB to now point to SYS1.SBLSCLI0.

BCP Migration Actions Post-First IPL

Check the maximum number of XES connectors per address space (Required-IF, as of R7 w/ rollback via OA03194)

Required if you support connections to serialized coupling facility structures.

Before z/OS V1R7, the number of XES connections to a serialized coupling facility structure (lock or serialized list) was limited to 64 per address space. With z/OS V1R7, the limit is reduced to approximately 6 lock structure connections per address space. This reduction is due to the increase in the number of data spaces owned by connectors to coupling facility lock structures. The limit for connections to serialized list structures is not changed; however, if an address space uses connections to both lock and serialized list structures, the extra use of data spaces by the lock structure will reduce the availability of data spaces for the serialized list structure. Also, connections that support user-managed structure rebuild use double the number of data spaces, thus reducing the maximum connector limit even more.

Migration action: Review the use of serialized coupling facility structures per address space. If the number of connectors to lock structures from any one address space exceeds about six, reduce the number of connectors. If the connectors are

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associated with applications written by you, restructure the applications to connect from multiple address spaces. If the connectors are associated with vendor applications, contact the owning vendors.

Accept the UCB overlay detection default change (Recommended, as of R7)

Not required, but is recommended to detect UCB overlays before they happen, which could have serious system impacts. The unit control block (UCB) is a critical control structure in z/OS that designates the state and definition of an I/O device. Since MVS/ESA SP 5.2.0, applications could capture a UCB into a private virtual address. This implies that application programs could inadvertently overlay this storage and cause the real UCB contents to be overlaid, resulting in system outages. In z/OS V1R5, the input/output supervisor (IOS) was enhanced to provide read-only views for all captured UCB requests. However, you had to use an IBM internal option in DIAG_{xx} to enable IOS to provide the views. In z/OS V1R7, this overlay protection mechanism is enabled by default to help prevent UCB overlays.

Migration action: You need do nothing to take the recommended action, which is to accept the UCB overlay detection default change. By default, z/OS V1R7 systems come up with UCB overlay protection enabled. During operation of your system, if you encounter UCB overlays and dumps, report them to the software vendor or program owner. If you need to disable the system level trap (and thereby stop detecting UCB overlays), you can do so with either of the following methods:

- By command: SETIOS CAPTUCB,PROTECT=NO
- By IECIOS_{xx} parmlib member: CAPTUCB,PROTECT=NO

If a program attempts to write into storage that represents a captured UCB, a protection check abend occurs. It is the responsibility of the abending program to recover from this appropriately. Programs that wish to store into a UCB must do so using the actual UCB address and not a captured view. Obtaining the actual UCB address can be done using services provided by IOS.

Review the IXLLOCK hash algorithm (Required-IF, as of R7 with rollback via OA03194)

Required if you use coupling facility lock structures.

Before z/OS V1R7, the number of XES connections to serialized structures (lock and serialized list structures) was limited to 64 structures per address space. This limit related to the number of connector-owned data spaces that can reside on an address space's PASN access list. With z/OS V1R7, the system obtains additional data spaces for each lock structure and spreads resource information across the data spaces based on the lock hash value specified on IXLLOCK requests.

Migration action: Review the hash algorithm used by your application to ensure that the algorithm produces hash values that are evenly distributed on the low-order digit of the result.

Update IPCS subcommands that require the ERROR criterion to select ASIDs(Required-IF, as of R7)

Required if you have IPCS procedures that require the ERROR criterion to select ASIDs.

Before z/OS V1R7, most IPCS subcommands that support ASID selection criteria defaulted to both CURRENT and ERROR ASIDs. As of z/OS V1R7, the default for address space selection has been changed to solely the CURRENT option. If you have specific IPCS procedures that benefit from using the ERROR option to select ASIDs, update those procedures to explicitly request the option.

Migration action: Update appropriate IPCS procedures to explicitly request the ERROR option to select ASIDs.

Update operator procedures for certain changed MVS commands (Required-IF, as of R7)

Required if you expect certain results from issuing any of the following MVS commands: START DEALLOC, VARY OFFLINE, and UNLOAD.

Before z/OS V1R7, certain MVS commands produced results that are different from what occurs in z/OS V1R7:

- The START DEALLOC command was used to redrive pending offline processing, often as an automated procedure. As of z/OS V1R7, the pending offline process is a timer-driven process and a redrive procedure is not required by the installation.
- Before z/OS V1R7, when message IEF238D ("Reply device_name, WAIT OR CANCEL") was issued, VARY OFFLINE processing for a device could not complete until the operator responded to the message. The device entered a pending offline state (message IEF524I, "device PENDING OFFLINE") and remained so for 15 minutes, at which point message IEF525E ("device STILL PENDING OFFLINE") was issued and repeated at 15 minute intervals until either a response was provided or the job was canceled. As of z/OS V1R7, when message IEF238D is issued, VARY OFFLINE processing is not initiated until the message is replied to. Messages IEF524I and IEF525E are not issued

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until the VARY OFFLINE processing is started. Devices that were already in a pending offline state before message IEF238D was issued can be processed.

Also, prior to the improvements in VARY OFFLINE processing in z/OS V1R7, when an operator responded to message IEF238D (Recovery Allocation) with a device number that was “pending offline”, the device would remain “pending offline” after the device was unallocated (that is, when the job was finished with it). As of z/OS V1R7, it is likely that the device will go offline before the Recovery Allocation process can bring it online. Therefore, the device will no longer be marked “pending offline” after the allocation completes. You must reissue the VARY command to bring the device offline.

- Previously, when a device was “pending unload” because of being allocated when an UNLOAD command was issued, the device would remain “pending unload” after the device was unallocated (that is, when the job was finished with it). As of z/OS V1R7, because of changes in UNLOAD processing, if a volume is mounted on a device and the device is allocated, the system passes responsibility for unloading the device to the job that allocated it. The pending unload process will complete with message IEF415I.

Migration action: Update your operator procedures to allow for the changed behavior of these commands

Correct programs that issue erroneous WTO or WTOR messages (Recommended)

Not required, but is recommended to prevent system errors if erroneous WTO and WTOR parameter lists are processed. Prior to the z/OS V1R4 Consoles Enhancements feature, you could create WTO and WTOR parameter lists that were invalid, yet the WTO and WTOR service would accept them with a zero return code and no abend. An example is invalid parameter combinations. In some cases the message would be partially displayed, but in other cases the message might not be displayed at all or would result in system errors.

Effective with the z/OS V1R4 Consoles Enhancements feature, the WTO and WTOR services now provide stronger parameter list checking to prevent errors. In most cases, the WTO and WTOR services now record any errors as symptom records in the logrec data set and issue a D23 abend for diagnostic purposes. The message might or might not be partially displayed in these cases. Also, your program will likely get different return codes from the WTO and WTOR service than it did in prior releases.

You should correct programs that issue erroneous WTO or WTOR messages regardless of whether the messages are actually displayed.

Migration action: Look in the logrec data set for WTO and WTOR symptom records and D23 abends. Correct any erroneous WTO or WTOR parameter lists that you find.

When a logrec symptom record is produced, it may indicate the following:

- Whether the error is caused by a WTO or WTOR.
- Whether the WTO issuer was authorized or a problem program.
- As much information as could be gathered to identify the issuer. The record may contain the ASID, job name, program name, and offset into the program where the WTO was issued.
- A description of the error.
- The message line number where the error was detected.
- The WTO/WTOR parameter list (WPL). Note that the entire WPL might not be shown due to size constraints.
- The text of the first line if a multiline WTO.

As stated previously, a D23 abend may be issued for these errors. The abend is for diagnostic purposes only and no dump is taken. If you need a dump to debug the problem, you can set the following SLIP to cause the dump:

```
SLIP SET,ENABLE,COMP=D23,ACTION=SVCD,END
```

Reference information: For more information about diagnosing missing message errors and D23 abends, see the WTO and WTOR macros in *z/OS MVS Programming: Assembler Services Reference IAR-XCT* and *z/OS MVS Programming: Authorized Assembler Services Reference SET-WTO*

Adjust accounting practices for changed WTO and WTOR processing (Required-IF, as of R4 Consoles)

Required if applications use WTO or WTOR services and processing time is significant to your accounting practices.

Effective with the z/OS V1R4 Consoles Enhancements feature, WTO and WTOR processing is changed in that processing that used to be performed asynchronously now occurs in the WTO/R path (SVC 35). This processing is now done much earlier than in prior releases and results in additional processing occurring under the unit of work of the WTO or WTOR issuer.

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Thus, if your accounting practices take into account the time used by an application, you might want to consider adjusting them because applications that are heavy users of the WTO and WTOR services will now use more time. Typically, most heavy users of the WTO and WTOR services are subsystems, which are often considered as system overhead for accounting purposes.

Migration action: Adjust your accounting practices based on your installation's policies.

Reference information: For information about using the WTO and WTOR macros, see *z/OS MVS Programming: Assembler Services Reference IAR-XCT* and *z/OS MVS Programming: Authorized Assembler Services Reference SET-WTO*.

IBM

XL C/C++ Migration Actions from z/OS R4 to z/OS R7

► **Migration Actions You Can Do NOW:**

- ➔ Review the **XL C/C++ Migration Guide for the Application Programmer (Recommended)**
 - For instance, there may be c89 utility information that could be of possible interest to the sysprog.
- Migrate from use of the C/C++ ISPF panels (**Required-IF, as of R6**)
 - Invoke the C/C++ compiler via z/OS UNIX commands, using JCL, and under TSO/E
- Remove your dependency on the C/C++ IBM Open Class Library (**Required-IF, as of R5**)
 - Development support is removed. This includes removal of the Application Support Class and Collection Class libraries. Use the C++ Standard Library (shipped with Language Environment) instead.

Remove your dependency on the OS/390 R10 level of the C/C++ compilers (**Required-IF, as of R7**)

- Only the ISO C/C++ compilers are shipped in z/OS R7! (The OS/390 R10 C/C++ compilers have been removed.). Remove your dependency on the OS/390 R10 C/C++ compilers now!
- Can copy the OS/390 R10 C/C++ compilers to your z/OS R7 system - see APAR PK05324.
- Some utilities will default to the ISO C/C++ compiler: z/OS USS c89, cc, and cxx default to z/OS C/C++.
- Ensure references are to the desired compiler level in:
 - JCL jobs and cataloged procedures
 - TSO/E REXX execs and logon procedures
 - SYSLIB concatenation and SEARCH option

► **Migration Actions Pre-First IPL:**

- Accommodate the change to the euro as the default currency (**Required-IF, as of R6**)
 - Prior to R6, default local currency for EU countries was the local currency in the LC_MONETARY category of the locale. Now, it's the euro.

► **Migration Actions Post-First IPL:**

- ➔ Add CEE.SCEERUN2 to user-written compiler procedures (**Required-IF, as of R5**)
 - If you had a reference to CEE.SCEERUN in your JCL, add CEE.SCEERUN2.

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XL C/C++ Migration Actions Between z/OS R4 and z/OS R7

These migration actions were taken from *z/OS Migration*. Some descriptions and actions have been shortened for inclusion in this presentation. For the complete descriptions and actions, refer to *z/OS Migration*.

XL C/C++ Migration Actions You Can Do Now

Review the XL C/C++ Migration Guide for the Application Programmer (Recommended)

Not required, but recommended if you use XL C/C++.

The publication *z/OS XL C/C++ Compiler and Run-Time Migration Guide for the Application Programmer* is written for application programmers, whereas *z/OS Migration* is written for system programmers. However, in some customer locations, job scope could overlap such that system programmers might find information in the XL C/C++ publication that is relevant to their responsibilities. For example, migration information related to the c89 utility in the XL C/C++ publication could be of interest. Therefore, you ought to review the XL C/C++ publication if you use XL C/C++.

Migrate from use of the C/C++ ISPF panels (Required-IF, as of R6)

Required if you use the C/C++ ISPF panels.

In z/OS V1R6, IBM has removed the C/C++ ISPF panels from z/OS. z/OS V1R5 was the last release that includes the panels. These panels are shipped with the C/C++ without Debug Tool feature and include panels for C/C++ foreground compiles, C/C++ background compiles, and help panels for these compiles.

Migration action: Instead of using the ISPF panels, you can continue to invoke the C/C++ compiler via z/OS UNIX commands, using JCL, and under TSO/E.

Reference Information: *z/OS C/C++ User's Guide*.

Remove your dependency on the C/C++ IBM Open Class Library (Required-IF, as of R5)

Required if you use the C/C++ IBM Open Class Library

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As of z/OS V1R5, development with the C/C++ IBM Open Class Library is not supported. This includes removal of the Application Support Class and Collection Class libraries. Run-time support is provided for existing applications, but this support will be removed in a future release.

The data sets and paths that are affected are:

- The path for the header file is changed from /usr/lpp/ioclib to /usr/lpp/cbclib.
- The IBM Open Class (IOC) samples are removed from /usr/lpp/ioclib/sample.
- The Application Support and Collection Class Library headers are removed from /usr/lpp/ioclib/include.
- The Application Support and Collection Class Library static onxplink/xplink objects are removed from CBC.SCLBCPP2.
- The Application Support and Collection Class Library static objects are removed from CBC.SCLBCPP.
- The Application Support and Collection Class Library files are removed from CBC.SCLBH.C.
- The Application Support Class Library files are removed from CBC.SCLBH.HPP.
- The Collection Class Library files are removed from CBC.SCLBH.INL.
- The Application Support and Collection Class Library side decks are removed from CBC.SCLBSID.

Migration action: For new application development that needs C++ library support, use the C++ Standard Library, shipped with z/OS base element Language Environment, instead of the C/C++ IBM Open Class Library.

You can no longer compile and link applications that use IOC classes. This includes all the classes, templates, and facilities that are described in *IBM Open Class Library Reference* with the two exceptions noted below. Run-time support is provided for existing applications that use IOC, but this support will be removed in a future release.

The following classes are still supported for application development. The name of the base element that provides this application development support has changed from C/C++ IBM Open Class Library to Run-Time Library Extensions:

- UNIX System Laboratories (USL) I/O Stream Library
- USL Complex Mathematics Library

Although support for these two classes is not being removed at this time, it is recommended that you migrate to the Standard C++ iostream and complex classes. This is especially important if you are migrating other IOC streaming classes to Standard C++ Library streaming classes, because combining USL and Standard C++ Library streams in one application is not recommended.

Remove your dependency on the OS/390 R10 level of the C/C++ compilers (Required-IF, as of R7)

Required if you are currently using the OS/390 V2R10 C/C++ compilers to compile your programs.

Starting with z/OS V1R2, the OS/390 V2R10 C/C++ compiler was shipped in addition to the strategic ISO XL C/C++ compiler that is provided with the z/OS optional feature C/C++ without Debug Tool. As of z/OS V1R7, the OS/390 V2R10 C/C++ compiler is removed from the C/C++ without Debug Tool feature, leaving only the ISO C/C++ compiler..

Migration action: The ISO C++ Standard (also known as ISO/C++98 or ANSI/C++98) introduces new features to the C++ language. Semantics are changed, keywords are added, and new facilities are added to the Standard Library.

Highlights are:

- The **for**-loop scoping rule is changed.
- Implicit **int** is no longer supported.
- The semantics of **friend** class declaration is changed.
- The semantics of the **throw** operator is changed.
- Exception handling is added to the **new** and **delete** operators.

The following keywords are added to the compiler. If your existing code uses any of these keywords as identifiers, the recommended practice is to change your code. If that is not possible or not practical, use the NOKEYWORD(keyword) option to disable the individual keyword.

- bool
- explicit
- export
- false
- mutable
- namespace
- true
- typename
- using

Use the LANGLVL option, which controls the language level of the compiler, to help in your migration:

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- LANTLRVL(COMPAT92). This option group instructs the z/OS C/C++ compiler to follow the OS/390 V2R10 compiler's semantics whenever possible. Use this as a tactical transition if your code compiles with OS/390 V2R10 and you want to move quickly to the new compiler with minimal immediate changes.
- LANTLRVL(STRICT98) or LANTLRVL(ANSI). These two are identical; they instruct the z/OS C/C++ compiler to follow the ISO/C++98 standard.
- LANTLRVL(EXTENDED). This is the extended language level; it includes all IBM extensions on top of ISO/C++98. The OS/390 V2R10 C/C++ compiler is shipped along with the new z/OS C/C++ compiler. If the source changes required by the new C++ Standard cannot be applied to your existing code all at once, you can also use the OS/390 V2R10 C/C++ compiler to help the transition. Setup considerations in the environment to select the respective compiler are described below:

Replace the following OS/390 V2R10 compiler options, which are not supported with the newer compilers:

- DECK. The replacement for the DECK functionality that routes output to DD:SYSPUNCH is OBJECT(DD:SYSPUNCH).
- GENPCH.
- HWOPTS. The replacement for HWOPTS is ARCHITECTURE.
- LANTLRVL(COMPAT).
- OMVS. The replacement for OMVS is OE.
- SRCMSG.
- SYSLIB. The replacement for SYSLIB is SEARCH.
- SYSPATH. The replacement for SYSPATH is SEARCH.
- USEPCH.
- USERLIB. The replacement for USERLIB is LSEARCH.
- USERPATH. The replacement for USERPATH is LSEARCH.

Note that GENPCH and USEPCH served as a tactical initiative to reduce compile times. IBM is concentrating instead on improving compile times by building the compilers with successively higher levels of optimization from release to release, exploiting the ongoing optimization improvements made in the compilers.

Note: If you are not yet able to migrate to the ISO XL C/C++ compiler, you can copy the OS/390 V2R10 C/C++ compiler (which is not shipped with z/OS V1R7) from your old z/OS system for use on z/OS V1R7, with limitations. See informational APAR PK05324 for details.

z/OS UNIX System Services

c89, cc, and cxx default to z/OS C/C++. You can override the compiler selection with the use of environment variables, shown below:

Environment variables	Value as of z/OS V1R2 C/C++ (default)	Value for OS/390 V2R10 C/C++
C89_CVERSION	"0x41020000"	"0x220A0000"
CC_CVERSION	"0x41020000"	"0x220A0000"
CXX_CVERSION	"0x41020000"	"0x220A0000"
C89_CNAME	"CCNDRVR"	"CBCDRVR"
CC_CNAME	"CCNDRVR"	"CBCDRVR"
CXX_CNAME	"CCNDRVR"	"CBCDRVR"
STEPLIB	include SCCNCMP	include SCBCOMP

JCL jobs and cataloged procedures

z/OS C/C++ cataloged procedures are in the hlq.SCCNPRC library. There are new cataloged procedures for z/OS C/C++, aliased to old procedure names where applicable. OS/390 V2R10 C/C++ cataloged procedures are in the hlq.SCBCPRC library. You can switch compilers by switching proclibs.

TSO/E REXX execs and logon procedures

z/OS C/C++ TSO/E REXX execs are in the hlq.SCCNUTL library. OS/390 V2R10 C/C++ TSO/E REXX execs are in the hlq.SCBCUTL library. You can switch compilers by switching SYSPROC and STEPLIB allocations in the logon procedure.

Reference information: For more information about the compiler changes that were made between OS/390 V2R10 and z/OS V1R2, and about migrating from the older to the newer level, see *z/OS C/C++ Compiler and Run-Time Migration Guide*. The new language standard is described in publications from the International Standards Organization (ISO) and the American National Standards Institute (ANSI). They make them available for purchase on the Internet at <http://www.iso.ch> and at <http://www.ansi.org>. For details about the LANTLRVL option, see *z/OS C/C++ User's Guide*.

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XL C/C++ Migration Actions Pre-First IPL

Accommodate the change to the euro as the default currency (Required-IF, as of R6)

Required if your applications use the default currency and need to use the local currency (that is, not the euro currency symbol).

Migration action: Prior to z/OS V1R6, the default currency for European Union countries was set to the local currency in the LC_MONETARY category of the locale. If you wanted to set the euro as the currency, you would set the @euro locales using setlocale(). As of z/OS V1R6, the LC_MONETARY information in the base locale is set to use the euro. If you set the base locale, the euro is now the default currency. If you want your applications to continue using the old (local) currency, you must now issue setlocale() with the new @preeuro locale as the parameter. Behavior of the @euro locales has not changed.

To set the euro as the currency, do nothing. But if you want to restore the prior situation, which is to use the local currency as the default, use the setlocale() function to do so.

XL C/C++ Migration Actions Post-First IPL

Add CEE.SCEERUN2 to user-written compiler procedures (Required-IF, as of R5)


Required if you modified any IBM-supplied procedures that reference the CEE.SCEERUN2 data set.

As of z/OS V1R5, CEE.SCEERUN2 was added; it is a PDSE that contains the run-time library routines needed during execution of applications written in XL C/C++ and COBOL.

Migration action: Add a reference to CEE.SCEERUN2 wherever you have a reference to CEE.SCEERUN in user-written JCL. If you have the current z/OS level of CEE.SCEERUN, CEE.SCEERUN2, CBC.SCCNCMP, CBC.SCLBDLLL, and CBC.SCLBDLL2 in your system's link list, there is no need to have a STEPLIB DD statement specified in your XL C/C++ compiler procedures.

DFSMS Migration Actions from z/OS R4 to z/OS R7

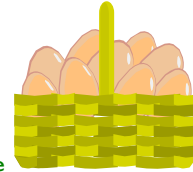
► Migration Actions You Can Do NOW:

-  **Redefine existing VSAM data sets that contain the IMBED, REPLICATE, and KEYRANGE attributes (Recommended)**
 - Determine which VSAM data sets were allocated with IMBED, REPLICATE, or KEYRANGE by using tool **IMBDSHIP.JCL.TRSD**.
 - Schedule a time for the VSAM data sets to be unavailable, and redefine them.

- Convert ISAM data sets and programs to VSAM (Required-IF, as of R7)
 - R7 removes support for ISAM. Convert to VSAM data sets. ISAM programs can still use ISAM interface to VSAM.
- Remove CATALOG parm from DEFINE PAGESPACE unless RECATALOG is specified (Required-IF, as of R7)
- Ensure that the DFSMSshm journal is allocated correctly (Required, as of R7)
- Evaluate the need to increase DFSMSrmm control data set size (Required, as of R5 APAR)

► Migration Actions Pre-First IPL:

- Ensure that the Language Environment run-time is available for DLLs (Required-IF)
 - SCEERUN and SCEERUN2 must be available to create or use DLLs
- Build the IPLable stand-alone DFSMSdss image (Required-IF)
 - Use the **BUILDASA** command to create the Stand-Alone Services IPL-capable core image
- Ensure SYSI.IMAGELIB is customized for your printing environment (Required-IF)
 - ServerPac delivers a new SYSI.IMAGELIB, and you may have had line mode printer information in your previous SYSI.IMAGELIB
- Tune DFSMSshm for the secondary space management multiple tasks enhancement (Recommended, as of R6)
 - Among other things, determine the max number of SSM tasks that should be processed concurrently. Prior to z/OS VIR6, the default was 1. Now the default is 3.



► Continued on next foil...

DFSMS Migration Actions from z/OS R4 to z/OS R7

► Continued from previous foil...

► Migration Actions Pre-First IPL:

- Modify DFSMSshm ARCMDEXT and ARCMEXT exit routines to handle data set processing (Required-IF, as of R5)
- Modify HQUERY REQUEST commands that don't have request numbers (Required-IF, as of R5)
 - To determine all pending hsm requests for a userid use **HQUERY**, and not **HQUERY REQUEST**

-  **Use catalog search order, instead of JOBCAT and STEPCAT (Required-IF, as of R7)**
 - In z/OS R7, JOBCAT and STEPCAT support has been removed. You can no longer enable or disable them.

- Define RACF FACILITY class profiles for DFSMSshm (Required-IF, as of R5)
 - If you have the RACF FACILITY class active, you must define the new profiles prior to starting DFSMSshm in z/OS R5. If you do not have the new profiles defined, every DFSMSshm command fails.
- Make sure your VOLCAT is large enough to support 255 media types (Required-IF, as of R5)
 - LIBRARYENTRY in the volume catalog (VOLCAT) has increased in size to accommodate 255 media types and recording technologies.
- Convert the optical configuration database to z/OS R5 format (Required, as of R5)
 - You must run the **CBRSMR15** sample job to convert your optical configuration data base to z/OS R5 format. It adds two new columns to the DB2 TAPEVOL table.
- Recompile exit ADRUIXIT or your UIM because the ADRUFO parm list increased (Required-IF, as of R5 and APARs)
 - Length of ADRUFO parameter list has increased. Recompile installation exit ADRUIXIT or the UIM with the updated ADRUFO macro.

► Migration Actions Post-First IPL:

- Ensure the integrity of SMS control data sets (Recommended)
 - Update, translate, validate, and activate SMS policies from a z/OS VIR6 system, when in a mixed-level sysplex

Migrating to z/OS R7

DFSMS Migration Actions Between z/OS R4 and z/OS R7

These migration actions were taken from *z/OS Migration*. Some descriptions and actions have been shortened for inclusion in this presentation. For the complete descriptions and actions, refer to *z/OS Migration*.

DFSMS Migration Actions You Can Do Now

Redefine existing VSAM data sets that contain the IMBED, REPLICATE, and KEYRANGE attributes (Recommended)

Recommended because it will become a requirement in a future release.

No supported release of z/OS allows you to use the IMBED, REPLICATE, and KEYRANGE attributes for new VSAM data sets. In fact, using these attributes can waste DASD space and often degrades performance. Servicing these VSAM data sets has become increasingly difficult. In some cases, unplanned outages have occurred. To provide an environment in which outages are less likely, IBM has announced the removal of the support in existing VSAM data sets for the IMBED, REPLICATE, and KEYRANGE attributes. IMBED and REPLICATE were intended as performance improvements and have been obsoleted by newer, cached DASD devices. Striped data sets provide much better performance than KEYRANGE and should be viewed as a candidate for any existing KEYRANGE data sets.

Migration action:

1. Determine which VSAM data sets were defined with the IMBED, REPLICATE, or KEYRANGE attribute. To help you perform this task, you can get a tool that reads existing VSAM data sets and reports which ones have these attributes. The tool is available from the software server (<ftp://software.ibm.com>) in the `s390/mvs/tools` directory as `IMBDSHIP.JCL.TRSD`. Download the file in binary format and uncompress it on your z/OS system using `TRSMMAIN`. Instructions for using the tool are included in the downloaded JCL. See APAR II13894 for additional information.
2. Install the PTF for APAR OA10952. The PTF fixes the problem in which an exported copy of a VSAM data set that has the IMBED or REPLICATE attribute (or both) does not remove the attribute when the `IMPORT` is done. Note that this change helps further remove, through normal processing, data sets that have the IMBED or REPLICATE attribute. The PTFs for APAR OA10952 are `UA17230` for z/OS V1R6, `UA17229` for z/OS V1R5, and `UA17237` for z/OS V1R4.
3. Schedule a time for the affected VSAM data sets to be unavailable, and redefine them.

Convert ISAM data sets and programs to VSAM (Required-IF, as of R7)

Required if you have any ISAM data sets in use or programs that use ISAM.

In z/OS V1R7, IBM removed most support for the indexed sequential access method (ISAM) and indexed sequential data sets. Users are no longer able to process (create, open, copy, or dump) ISAM data sets. Current ISAM data sets can still exist, and users can display information about them and delete them. Before migrating to z/OS V1R7, any ISAM data sets still in use should be copied or converted to VSAM data sets. Subject to existing restrictions, programs that use ISAM will continue to work using the ISAM interface to VSAM.

Migration action:

1. Find out if you have ISAM data sets or programs that use ISAM:

For data sets: If you know your system has no ISAM data sets, you do not have to take migration steps. If you are not sure whether your system has ISAM data sets in use, you can take one of the following actions to find out:

- Check for `SYS1.ISAMLPA` — if `SYS1.ISAMLPA` is not in your existing LPA concatenation or `LINKLST` concatenation, then programs are not using ISAM to access ISAM data sets (they could still be using the ISAM interface to VSAM). Note: the system data set `SYS1.ISAMLPA` and the distribution library `SYS1.AOSD8` no longer exist in z/OS V1R7. If `SYS1.ISAMLPA` is in your LPA concatenation, you should remove it. This will save you about 177,528 bytes below the 16 MB line in LPA. Removing this will not affect programs that use the ISAM interface to VSAM data sets.
- Use the `DCOLLECT` function of `IDCAMS` to search online volumes for a data set that has `IS` or `ISU` indicated for the `DSORG` value.
- Check system logs for message `IEC134I` — starting in `OS/390 V2R10`, this message has been issued whenever ISAM data sets are opened, to warn that ISAM support is being discontinued.

For programs: To find programs that use ISAM services, do the following:

- Search for `DSORG=IS` in assembler source code and JCL. It appears on the `DCB` macro for `BISAM` and `QISAM` and on the `DD` statements. Search for equivalent statements in COBOL and PL/I programs. Then find the data sets used by these programs or JCL.

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- It is possible that you have an assembler language program that uses certain internal IBM macros that are no longer distributed. They were previously shipped in the SYS1.AMODGEN macro library. Their names, and any alternatives to use, are: IGGDEBD, IGGIOBD, IEZIOB, IGGLDCP, IGGLOAD, IGGSCAN, IGGWKNCP.
 - Look for any invocations of the IEBISAM utility program and remove them or ensure they are not used.
2. For ISAM data sets and the programs that use them, take one of the following actions before migrating to z/OS V1R7:
- Delete the data sets or programs if no longer needed.
 - Copy the data to VSAM data sets and switch to using the ISAM interface to VSAM.
 - Convert the programs and data sets to VSAM.

Remove the CATALOG parameter from DEFINE PAGESPACE commands unless RECATALOG is specified (Required-IF, as of R7)

Required if you specified the CATALOG parameter on a DEFINE PAGESPACE command without the RECATALOG parameter. Before z/OS V1R7, it was possible to specify a catalog on the access method services command to define a new page space. However, IBM recommended against the use of this CATALOG parameter, since it could conflict with the allocate specifications for the main page space data set. As of z/OS V1R7, the CATALOG parameter is no longer supported on the AMS DEFINE PAGESPACE command, unless it is used together with the RECATALOG parameter. Commands specifying the CATALOG parameter without RECATALOG will fail with the message IDC3171I.

Migration action: In jobs that issue the access method services DEFINE PAGESPACE command with the CATALOG parameter, delete the CATALOG parameter unless the RECATALOG parameter is also specified.

Ensure that the DFSMSHsm journal is allocated correctly (Required, as of R7)

The DFSMSHsm journal data set must be allocated with the following attributes:

- Single volume
- Single extent
- Contiguous space
- No secondary space allocation
- Non-striped

Before z/OS V1R7, definition of the attributes was not enforced by the DFSMSHsm code, even though the attributes were documented in *z/OS DFSMSHsm Implementation and Customization Guide*. Starting with z/OS V1R7, their definition is enforced by the code. Therefore, you should make sure that you've defined your journal data set correctly. Failure to define the journal with the attributes above causes DFSMSHsm to shut down. These attributes are required even if you use a large format data set for the journal.

Evaluate the need to increase DFSMSrmm control data set size (Required, as of R5 APAR)

As of z/OS V1R5, the required space for your DFSMSrmm control data set increases over time. This requirement for additional space is caused by an increase in the size of the volume record caused by APAR OW56584 and extended bin support when it is enabled. For example, each time a volume record is updated (such as during inventory management) or a new data set is written on a volume, the associated control data set volume records migrate to a new level dynamically. This increases the size of the volume record by 64 bytes. When extended bin support is enabled, the size of the bin records also increases by 24 bytes if the move is to or from a bin-managed storage location. In addition, larger control data set records for volumes and bins require larger journal records.

Migration action: Refer to the detailed steps in *z/OS Migration* for the migration action to perform.

DFSMS Migration Actions Pre-First IPL

Ensure that the Language Environment run-time library is available for DLLs (Required-IF)

Required if your installation builds or references DLLs.

Language Environment provides common services and language-specific routines in a single run-time environment. You can use Language Environment to build and use dynamic link libraries (DLLs) for applications.

Migration action: If your installation builds or references DLLs, either you must set up the system link list to refer to the Language Environment run-time libraries (SCEERUN and SCEERUN2), or each job that creates or uses a DLL must include a STEPLIB DD statement referencing these libraries.

Reference information: *z/OS DFSMS Migration*, *z/OS Language Environment Run-Time Migration Guide*, *z/OS Language Environment Customization*, and *z/OS Language Environment Programming Guide*

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Build the IPLable stand-alone DFSMSdss image (Required-IF)

Required if you intend to use the Stand-Alone Services provided by DFSMSdss.

If you intend to use the Stand-Alone Services provided by DFSMSdss, you must use the DFSMSdss BUILDSA function to create the Stand-Alone Services IPL-capable core image

Migration action:

1. Prepare for Stand-Alone Services by creating a Stand-Alone Services IPL-able core image with the BUILDSA command. With the BUILDSA command you can specify the device (card reader, tape drive, or DASD volume) from which Stand-Alone Services will be IPLed. You can also specify the operator console to be used for Stand-Alone Services. The BUILDSA function builds the IPL-able core image under the current operating system and determines a record size based on whether the IPL is from card, tape, or DASD.
2. Use RACF or another external security system to protect the SYS1.ADR.SAIPLD.Vvolser data set and the Stand-Alone Services modules.
3. If you haven't done so already, make a backup copy of your system that can be restored by this function. For information about backing up volumes, see *z/OS DFSMSdss Storage Administration Guide*.

Reference information: *z/OS DFSMS Migration* and *z/OS DFSMSdss Storage Administration Reference*.

Ensure your SYS1.IMAGELIB is customized for your printing environment (Required-IF)

Required if you are not using your old SYS1.IMAGELIB, you are installing with ServerPac or SystemPac, and you are using line mode printers such as the 3800 or 3900.

If you use line mode printers such as the IBM 3800 or the IBM 3900 running in line mode (not page mode), you must install library character sets, graphic character modification modules, and character arrangement tables in SYS1.IMAGELIB. This migration action does not apply if you are using IBM 3900 printers that are driven by PSF.

Migration action:

1. Run the LCSBLD1 job from the samplib data set to create character sets, graphic character modification modules, and character arrangement tables in SYS1.IMAGELIB.
2. Copy customized or locally-written FCBs and UCS images from your old system's SYS1.IMAGELIB data set to the new system's SYS1.IMAGELIB data set.

Reference information: *z/OS DFSMS Migration*.

Tune DFSMShsm for the SSM multiple tasks enhancement (Recommended, as of R6)

Recommended if you use secondary space management.

The secondary space management (SSM) function is enhanced to run with multiple tasks in a single DFSMShsm host, allowing the function to complete more quickly. As a result of this enhancement, the following performance improvements have been made, and you might want to retune DFSMShsm because of them:

- The default number of tasks for SSM has increased from one to three: two cleanup tasks and one tape movement task.
- The default number of recall tasks has increased from 5 to 15 to aid in the processing of deletions that SSM initiates.
- Small data set packing (SDSP) data sets are no longer allocated for the entire SSM window.
- Deletion requests for expired migrated data sets are given a low priority so that user recalls and user-initiated deletions are processed before SSM-generated deletions.

In addition, a new SETSYS parameter, MAXSSMTASKS, allows you to specify the number of SSM tasks that you want to run concurrently.

Migration action:

- Determine the maximum number of SSM tasks that should be processed concurrently. Prior to z/OS V1R6, the default was 1. Now the default is 3: two cleanup tasks and one tape movement task. You can set the maximum by using the SETSYS MAXSSMTASKS command. Note that each SSM tape movement task requires two tape drives if you are using DUPLEXing for migration; this might affect the number of SSM tasks that you want to allow.
- Determine the maximum number of recall tasks that can be processed concurrently. Prior to z/OS V1R6, the default was 5. Now the default is 15 to accommodate SSM deletion requests. You can set the maximum by using the SETSYS MAXRECALLTASKS command. If a DFSMShsm host will not be performing SSM, you will probably want to reduce the maximum number of recall tasks.
- Because SDSPs are no longer allocated for the entire SSM window, you might want to reconsider your SDSP reorganization procedures.
- Reconsider any procedures you have in place to reduce or eliminate user-initiated recalls or deletes during SSM processing because SSM-initiated deletes are processed only after all user-initiated recalls and deletes have been processed.

Migrating to z/OS R7

- Determine the number of SDSF data sets that should be defined to your DFSMSHsm system, now that the number of SSM tasks has increased from one to three (or more). It is important to plan the number of SDSF data sets in relation to the number of concurrent migration tasks and the amount of processing performed by functions with a higher usage priority for the SDSF data sets.

Modify DFSMSHsm ARCMDEXT and ARCMEXT exit routines to handle data set processing (Required-IF, as of R5)

Required if you use the ARCMDEXT or ARCMEXT installation exit.

z/OS V1R5, neither the ARCMDEXT nor the ARCMEXT installation exits were called during command data set migration. Beginning with z/OS V1R5, both are called for command data set migration, either via the HMIGRATE end-user command or the MIGRATE storage administrator command specified with the DATASETNAME parameter. The ARCMDEXT exit is called when migrating from Level0 DASD to either migration level (ML) 1 disk or ML2 tape or disk. The ARCMEXT exit is called when migrating an already migrated data set to either ML1 disk, ML2 disk, or ML2 tape. You should modify your ARCMDEXT and ARCMEXT exit routines to first determine why they are called (volume processing or data set processing) and then perform the volume processing (as before) or data set processing (which is new).

Modify HQUERY REQUEST commands that don't have request numbers (Required-IF, as of R5)

Required if you use the HQUERY REQUEST command with no parameters.

Previously, you could list all pending DFSMSHsm requests for a particular user ID by specifying an HQUERY command with no parameters, or by specifying an HQUERY command with the REQUEST parameter but no request numbers. For example, the following command: HQUERY IBM

Would yield the same result as this command: HQUERY REQUEST

Starting with z/OS V1R5, only the HQUERY command (without parameters) lists all pending requests. The HQUERY REQUEST command fails and message ARC0165I is issued. This change is necessitated by the DFSMSHsm RACF FACILITY class enhancement.

Migration action: Remove the REQUEST parameter from any HQUERY commands that are used to obtain a list of all pending DFSMSHsm requests for a particular user ID.

Use the catalog search order instead of JOBCAT and STEPCAT (Required-IF, as of R7)

Required if you use the JOBCAT or STEPCAT facilities.

As a first step toward removal of the DFSMSdfp JOBCAT and STEPCAT facilities, in z/OS V1R5 the JOBCAT and STEPCAT DD statements were disabled by default, but you could still enable or disable them. **Now, in z/OS V1R7, they have been removed and you can no longer enable or disable them.**

By way of background, the JOBCAT and STEPCAT facilities have been in existence for many years, predating the introduction of ICF (integrated catalog facility) catalogs. JOBCAT and STEPCAT were designed to address some of the functional shortcomings of VSAM catalogs, such as:

- VSAM volume ownership, that is, all data sets on a volume having to be in the same VSAM catalog. Multiple catalogs could not point to data sets on the same volume.
- Performance problems resulting from no multilevel alias support, as well as lack of ability to subset catalog data for recovery purposes.
- Restrictions in the definition of the catalog SVC interface.

The introduction of ICF catalogs in the mid-1980s and other catalog enhancements (such as the multilevel alias support) directly addressed those problems. In addition, processes were developed for system build to use system specific aliases instead of JOBCAT or STEPCAT. CBIPO introduced these processes and they are used today by offerings such as ServerPac to create data set entries in the new master catalog of the system being built.

At the time ICF catalogs were introduced, the JOBCAT and STEPCAT facilities were functionally stabilized. Neither SMS-managed data sets nor UCBs above the 16 megabyte line may be used with JOBCAT or STEPCAT. ICF catalogs contain sufficient functional capabilities that all functions that previously could only be performed with JOBCAT or STEPCAT can now be done without them.

Furthermore, the use of JOBCAT and STEPCAT can actually cause significant problems. Data sets are generally not cataloged according to the normal predictable search order when JOBCAT or STEPCAT is used. This impacts the ability to do comprehensive installation storage management and can increase staff requirements. For example, interval migration and recall using DFSMSHsm is effectively unusable when the data sets cannot be found using the standard

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catalog search order. The use of JOBCAT and STEPCAT can also result in noticeable increases in the time required to perform catalog requests.

Migration action: Change the jobs that use JOBCAT and STEPCAT to use the normal catalog search order, as described in *z/OS DFSMS Access Method Services for Catalogs*.

Define RACF FACILITY class profiles for DFSMSHsm (Required-IF, as of R5)

Required if the RACF FACILITY class is active.

z/OS V1R5, the DFSMSHsm RACF FACILITY class enhancement provides a way to protect all DFSMSHsm command access through the use of RACF FACILITY class profiles. An active RACF FACILITY class establishes the security environment. An active RACF FACILITY class means that DFSMSHsm uses RACF protection for all commands instead of using only simple AUTH command protection.

If the RACF FACILITY class is active, DFSMSHsm uses RACF FACILITY class checking. If you have not defined the new profiles, every DFSMSHsm command fails.

Migration action: If you have the RACF FACILITY class active, you must define the new profiles prior to starting DFSMSHsm V1R5. If the new profiles are not defined, all storage administrator commands and user commands fail. Inform users that they can no longer use the following DFSMSHsm commands. They must use the equivalent commands with the "H" prefix.

OLD Command	NEW Command
QUERY	HQUERY
CANCEL	HCANCEL
BDELETE	HBDELETE
ALTERDS	HALTERDS

Perform the following steps to define new profiles for access to DFSMSHsm commands. These profiles provide DFSMSHsm users and storage administrators the equivalent access to DFSMSHsm commands that they had before installing z/OS V1R5:

1. To allow all users to access all user commands, define a generic profile of STGADMIN.ARC.ENDUSER.* with a default access of READ. For example: RDEFINE FACILITY STGADMIN.ARC.ENDUSER.* UACC(READ).
2. To prevent all users from issuing storage administrator commands, define a generic profile of STGADMIN.ARC.* with a default access of NONE. For example: RDEFINE FACILITY STGADMIN.ARC.* UACC(NONE).
3. To permit storage administrators to issue all DFSMSHsm storage administrator commands, use the RACF PERMIT command. For example: PERMIT STGADMIN.ARC.* CLASS(FACILITY) USER(*userid*) ACCESS(READ).

Reference information: For an outline of the steps for implementing RACF FACILITY classes for DFSMSHsm commands, see *z/OS DFSMS Migration*. For greater detail, see *z/OS DFSMSHsm Implementation and Customization Guide*. For a discussion of the changes to the DFSMSHsm commands, see *z/OS DFSMSHsm Managing Your Own Data*.

Make sure your VOLCAT is large enough to support 255 media types (Required-IF, as of R5)

Required if you use more than four media types or more than five recording technologies.

When the system-managed tape library was originally designed, it supported up to eight media types and 15 recording technologies. Four of the eight media types (MEDIA1/CST, MEDIA2/ECCST, MEDIA3/HPCT, and MEDIA4/EHPCT) and five of the 15 recording technologies (18-TRACK, 36-TRACK, 128-TRACK, 256-TRACK, and 384-TRACK) are used today. As of z/OS V1R5, the tape library supports 255 media types and recording technologies to allow you to easily use additional media types and recording technologies as they become available.

As a result of this change, the LIBRARYENTRY in the volume catalog (VOLCAT) has increased in size. You should examine the size of your volume catalog to ensure that it is large enough to hold your catalog records.

Migration action: Determine whether you have free space in the catalog and have secondary allocation defined for the volume catalog. In most cases, there should be room in your existing volume catalog to accommodate the expanded library record length, which has grown by 1976 bytes.

Note: The first time (and first time *only*) that a specific LIBRARYENTRY is updated (for *any reason*), the length of the record is changed to the new length.

Review any DFSMSHsm PATCH commands that patch the YGCB control block. Two offsets have changed. If you are patching the following two YGCB areas, you need to update your PATCH commands:

- The reuse capacity table for migration tapes has moved from YGCB.+2C to YGCB.+1EC.
- The reuse capacity for backup tapes has moved from YGCB.+6C to YGCB.+22C.

Convert the optical configuration database to z/OS R5 format (Required, as of R5)

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In z/OS V1R5, an Object Access Method (OAM) object enhancement allows OAM to expire object tape volumes and to expire tape and optical volumes that belong to object backup storage groups. This enhancement significantly reduces the amount of private storage that the OAM address space uses at larger installations.

Even if you don't take advantage of this enhancement, you must run the CBRSMR15 samplib job to convert the optical configuration database to z/OS V1R5 format.

Migration action: Run the CBRSMR15 job in SYS1.SAMPLIB to add two new columns, OUNITNAM and DATACLAS, to the DB2 TAPEVOL table.

If you will retain expired tape volumes in their original storage group, or release expired volumes to MVS scratch, then it is appropriate to leave the OUNITNAM and DATACLAS names blank. However, in order for object tape volumes introduced into the OAM inventory prior to z/OS V1R5 to be eligible for reuse when they are returned to OAM scratch status, you must either manually update their OUNITNAM and DATACLAS fields in the TAPEVOL table or, if appropriate, enable SETOAM OAMSCRATCHSYNCH mode in the CBROAM_{xx} PARMLIB member.

Reference information: For information about synchronizing OAM scratch tapes, see *z/OS DFSMS OAM Planning, Installation, and Storage Administration Guide for Object Support*.

Recompile exit ADRUIXIT or your UIM because the ADRUFO parm list increased (Required-IF, as of R6 and rolled back in APARs)

Required if your user exit ADRUIXIT or UIM is sensitive to ADRUFO length changes.

The length of the ADRUFO parameter list has increased to support new functions. You might have to recompile installation exit ADRUIXIT or the user interaction module (UIM) with the updated ADRUFO macro.

Migration action: If you use installation exit ADRUIXIT or invoke DFSMSdss with an application program, perform the following steps:

1. If you use ADRUIXIT to change installation options with the ADRUFO parameter list, review the updated ADRUFO macro to determine if you need to recompile and link-edit installation exit ADRUIXIT using the z/OS V1R5 macro libraries. UFOFUNCT and UFOPARM sizes have increased. New keyword indicators are added and the existing UFOT0IND is changed to UFO4FLGS.
2. If you invoke DFSMSdss using the API and change options with the ADRUFO parameter list on EIOPTION 13, review the updated ADRUFO macro to determine if you need to recompile and link-edit your user interaction module (UIM) using the z/OS V1R5 macro libraries. The increased UFOFUNCT and UFOPARM lengths and changes to some fields in the ADRUFO parameter list might affect the UIM.

Reference information: For details about DFSMSdss application programming interfaces and EIOPTION 13, see *z/OS DFSMSdss Storage Administration Reference*. For ADRUFO mapping, see *z/OS DFSMS Installation Exits*.

DFSMS Migration Actions Post-First IPL

Ensure the integrity of SMS control data sets (Recommended)

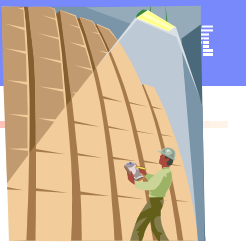
Recommended when using SMS in a mixed-level sysplex.

In a multisystem Storage Management Subsystem (SMS) complex, operating systems share a common set of SMS classes, groups, ACS routines, and a configuration base, which make up the storage management policy for the complex. This storage management policy is maintained in a source control data set (SCDS). When this policy is activated for SMS, the bound policy is maintained in processor storage and on DASD in an active control data set (ACDS). Systems in the complex communicate SMS information through a common communications data set (COMMDS).

It is strongly recommended that to successfully share SMS control data sets in a multisystem environment where there are mixed levels of DFSMS, you update, translate, validate, and activate SMS policies on the system with the latest level of DFSMS. If you do not translate your ACS routines and validate your SCDS on the latest level of DFSMS, the translation and validation might fail. This failure occurs because some constructs and definitions are known only to later levels of DFSMS. It can also occur due to changes in validation rules between releases. Once the control data sets are formatted by the later-level system, the SMS control blocks reflect the new rather than the back-level lengths and control information.

Migration action:

1. Install all coexistence PTFs, which you can find in the z/OS Migration book, or in the presentation "Migrating to z/OS V1.6 - Preparation Can Be Priceless - Part 1".
2. Update, translate, validate, and activate SMS policies from a z/OS V1R6 system. Remember, once you've translated from a z/OS V1R6 system, you risk failure if you update and translate from a back-level system.



HCD Migration Actions from z/OS R4 to z/OS R7


► **Migration Actions You Can Do NOW:**

<None>

► **Migration Actions Pre-First IPL:**

- Use the new HCD profile keyword defaults (Recommended, as of R4 w/z990 Compat support)
 - These keywords now have the default changed from NO to YES:
 - IODF_DATA_SPACE
 - SHOW_IO_CHANGES
 - BATCH_IODF_NAME_CHECK

► **Migration Actions Post-First IPL:**

 **Upgrade the IODF to V5 (Required if you want to make updates to the IODF, and it's not yet at the V5 level, as of R7)**

- **Coexistence considerations with the V5 IODF! For back-level systems:**
 - Need OA07875 (HCD) to read from, IPL with, or dynamically activate a R5 IODF. **CANNOT** use the downlevel systems with this APAR to update the V5 IODF.
 - Need BCP Allocation APAR OA08197 installed on back-level systems to IPL. Without this compatibility code, systems below the z/OS R7 level which attempt to use a V5 IODF will load WAIT0B0 RSN02.
 - Once your IODF is at V5, you must use z/OS R7 HCD libraries to process any updates (STEPLIB or JOBLIB is fine).

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HCD Migration Actions Between z/OS R4 and z/OS R7

These migration actions were taken from *z/OS Migration*. Some descriptions and actions have been shortened for inclusion in this presentation. For the complete descriptions and actions, refer to *z/OS Migration*.

HCD Migration Actions You Can Do Now

<none>

HCD Migration Actions Pre-First IPL

Use the new HCD profile keyword defaults (Recommended, as of R4 with the z990 Compatibility Support)

Not required, but recommended because the new defaults provide more information and data integrity and avoid restrictions on the size of the IODF.

The default values of the following keywords in the HCD profile have changed from NO to YES:

- IODF_DATA_SPACE
- SHOW_IO_CHANGES
- BATCH_IODF_NAME_CHECK

The new defaults provide more information and data integrity, and avoid restrictions on the size of the IODF.

Migration action: Either specify, or default to, YES on the changed keywords in the HCD profile (HCDPROF). However, if you want the behavior to be the same as in releases before z/OS V1R6 (which is not recommended), specify NO on the changed keywords, as follows:

- IODF_DATA_SPACE = NO. This tells HCD that the IODF is to be loaded into the user address space. If you were to specify YES, or allow it to default, the IODF would be loaded into a data space, thereby removing restrictions on the size of the IODF imposed by address space limitations.
- SHOW_IO_CHANGES = NO. This tells HCD, when you're performing both a hardware and software change, not to display information about channel paths, control units, and devices that are deleted, modified, or added. If you were to specify YES, or allow it to default, the information would be displayed.

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- BATCH_IODF_NAME_CHECK = NO. This tells HCD not to check the IODF names specified for batch jobs. If you were to specify YES, or allow it to default, HCD would check whether the IODF specified for a batch job conforms to the naming convention described in *z/OS HCD User's Guide*. Processing of IODFs with invalid names is limited to deletion.

HCD Migration Actions Post-First IPL

Upgrade the IODF to V5 (Required-IF, as of R7)

Required if you need to update the IODF but the IODF is not yet at the z/OS V1R7 level (that is, IODF V5).

A new IODF level, called V5, is introduced in z/OS V1R7. This new IODF level reduces the size of the IODF and improves the processing performance of large configurations. Once z/OS V1R7 is running, updates are only allowed to an IODF that has been upgraded to the V5 level.

Coexistence consideration: To read from, IPL with, and dynamically activate an IODF at the V5 level, the PTFs for coexistence APARs OA07875 and OA08197 are required on back-level systems. If you attempt to IPL with a V5 IODF from a back-level z/OS system that does not have the PTF for APAR OA08197 installed, a wait state occurs. The coexistence PTF for APAR OA07875 allows you to view and dynamically activate the V5 IODF, but does not allow you to update the V5 IODF from back-level systems. Once the IODF has been upgraded to V5, the z/OS V1R7 HCD libraries must be used to process updates to it. (A STEPLIB or JOBLIB from a back-level system to the z/OS V1R7 HCD libraries, or to a copy of the libraries, is acceptable.)

Note: APAR OA07875 is available for z/OS V1R4 systems that have the z/OS V1R4 z990 Compatibility Support feature installed (that is, HCD FMID HCS7708). z/OS V1R4 HCD **without** the z990 Compatibility Support feature (that is, HCD FMID HCS6091) does **not** have an applicable coexistence PTF.

(Tip: HCD FMID HCS7708 shows up as “z/OS V1.4 HCD” on its primary panel and is described as “z/OS V1.4 HCD” in the documentation. HCD FMID HCS6091 shows up as “OS/390 Release 9 HCD” on its primary panel.)

If you are running z/OS V1R4 **without** the z990 Compatibility Support feature, an additional coexistence and fallback requirement applies: you cannot read or dynamically activate a V5 IODF from the z/OS V1R4 system. If you want to read or dynamically activate a V5 IODF from the z/OS V1R4 system, install the z/OS V1R4 z990 Compatibility Support feature (or its replacement, the z/OS V1R4 z990 Exploitation Support feature,) and install the PTF for APAR OA07875.

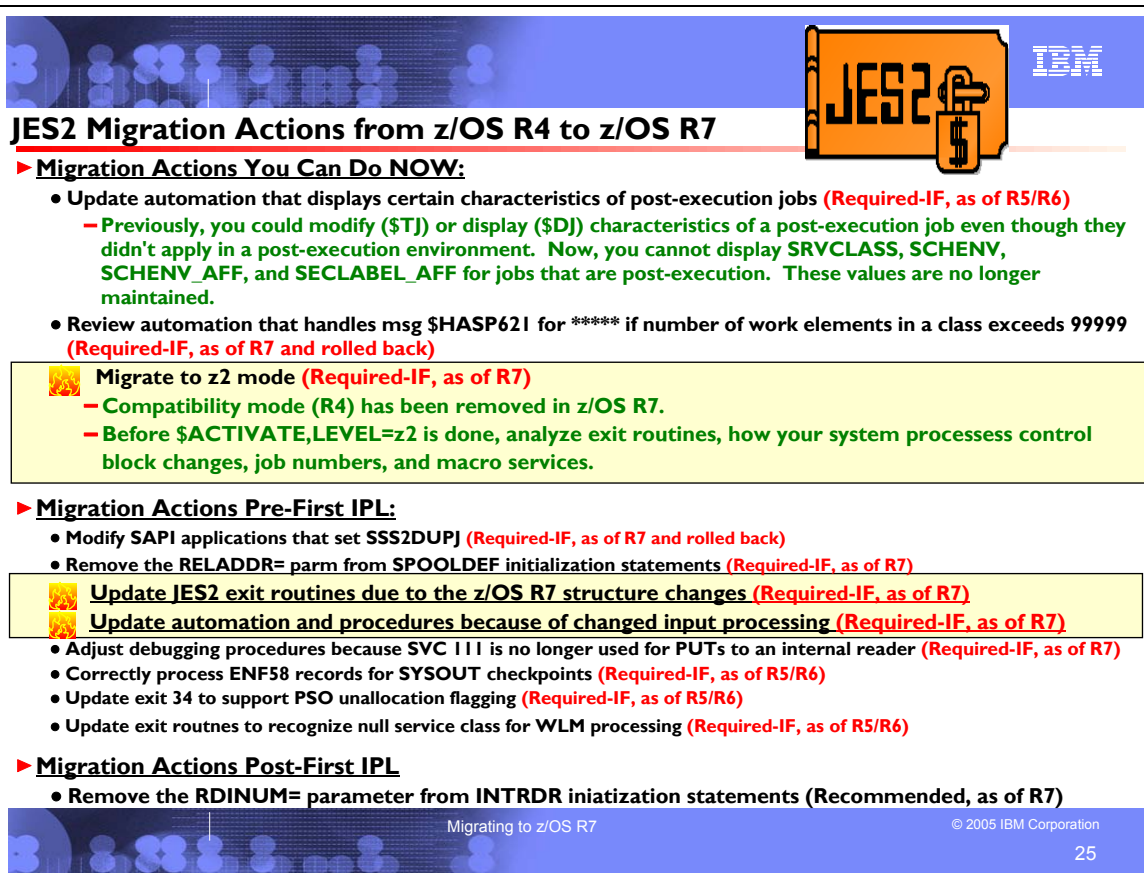
Other methods to satisfy this coexistence requirement are:

- Do not share the IODF. Use EXPORT/IMPORT or COPY to create a second IODF.
- Delay making IODF updates from the z/OS V1R7 system until all systems are at the level of the z/OS V1R4 z990 Compatibility Support feature (FMID HCS7708) or later.

Restrictions: Once z/OS V1R7 is running, updates are only allowed to an IODF that has been upgraded to the V5 level.

Migration action: Upgrade your IODF to the V5 level in order to allow updates to device configurations, following the instructions in *z/OS HCD User's Guide*.

If you wish to make updates to your V5 IODF from back-level systems, ensure that you invoke the z/OS V1R7 HCD libraries to make the updates. A STEPLIB or JOBLIB from the back-level system to the z/OS V1R7 HCD libraries, or to a copy of the libraries, is acceptable.



JES2 Migration Actions from z/OS R4 to z/OS R7

► Migration Actions You Can Do NOW:

- Update automation that displays certain characteristics of post-execution jobs (Required-IF, as of R5/R6)
 - Previously, you could modify (\$TJ) or display (\$DJ) characteristics of a post-execution job even though they didn't apply in a post-execution environment. Now, you cannot display SRVCLASS, SCHENV, SCHENV_AFF, and SECLABEL_AFF for jobs that are post-execution. These values are no longer maintained.
- Review automation that handles msg \$HASP62I for ***** if number of work elements in a class exceeds 99999 (Required-IF, as of R7 and rolled back)

► Migrate to z2 mode (Required-IF, as of R7)

- Compatibility mode (R4) has been removed in z/OS R7.
- Before \$ACTIVATE,LEVEL=z2 is done, analyze exit routines, how your system process control block changes, job numbers, and macro services.

► Migration Actions Pre-First IPL:

- Modify SAPI applications that set SSS2DUPJ (Required-IF, as of R7 and rolled back)
- Remove the RELADDR= parm from SPOOLDEF initialization statements (Required-IF, as of R7)

► Update JES2 exit routines due to the z/OS R7 structure changes (Required-IF, as of R7)

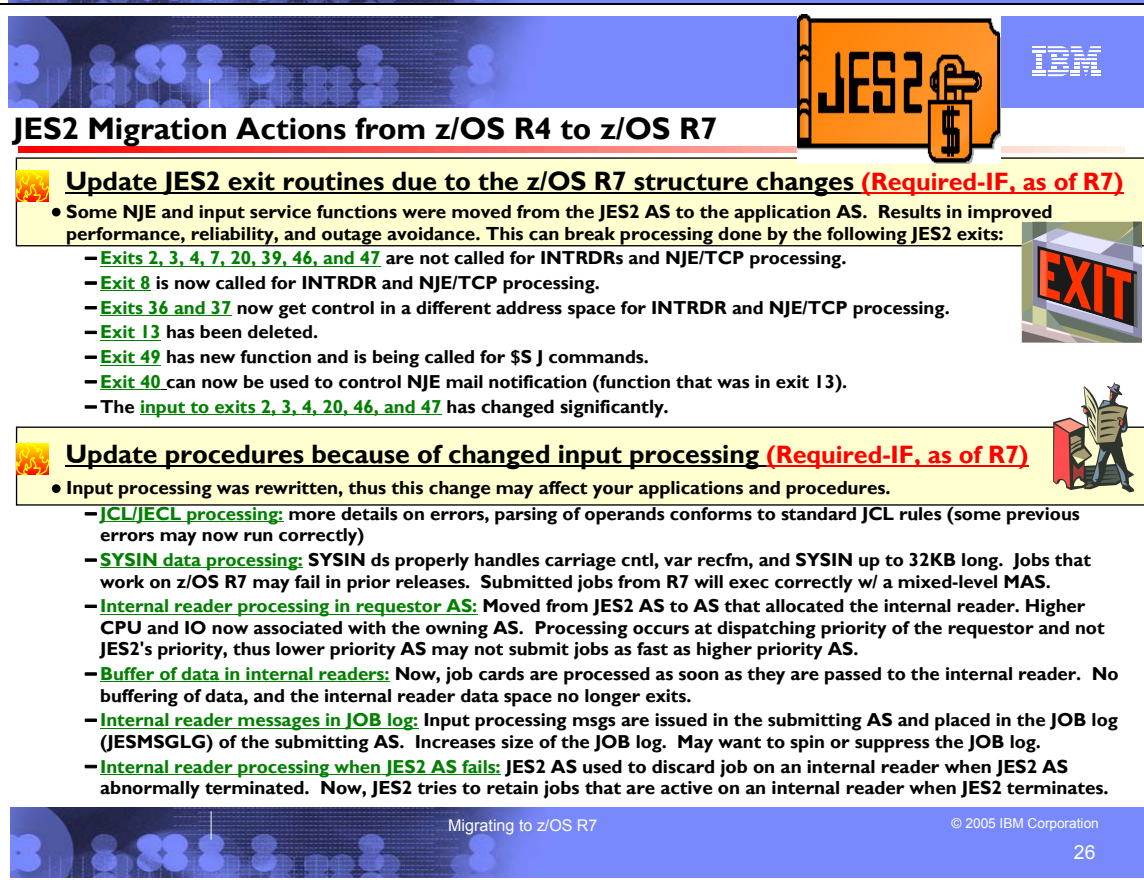
► Update automation and procedures because of changed input processing (Required-IF, as of R7)

- Adjust debugging procedures because SVC 111 is no longer used for PUTs to an internal reader (Required-IF, as of R7)
- Correctly process ENF58 records for SYSOUT checkpoints (Required-IF, as of R5/R6)
- Update exit 34 to support PSO unallocation flagging (Required-IF, as of R5/R6)
- Update exit routines to recognize null service class for WLM processing (Required-IF, as of R5/R6)

► Migration Actions Post-First IPL

- Remove the RDINUM= parameter from INTRDR initialization statements (Recommended, as of R7)

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JES2 Migration Actions from z/OS R4 to z/OS R7

► Update JES2 exit routines due to the z/OS R7 structure changes (Required-IF, as of R7)

- Some NJE and input service functions were moved from the JES2 AS to the application AS. Results in improved performance, reliability, and outage avoidance. This can break processing done by the following JES2 exits:
 - Exits 2, 3, 4, 7, 20, 39, 46, and 47 are not called for INTRDRs and NJE/TCP processing.
 - Exit 8 is now called for INTRDR and NJE/TCP processing.
 - Exits 36 and 37 now get control in a different address space for INTRDR and NJE/TCP processing.
 - Exit 13 has been deleted.
 - Exit 49 has new function and is being called for \$\$ J commands.
 - Exit 40 can now be used to control NJE mail notification (function that was in exit 13).
 - The input to exits 2, 3, 4, 20, 46, and 47 has changed significantly.

► Update procedures because of changed input processing (Required-IF, as of R7)

- Input processing was rewritten, thus this change may affect your applications and procedures.
 - JCL/JECL processing: more details on errors, parsing of operands conforms to standard JCL rules (some previous errors may now run correctly)
 - SYSIN data processing: SYSIN ds properly handles carriage cntl, var recfm, and SYSIN up to 32KB long. Jobs that work on z/OS R7 may fail in prior releases. Submitted jobs from R7 will exec correctly w/ a mixed-level MAS.
 - Internal reader processing in requestor AS: Moved from JES2 AS to AS that allocated the internal reader. Higher CPU and IO now associated with the owning AS. Processing occurs at dispatching priority of the requestor and not JES2's priority, thus lower priority AS may not submit jobs as fast as higher priority AS.
 - Buffer of data in internal readers: Now, job cards are processed as soon as they are passed to the internal reader. No buffering of data, and the internal reader data space no longer exits.
 - Internal reader messages in JOB log: Input processing msgs are issued in the submitting AS and placed in the JOB log (JESMSG LG) of the submitting AS. Increases size of the JOB log. May want to spin or suppress the JOB log.
 - Internal reader processing when JES2 AS fails: JES2 AS used to discard job on an internal reader when JES2 AS abnormally terminated. Now, JES2 tries to retain jobs that are active on an internal reader when JES2 terminates.

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JES2 Migration Actions Between z/OS R4 and z/OS R7

These migration actions were taken from *z/OS Migration*. Some descriptions and actions have been shortened for inclusion in this presentation. For the complete descriptions and actions, refer to *z/OS Migration*.

JES2 Migration Actions You Can Do Now

Update automation that displays certain characteristics of post-execution jobs (Required-IF, as of R5/R6)

Required if you use automation to modify or display SRVCLASS, SCHENV, SCHENV_AFF, or SECLABEL_AFF for jobs that are post-execution.

Prior to z/OS V1R5, you could modify (using a \$TJ command) or display (using a \$DJ command) characteristics of a post-execution job even though those characteristics did not apply in a post-execution environment. As of z/OS V1R5, you cannot display SRVCLASS, SCHENV, SCHENV_AFF, and SECLABEL_AFF for jobs that are post-execution, because JES2 does not maintain these values for jobs once they complete execution.

Migration action: It is possible that operators or automation scripts might attempt to issue a command to modify a range of jobs (or use some filter) that includes jobs that are already in post-execution processing. Educate your operations staff about this change and review and change automation scripts that issue \$Djob and \$Tjob commands that attempt to set SRVCLASS= or SCHENV= for post-execution jobs.

Reference information: For information about using the \$Djob and \$Tjob commands used by operators and automation scripts, see *z/OS JES2 Commands*.

Review automation that handles message \$HASP621 (Required-IF, as of R7 and rolled back via OA08768)

Required if you have automation routines that examine message \$HASP621.

Message \$HASP621 displays the number of work elements in a class. Before z/OS V1R7 JES2, if the number exceeded 99999, an incorrect value was displayed. As of z/OS V1R7 JES2, if the number exceeds 99999, ***** is displayed. Be sure that your automation can handle the new display.

In z/OS R7, the format of the command is: OUT R=..... CLASS class= nnnnn,... where class=nnnnn,... are the classes and the number of work elements in each class. **Note:** If the number of work elements exceeds 99999 then ***** will display.

Migration action: Review automation routines that handle message \$HASP621 to make sure they can handle ***** for the number of work elements, and update any routines that can't handle *****.

Migrate to z2 mode (Required-IF, as of R7)

Required if you use R4 mode.

Before z/OS V1R7, JES2 could operate in either of two modes, as specified on the \$ACTIVATE command: *compatibility (R4) mode* and *full function (z2) mode*. As of z/OS V1R7, JES2 can operate only in z2 mode; R4 mode is withdrawn. z2 mode enables larger limits for jobs, output elements, trackgroup space, and job number range, and improves trackgroup usage tracking. You must migrate to z2 mode before IPLing z/OS V1R7 JES2. Do not activate z2 mode until all systems in the MAS are at z/OS V1R2 or later JES2.

Migration action: In preparing for your migration to JES2 z2 mode, analyze the following:

- Exit routines and unique code that would be affected by activating JES2 in z2 mode. If your exit routines use JQE or JOE chaining fields, or reference job number fields, then z2 mode changes require you to update the exit routines. Field names have been changed to help identify where logic changes are needed. You might want to enable your exit routines to support both R4 and z2 modes to facilitate migration. If your exit routines must support systems running in both modes, be aware that fields within control blocks such as the JQE are mode sensitive. For example in R4 mode, use JQEJOBNO_R4 for the job number in a real JQE; in z2 mode, use JQEBNUM for the job number. However if you are referencing the job number in a JQA (artificial JQE), use JQEBNUM.
- How your JES2 system processes the JOE, JQE, JQA, and JOT control blocks that are significantly changed in z2 mode.
- Control blocks and fields used to store job numbers (such as the \$SJB, \$JIB, \$FSAXB, and \$COMWORK).
- How you use the following JES2 macro services:
 - *\$QJQE and \$#JOE:* These macros process the JQE and JOE control block chains using proper chaining fields based on the current checkpoint processing mode (either R4 mode or z2 mode). Therefore, users of these macros do not have to be sensitive to which JES2 processing mode is currently being used. \$#JOE is changed to process chains (such as the CHAR JOE chain). Both \$QJQE and \$#JOE have improved their loop control and have usability enhancements.

Migrating to z/OS R7

- *\$DOGJQE*: The JQA returned by \$DOGJQE always reflects the z2 mode processing format. Code that processes an artificial JQE (JQA) need not examine the JES2 processing mode (z2 mode or R4 mode) to examine JQA fields.
- *\$JQEJNUM*: \$JQEJNUM is a new macro used to obtain the binary job number for a particular JQE. This macro operates in z2 mode and R4 mode and processes the JQA or JQE that is passed.
- *\$JBIDBLD*: This macro converts a binary job number to a printable job ID. \$JBIDBLD is updated to accept a JQE (or JQA) as input and operates in z2 mode or R4 mode. \$JBIDBLD formats the job ID, in the correct way, based on the current job number range.
- Your changes made to support JES2 in R4 mode, to ensure that they are compatible with z2 mode.

After your analysis is complete, perform the following tasks as appropriate for your installation:

- Convert any locally-developed code to use the new fields and field names.
- Process JOE and job queue element (JQE) control blocks as much as possible with the macros provided (\$QJQE, \$#JOE, \$DOGJQE, \$JQEJNUM, \$JBIDBLD) instead of writing and using your own code.
- Ensure that all the field and control block changes identified with z/OS V1R2 JES2 are incorporated, including updates to the surrounding logic.

You can use the \$ACTIVATE command (\$ACTIVATE,LEVEL=R4) to revert to R4 mode from z2 mode. Before deactivating z2 mode, z/OS checks that no features exploiting z2 mode are active. If functions are exploiting z2 mode, the \$ACTIVATE,LEVEL=R4 command fails with message HASP445. By default, JES2 restarts in the same mode (R4 or z2) as other members of the MAS (if any are active) or the mode the last active JES2 member was in when it came down. To restart JES2 in R4 mode, specify UNACT on PARM=.

Note: As of z/OS V1R7 JES2, the \$ACTIVATE command has been deleted.

JES2 Migration Actions Pre-First IPL

Modify SAPI applications that set SSS2DUPJ (Required-IF, as of R7 and rolled back via OA04745)

Required if you have SAPI applications that select sysout data sets by specific job name and set SSS2DUPJ.

SAPI applications that select sysout data sets by specific job name and set SSS2DUPJ now work differently. Before z/OS V1R7, without the PTF for APAR OA04747 installed, if two jobs in the system matched the name specified in SSS2JOBNAME and one of them had sysout data sets destined for another node, SSS2DUPJ was not set. As of z/OS V1R7, if two jobs in the system match the name specified in SSS2JOBNAME and one of them has sysout data sets destined for another node, SSS2DUPJ is set.

Migration action: Modify any applications that are affected by the change in processing.

Remove the RELADDR= parameter from SPOOLDEF initialization statements (Required-IF, as of R7)

Required if SPOOLDEF RELADDR= is set to NEVER.

z/OS V1R2 (and rolled back to OS/390 V2R10 by an APAR), JES2 added initial support for large SPOOL volumes by allowing you to place a SPOOL data set anywhere on a volume, with the size of the SPOOL data set limited to 64K tracks. Also in z/OS V1R2, the keyword RELADDR= was added to the SPOOLDEF initialization statement to specify relative track addressing. Because older releases did not support relative track addressing, this keyword specified that relative addressing was allowed when a new SPOOL volume was started.

In z/OS V1R7, JES2 introduces support for SPOOL volumes greater than 64K tracks. Because of this larger SPOOL volume support and because compatibility with older releases is no longer an issue, the RELADDR= keyword is no longer supported and you should discontinue using it. All new SPOOL volumes started in z/OS V1R7 use relative track addressing.

Migration action: Remove RELADDR= from the SPOOLDEF initialization statement in your z/OS V1R7 initialization deck. If you don't remove it, RELADDR=ALWAYS or RELADDR=ASNEEDED is ignored, but RELADDR=NEVER results in an invalid statement error and the entire SPOOLDEF statement is not processed.

Specify SPOOLDEF RELADDR=ALWAYS on pre-z/OS V1R7 members that share SPOOL with z/OS V1R7 by updating their initialization decks and by issuing the command \$TSPOOLDEF,RELADDR=ALWAYS on one pre-z/OS V1R7 MAS member.

z/OS V1R7 JES2 continues to support existing SPOOL volumes that use absolute track addressing. No changes to your existing SPOOL volumes are needed. Only new volumes that are started by a z/OS V1R7 JES2 are affected by removal of support for the RELADDR= keyword.

Update JES2 exit routines because of z/OS V1R7 structure changes (Required-IF, as of R7)

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Required if you use any of the affected JES2 exits.

In z/OS V1R7 JES2, some NJE and input service functions were moved from the JES2 address space to application address spaces. This was done to improve performance and reliability as well as reduce system outages. In particular, the new NJE over TCP/IP (NJE/TCP) function and existing internal reader (INTRDR) processing now occur outside the JES2 address space. This can break processing done by the following JES2 exit routines: 2, 3, 4, 7, 8, 13, 20, 36, 37, 39, 40, 46, 47, and 49. The specific changes are:

- Exits 2, 3, 4, 7, 20, 39, 46, and 47 are not called for INTRDRs and NJE/TCP processing.
- Exit 8 is now called for INTRDR and NJE/TCP processing.
- Exits 36 and 37 now get control in a different address space for INTRDR and NJE/TCP processing.
- Exit 13 has been deleted.
- Exit 49 has new function and is being called for \$\$ J commands.
- Exit 40 can now be used to control NJE mail notification (function that was in exit 13).
- The input to exits 2, 3, 4, 20, 46, and 47 has changed significantly.

If you are using any of these changed exits, examine your routines and modify them if necessary.

Migration action: Modify your exit routines to take into account the changes above. See *z/OS JES2 Installation Exits* for details about the functions and interfaces of the changed exits.

Some services have been added to z/OS V1R7 JES2 to help you rework your exit routines to support the new environment. The services are a new USER,ANY environment, local \$JCT extensions, \$BLDMSG and \$SCAN support, table pair enhancements, and multiple exit 0s. These services are discussed in *z/OS JES2 Macros* and *z/OS JES2*

Installation Exits.

Update automation and procedures because of changed input processing (Required-IF, as of R7)

Required if any of the changes impact your local procedures.

z/OS V1R7 JES2, input processing was rewritten to support NJE over TCP/IP and internal reader changes. If any of your applications are affected by the changed processing, you have to modify them. The changes are:

- **JCL/JECL processing:** In previous releases, error messages for erroneous statements simply stated that the statement was incorrect (for example, HASP112 jobname -- INVALID /*JOBPARM CARD). In z/OS V1R7 JES2, these messages include details about the operand in error (for example, HASP112 jobname -- INVALID /*JOBPARM CARD - VALUE OF CARDS= EXCEEDS 99999999). You might need to update processing that examines error messages. In z/OS V1R7 JES2, the parsing of operands has been modified to conform to standard JCL rules. Some JCL that would result in errors in earlier releases now runs correctly. For example, SECLABEL='SYSHIGH' is allowed in z/OS V1R7 but is not processed correctly in previous releases. Pre-z/OS V1R7 JES2 code does not support the use of apostrophes with SECLABEL. Because of this, be careful when developing JCL in z/OS V1R7 JES2 that is to be run on previous releases. Test JCL on the target release to ensure that it is processed correctly.
- **SYSIN data processing:** In z/OS V1R7 JES2, the processing of SYSIN data sets has been updated to properly handle carriage control, variable record formats, and SYSIN records up to 32 KB in length. Because of this, job streams that work in z/OS V1R7 might fail in prior releases of JES2. However, jobs submitted on z/OS V1R7 will run correctly on other MAS members, even if the member they run on is pre-z/OS V1R7.
- **Internal reader processing in requestor address space:** In z/OS V1R7 JES2, internal reader processing has been moved from the JES2 address space to the address space that allocated the internal reader. This was done to allow multiple job streams to be processed in parallel and to improve error isolation. However, because the processing is now in the owner address space, CPU and I/O activity that was previously associated with the JES2 address space is now associated with the owning address space. In addition, because the processing occurs in the address space that owns the internal reader, the processing occurs at the dispatching priority of the requestor instead of JES2's priority. Thus, in a busy system, low priority address spaces are not able to submit jobs as fast as higher priority address spaces.
- **Buffering of data in internal readers:** Before z/OS V1R7 JES2, jobs submitted to an internal reader were buffered in 8 KB buffers in a data space. The buffers were not processed until the internal reader was closed, an ENDREQ was issued, or a /*EOF or /*DEL card was processed. In z/OS V1R7 JES2, the cards are processed as soon as they are passed to the internal reader. There is no buffering of data and the internal reader data space no longer exists.
- **Internal reader messages in JOB log:** In z/OS V1R7 JES2, internal reader processing has been moved to the submitting address space. This causes input processing messages (such as \$HASP100) to be issued in the submitting address space and to be placed in the JOB log (JESMSGLOG) of the submitting address space. This is useful for verifying the status of jobs that are submitted. However, it can increase the size of the JOB log, especially for address spaces that submit a significant number of jobs. If the size of the JOB log becomes a concern, consider using the JESLOG JOB card parameter to spin or suppress the JOB log data set.

Migrating to z/OS R7

- **Internal reader processing when JES2 address space fails:** Before z/OS V1R7 JES2, JES2 discarded any job that was on an internal reader when the JES2 address space abnormally terminated. With z/OS V1R7 JES2, JES2 attempts to retain jobs that are active on an internal reader when JES2 terminates. However, in some cases, JES2 still discards a job because of lost checkpoint updates.

Migration action: Review your automation and procedures, and update them as needed based on the changes discussed above.

Adjust debugging procedures because SVC 111 is no longer used for PUTs to an internal reader (Required-IF, as of R7)

Required if you debug problems using system trace.

In z/OS V1R7, many uses of SVC 111 were converted to stacking Program Call (PC) instructions. As a result, when you debug problems related to internal readers, you must look for the JES2 PC trace entries rather than SVC 111 trace entries to understand what JES2 is doing.

Migration action: Evaluate your debugging procedures for the system trace impacts.

Correctly process ENF58 records for SYSOUT checkpoints (Required-IF, as of R5/R6)

Required if you have applications that process all ENF58 records (with no qualifier).

In releases prior to z/OS V1R5, JES2 generates an ENF 58 record as SYSOUT data sets allocated with a client token are processed. This allows an application to track the progress of a SYSOUT data set as it is processed. However, once a data set starts printing, there are no status updates until the printing has completed. There is no indication of progress (or lack of progress) while the data set is printing.

To address this deficiency in ability to track progress, JES2 is updated to generate an ENF 58 record whenever a SYSOUT data set is checkpointed. A new qualifier is used on this ENF record. The rate at which these ENF records are issued is determined by the checkpoint interval on the printer that is processing the SYSOUT data set.

Migration action:

1. Review your frequency of checkpointing based on the addition of ENF58 record generation. You might find that updates to the PRT $nnnn$ checkpoint parameters are appropriate for better system tuning. Frequent checkpoints can slow down printing and increase system overhead. A balance needs to be achieved between the overhead of printers taking a checkpoint and the currency of information displayed by applications listening to ENF 58.
2. If you have an application that listens for ENF 58 record generation, review that code and consider updating it to be certain to process this new qualifier correctly. Correctly structured code should not need updating; however, consider the following code scenario:
 - a. There were 10 possible qualifiers for ENF58 when the exit was written.
 - b. Code that listens to ENF58 tests for the first nine qualifiers explicitly.
 - c. If not one of the first nine, the code assumes that the qualifier is the 10th.
 - d. Now that a new qualifier is added (number 11 for "checkpoint issued"), this same code would mistakenly assume that qualifier 11 (not one of the nine explicitly tested) is qualifier 10 (the one not explicitly tested but assumed above).

Your quick review of any ENF58 installation-provided processing code you now have might prove useful.

Update exit 34 to support PSO unallocation flagging (Required-IF, as of R5/R6)

Required if you use JES2 exit 34.

JES2 exit 34 (subsystem interface data set unallocation), decimal offset 16 of register 1 contains the address of a peripheral data definition block (PDDDB). Previously this address could be set to zero only if the data set type is a regular internal reader or an unknown data set type. It is now also set to zero if a Process SYSOUT Work Area (PSO) unallocation was performed after the job step TCB ended.

Migration action: Examine your exit 34 code to ensure that the potential zero address for PSO unallocation can be processed correctly.

Reference information: For information about coding an exit 34 routine to affect the subsystem interface data set unallocation, see *z/OS JES2 Installation Exits*.

Update exit routines to recognize null service class for WLM processing (Required-IF)

Required if you are using WLM-managed initiators (that is, if you specify MODE=WLM on any JOBCLASS(x) statements). z/OS uses the default workload manager (WLM) policy when z/OS is started without a WLM couple data set or if there is a problem or error when accessing the current policy in the WLM couple data set. The default WLM policy assigns a null

Migrating to z/OS R7

service class (SRVCLASS= on a \$Djob command) to all jobs. Previously, batch jobs in a WLM-managed job class that were assigned a null service class would not be selected for execution. Now these jobs are eligible for execution.

Migration action: Update exit routines and automation code to recognize a null service class as valid for jobs awaiting execution and in execution. This change implies that WLM-managed initiators will now select jobs with a null service class. This could impact data that is presented through SMF and information passed in various data areas. You should examine code that uses service classes to ensure that it properly handles a null or blank value.

Reference information: For information about coding exit routines, see *z/OS JES2 Installation Exits*


JES2 Migration Actions Post-First IPL

Remove the RDINUM= parameter from INTRDR initialization statements (Recommended, as of R7)

Not required, but recommended to avoid confusion in the future.

z/OS V1R7 JES2, internal reader processing was updated to move processing from the JES2 address space to the address space that allocates the internal reader. With this change, the table of internal readers that was maintained in ECSA is no longer required. The data areas that represent the internal reader are now in the private storage of the allocating address space. Because the table of internal readers no longer exists, you no longer need to specify the size of the table. As a result, the RDINUM= parameter, which specified the number of internal readers, has been removed from the INTRDR initialization statement. You should remove the obsolete RDINUM= parameter from your INTRDR initialization statements.

Migration action: Delete the RDINUM= parameter from the INTRDR statement in your initialization stream. If you don't delete it, it is ignored and no error message is generated. Nevertheless, deleting it can help avoid confusion by anyone who encounters it in the future and is unaware that it is no longer functional. Moreover, although the parameter is ignored now, it might not be ignored in a future release.



z/OS V1 R7 Install-Related Enhancements

► **Documentation:**

- *z/OS Migration* contains all supported migration paths to z/OS R7!
 - z/OS R4 to z/OS R7, z/OS R5 to z/OS R7, and z/OS R6 to z/OS R7
- No licensed publications anymore, effective with z/OS R7.

► **Deliverables**

- ServerPac in z/OS R7:
 - ★ **Merging z/OS UNIX file systems:** This support can allow you to merge z/OS UNIX file systems in zFS and HFS data sets in a way similar to the support for PDS and PDSE data sets, when the merge would result in a usable mount point. This can help you simplify file system configurations and parmlib management for file systems.
 - ★ **IBM Health Checker for z/OS:** Once the ServerPac installation steps have been completed, IBM Health Checker for z/OS will be enabled, reducing the setup required for use. This can help you use its new functions more quickly to identify potential problems in your installation.
 - ★ **PSP bucket removal in ServerPac and CBPDO:** Up-to-date PSP buckets are now available online. This current information is pointed to.
- **...and lots of other goodies from previous releases you may not have yet seen!**

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z/OS V1 R7 Install-Related Enhancements

Documentation Enhancements for z/OS R7

For z/OS V1.7, the *z/OS Migration* book (GA22-7499) covers all three supported migration paths. (For z/OS V1.4 it covered only one migration path.)

The three migration paths are:

- z/OS Release 1.6 to z/OS Release 1.7
- z/OS Release 1.5 to z/OS Release 1.7
- z/OS Release 1.4 to z/OS Release 1.7.

As an added bonus, you will be able to download a copy of the *z/OS Migration* book that is customized to your particular migration path. For example, if you download the V1.6-to-V1.7 book, you receive a PDF of the book that contains only the V1.6-to-V1.7 migration actions. The V1.4-to-V1.6 migration actions are not included in the customized book. In other words, the book won't contain migration actions that don't apply to your particular migration path.

The customized Migration books will be available with general availability of z/OS V1.7 from the z/OS Migration and Installation Web page, which is: http://www.ibm.com/eserver/zseries/zos/installation/zos_migration.html

ServerPac Enhancements in z/OS R7

- **Merging z/OS UNIX file systems:** This support can allow you to merge z/OS UNIX file systems in zFS and HFS data sets in a way similar to the support for PDS and PDSE data sets, when the merge would result in a usable mount point. This can help you simplify file system configurations and parmlib management for file systems.
- **IBM Health Checker for z/OS:** Once the ServerPac installation steps have been completed, IBM Health Checker for z/OS will be enabled, reducing the setup required for use. This can help you use its new functions more quickly to identify potential problems in your installation.
- **PSP bucket removal:** Up-to-date PSP buckets are now available online. ServerPac and CBPDO have been changed to point to this current information.

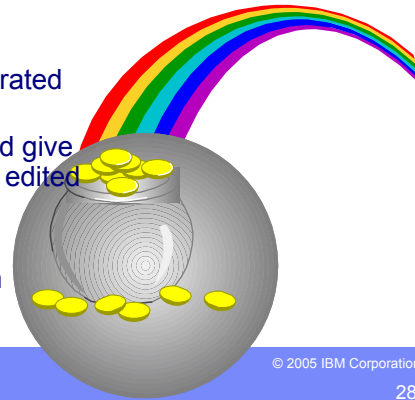
z/OS R7 Install-Related Enhancements


Two Enhancements of System Programmer Interest

- ★ **Language Environment: Run-Time Options Parmlib Member**
- ★ **BCP: IEARELEC Sample to Remove EMCS Consoles**

Other R7 goodies I couldn't fit in:

- Integrated Catalog Forward Recovery Utility incorporated into z/OS R7.
- USS OEDIT increase maximum width for file edit and give warning if extended attributes are set on a file being edited before oedit causes them to get reset.
- Tons of USS ISHELL enhancements!
- D OMVS,MF for move and mount failure information





z/OS R7 Install-Related Enhancements

LE: Run-Time Option Parameter Member

- ★ Before, your Language Environment default run-time options were specified in assembler language modules, probably within SMP/E usermods.
- ★ As of R7, there is Language Environment parmlib support (CEEPRMxx), for specifying your default run-time options. [You can get rid of those pesky assembler language modules and SMP/E usermods with this support!](#)
- ★ In CEEPRMxx, there are groups of Language Environment run-time options. Options in each group are delimited by open and closing parens “(...)”. Valid options for each group are the same as in the Assembler parts of the same name:
 - ★ CEEDOPT - non-AMODE 64 environment run-time options
 - ★ CEECOPT - CICS environment run-time options
 - ★ CELQDOPT - AMODE 64 environments run-time options
- ★ To use:
 - ★ Set up CEEPRMxx with your values (don't need to specify ones you want to do default to)
 - ★ IPL with it, by adding `CEE=(xx,yy,L)` to either the IEASYS member or `R0,sysp=aa,CEE=xx`
 - ★ Once the system is running, a different CEEPRM member may be used with the `SET CEE=zz` command

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z/OS R7 Language Environment: Run-Time Options Parameter Member

A new parmlib member, CEEPRMxx, can be used to specify Language Environment run-time options for the system. Operator commands are also provided that allow you to query and update the active run-time options for the system. This can simplify the management of Language Environment options, particularly in multisystem environments, and makes it possible to move Language Environment customization out of assembler language modules maintained using SMP/E usermods. Specifying Language Environment options using CEEDOPT, CEECOPT and CELQDOPT modules will continue to be supported.

z/OS R7 Language Environment provides PARMLIB members for specifying defaults for many system options (refer to CEE.SCEESAMP's CEEPRM00). The CEEPRMxx member can be used for specifying default run-time options in Language Environment. The member is identified during IPL by a CEE=xx statement, either in the IEASYSy data set or in the IPL PARMS. You can:

- Change the member after IPL with the SET CEE=xx command
- Change individual options using the SETCEE command
- Display current option settings with the D CEE command

Guideline: Using this support is not required, so the default IEASYS00 member does not specify a CEEPRMxx member. If you want to use this support a sample CEEPRM00 member is included in SCEESAMP.

The format of the CEEPRMxx member is:

```
CEECOPT(opt1, opt2, ..., optn)
CEEDOPT(opt1, opt2, ..., optn)
CELQDOPT(opt1, opt2, ..., optn)
```

During IPL, you can specify a parmlib member by using one of the methods shown in these examples:

- On the sysparms entered at system IPL: `R 0,sysp=yy,CEE=(xx,yy,L)`
- In the IEASYSy member: with `CEE=(xx,yy,L)`

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You can specify a group more than once in a single member. You can specify an option more than once within a group or a member. Options are processed in the order in which they appear. Suboptions that appear later override earlier occurrences of the same suboptions. When multiple members are specified, they are processed in the order specified.


After IPL, you can change the active PARMLIB member with the SET CEE=xx command. The format of the SET CEE command is: SET CEE=(xx,yy,...,nn)

Guidelines:

1. xx, yy, and nn are two alphanumeric characters that specify one or more CEEPRMxx PARMLIB members.
2. If you specify only one member, parentheses are optional.
3. If you specify two or more members, parentheses are required.

The SET CEE command parses the CEEPRMxx PARMLIB member and replaces the options with the contents of the new member.

Refer to *z/OS Language Environment Customization* for more information.




z/OS R7 Install-Related Enhancements

BCP: IEARELEC Sample for Removing EMCS Consoles

- ★ Before, there were long IPL and console data refresh times into a sysplex. Information on all EMCS consoles was sent across systems, including inactive EMCS consoles that are no longer needed.
- ★ As of z/OS R7: you have the ability to remove inactive EMCS consoles that are no longer needed. This will allow reduced system refresh and IPL times into a sysplex.
- ★ To use: All systems in a sysplex must be either z/OS V1R7 or have APAR OA06857 installed on any level between z/OS R4 and R6.
- ★ A sample program (IEARELEC) is provided to show customers how to use the service that removes inactive EMCS consoles:
 - ★ The service supports the wildcarding of console names.
 - ★ Must be APF-authorized.
- ★ Example:


```
//MYJOB JOB ...
//sss EXEC PGM=IEARELEC,PARM='CONSNAME(CONSOL*)'
```



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z/OS R7 BCP: IEARELEC Sample for Removing EMCS Consoles

z/OS V1.7 delivers the support for deleting unused EMCS consoles. You can delete the definition of any extended MCS console, thus freeing the ID that had been assigned to the extended MCS console. The system then can reuse that ID for a newly-defined extended MCS console. To remove a console definition, use the sample JCL for program IEARELEC in SYS1.SAMPLIB. The following restrictions for removing an extended MCS console apply:

- The extended MCS console must be inactive.
- **Extended MCS consoles can only be removed on a z/OS V1R7 or higher system.** The removal will be communicated to systems at a lower level.
- The console ID of a removed extended MCS console can be reused once it has been deactivated and removed. It is safe to use the console ID to process a command response, but you should avoid saving the console ID for later processing. Therefore, you should use the console name to direct messages to specific consoles. If the console ID is used, messages may end up going to unintended consoles.
- **The console ID of a removed extended MCS console can only be reused by activating another extended MCS console on a z/OS V1R7 or higher system.**

Sample invocations of IEARELEC:

```
//JOBA JOB ...
//sss EXEC PGM=IEARELEC , PARM=' CONSNAME (CONSOL01) '
```

JOBA will attempt to remove the console named 'CONSOL01'.

```
//JOB B JOB ...
```

```
//sss EXEC PGM=IEARELEC , PARM=' CONSNAME (CONSOL*) '
```

JOB B will attempt to remove any console with a name that begins with 'CONSOL' (for example, CONSOL01, CONSOL02, etc.)

```
//JOB C JOB ...
//sss EXEC PGM=IEARELEC , PARM=' CONSNAME (SY?CON*) '
```

Migrating to z/OS R7

JOBC will attempt to remove any console whose name has as its first two characters, 'SY', and its fourth through sixth characters, 'CON' (for example, SY1CON1, SY1CON2, SY2CON1, SY2CON2, etc.)

When you specify CONSNAME(*) for IEARELEC, all EMCS consoles that are inactive and are not IBM internal consoles are removed.

Looking at the last example, this is the output you will see:

Sample output from invoking IEARELEC:

```
//JOB      JOB      ...  
//SSS      EXEC PGM=IEARELEC, PARM='CONSNAME (SY?CON*) '
```

Service generates the following hardcopy-only message:

```
CNZ4002I EMCS CONSOLE REMOVAL FOR WILDCARD PATTERN SY?CON*  
        FOUND: 4 REMOVED: 4 NOT REMOVED: 0  
        THE FOLLOWING EMCS CONSOLES WERE REMOVED:  
        SY1CON1 SY1CON2 SY2CON1 SY2CON2
```

IEARELEC generates the following joblog message:

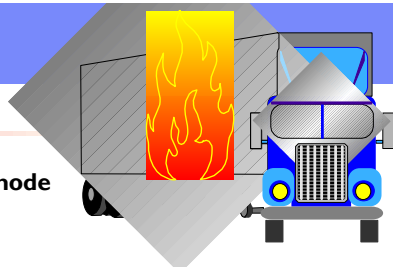
```
MRC104I ALL EMCS CONSOLES MATCHING THE WILDCARD PATTERN OF SY?CON* HAVE BEEN REMOVED
```

For more information on this function, refer to *z/OS MVS Planning: Operations*.

Marna's "Big Migs" from z/OS R4 to z/OS R7

► **Migration Actions You Should NOT Overlook:**

- **z/OS R6 Architecture Level Set** - must be z/Architecture mode
 - Use the z/Architecture checklist provided.
- **z/OS R7 DFSMS JOBCAT/STEP** support removed.
 - Use the MODIFY CATALOG,ENABLE(JOBSTEP) in R5 to turn support back on (for now!)
- **z/OS R7 BCP I-byte Console ID support removal**
 - Use the Console ID Tracking Facility, introduced in z/OS R4 Consoles Enhancement feature
- **z/OS R7 XL C/C++ does not ship the OS/390 R10 Compilers**
 - Move to the ISO C/C++ compilers now, may still use OS/390 R10 compilers from prior system.
- **z/OS R7 JES2 Z2** - must be in Z2 mode!
- **z/OS R7 JES2 Exit and Input Processing changes**
- **z/OS R7 HCD IODF V5** Coexistence considerations with lower systems



► **Future "Big Migs" You Can Mitigate NOW:**

- z/OS DFSMS Imbed, Replicate, Keyrange removal in a future release.
 - Use the IMBDSHIP tool, and install PTF for APAR OAI0952 now!
- Start your conversion from HFS to zFS after you migration to z/OS R7
 - Use z/OS R7's tool, BPXWH2Z to help.



Summary: Migrating to z/OS R7

► **Functions Removed from z/OS R7, and beyond:**

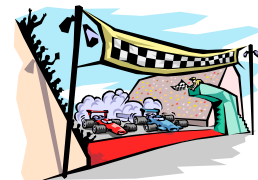
- Planned for after z/OS R7, the remaining one-byte console ID support will be removed.
- In the future: VSAM ds with IMBED, REPLICATE and KEYRANGE attributes.

► **Coexistence/Service**

- Maximum migration stretch: z/OS R4 to z/OS R7. z/OS R5 will coexist with z/OS R8.
- z/OS R4 will be end-of-service on March 31, 2007.

► **Migration Actions**

- General Migration Actions for Everyone
 - ServerPac - Update the dialog!
 - Must IPL in z/Architecture! Do HW first if you're not there yet!
- Element Specific Migration Actions for z/OS R7 (from z/OS R4):
 - BCP - Consoles enh updates, enough XCF groups in your sysplex CDS, SYSI.SIEMIGE
 - C/C++ - Only ISO compiler ships in R7. Get off the OS/390 R10 C/C++ compilers.
 - DFSMS - JOBCAT/STEP not support on R7.
 - HCD - Update IODF to V5 level, remember coexistence considerations.
 - JES2 - Migrate to z2 mode Note changes to exits and processing New ds SYSI.HASLNKE.



► **Installation Related Enhancements in R7**

- Functional Enhancements - **LE CEEPRMxx, Remove inactive EMCS consoles**

Migrating to z/OS R7

Appendix A: List of Base Elements and Optional Features for z/OS V1.7

The following table lists the base elements and optional features in z/OS V1.7. 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.) Also, this column tells you which elements and features are only in z/OS (not also in z/OS.e).

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. The z/OS and z/OS.e function levels are identical. Do not confuse the function level with the product level. All elements and features are at the V1R7 product level but they are at various function levels. For example, the product level of z/OS BookManager READ is z/OS V1R7 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 z/OS.e) 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.

Table 1. Base elements and optional features in z/OS V1R7 and z/OS.e V1R7

Name	Function level (last time changed)	Type and description
BCP	z/OS V1R7	Type: base element, exclusive. The Base Control Program (BCP) provides essential operating system services. 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, and support for the Unicode ^(TM) Standard. As of z/OS V1R3 and z/OS.e V1R3, the BCP also includes the program management binder, which was formerly in the DFSMSdfp base element. IBM Health Checker for z/OS is now part of the BCP. This tool helps improve availability by reporting on active z/OS and sysplex settings that are different than IBM recommended best practices or customer defined settings. It was initially available by PTF and download for z/OS V1R4 and z/OS.e V1R4, was integrated in base element msys for Operations in z/OS V1R5 and z/OS.e V1R5, and was moved to the BCP in z/OS V1R7 and z/OS.e V1R7.
BDT	OS/390 V1R2	Type: base element, exclusive.

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		<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 (z/OS only)	OS/390 V1R2	<p>Type: optional feature, exclusive, priced, can be dynamically enabled. This feature is supported with z/OS but not with z/OS.e. With z/OS.e, you install the code but it is not functional and you are not licensed to use it.</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 (z/OS only)	OS/390 V1R1 (BookManager BUILD/MVS V1R3, 5695-045)	<p>Type: optional feature, nonexclusive, priced, can be dynamically enabled. This feature is supported with z/OS but not with z/OS.e. With z/OS.e, you install the code but it is not functional and you are not licensed to use it.</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>
BookManager READ (z/OS only)	OS/390 V1R1 (BookManager READ/MVS V1R3, 5695-046)	<p>Type: base element, nonexclusive. This element is supported with z/OS but not with z/OS.e. With z/OS.e, you install the code but it is not functional and you are not licensed to use it.</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 V1R7	<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"> • The XL C/C++ compiler • C/C++ application development utilities. <p>As of z/OS V1R5 and z/OS.e V1R5, optional feature C/C++ with Debug Tool is withdrawn. For debugging tools, see http://www.ibm.com/software/awdtools/debugtool/.</p> <p>As of z/OS V1R7 and z/OS.e V1R7, the OS/390 V2R10 level of the C/C++ compiler is withdrawn. The XL C/C++ compiler remains. For information about migrating from the former to the latter, see <i>z/OS XL C/C++ Compiler and Run-Time Migration Guide for the Application Programmer</i>.</p>
CIM	z/OS V1R7	<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 from a common point of control, a subset of resources and metrics of a z/OS system are mapped into the CIM standard data model.</p> <p>CIM is new in z/OS V1R7 and z/OS.e V1R7.</p>

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		For encryption, CIM uses the DES 56-bit algorithm and, if z/OS Security Level 3 is installed, the TDES 168-bit algorithm.
Communications Server	z/OS V1R7	<p>Type: base element, exclusive, can be dynamically enabled.</p> <p>Communications Server (also known as CS z/OS) 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. SNA Services includes AnyNet function.</p> <p>A related optional feature is Communications Server Security Level 3.</p> <p>For encryption, IP Services uses the firewall CDMF DES 40-bit, SNMPv3 DES 56-bit, IP Sec DES 56-bit, and AES 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 V1R7	<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 algorithm for encryption. The actual level of encryption that takes place with this feature installed can be configured to be something less than the maximum level enabled by this feature.</p> <p>This feature is related to the base element Communications Server and to the Firewall Technologies component of the Integrated Security Services base element.</p> <p>This feature is worldwide exportable subject to U.S. export regulations.</p>
Cryptographic Services	z/OS V1R7	<p>Type: base element, exclusive.</p> <p>Cryptography is the transformation of data to conceal its meaning. In z/OS and z/OS.e, 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"> • Integrated Cryptographic Service Facility (ICSF). The level of V1R7 ICSF is FMID HCR7720, which is the same level as in the Web deliverable ICSF 64-bit Virtual Support for z/OS V1R6 and z/OS.e V1R6. Note that a later level of ICSF (FMID HCR7730) is available in the Cryptographic Support for z/OS V1R6/R7 and z/OS.e V1R6/R7 Web deliverable. • Open Cryptographic Services Facility (OCSF), last changed in OS/390 V2R10. • PKI Services, last changed in z/OS V1R7 and z/OS.e V1R7. Prior to V1R5, this component was in the optional feature Security Server, although it was licensed with the base operating system and could be used without ordering or enabling Security Server. • System Secure Sockets Layer (SSL), last changed in z/OS V1R6.

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		<p>For encryption:</p> <ul style="list-style-type: none"> • OCSF uses the RC2/RC4/RC5 40-56 bit and DES 56-bit algorithms. • PKI Services uses the RACF component of optional feature Security Server, and the ICSF, OCSF, and System SSL components of base element Cryptographic Services. For digital signatures, PKI Services uses the RSA and DSA algorithms. • System SSL uses the RC2/RC4, DES through 56-bit, and Diffie-Hellman algorithms.
DCE Base Services	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>
DFSMSdfp	z/OS V1R7	<p>Type: base element, exclusive.</p> <p>DFSMSdfp provides storage, data, program, and device management functions. Related optional features are DFSMSrmm, DFSMSdss, DFSMShsm, and DFSMStvs.</p> <p>As of z/OS V1R3 and z/OS.e V1R3, the program management binder is moved to the BCP base element.</p>
DFSMSdss	z/OS V1R7	<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>
DFSMShsm (and DFSMSdss)	z/OS V1R7	<p>Type: optional feature, exclusive, priced, can be dynamically enabled.</p> <p>DFSMShsm 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. DFSMShsm also lets you make effective use of tape media.</p> <p>DFSMShsm requires DFSMSdss. For this reason, DFSMShsm is not available by itself. If you want to use DFSMShsm, you must order the DFSMShsm/DFSMSdss combination. (DFSMSdss is also available by itself for those who don't want DFSMShsm.)</p>
DFSMSrmm	z/OS V1R7	<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 V1R7	<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> <p>DFSMStvs was introduced in June 2003 as an optional feature of z/OS V1R4 and z/OS.e V1R4.</p>
DFSORT	z/OS V1R5	<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,</p>

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		<p>Symbols, and multiple output capability with the powerful OUTFIL feature.</p> <p>As of z/OS V1R2, DFSORT is exclusive to z/OS; the product DFSORT V1R14 (5740-SM1) is no longer marketed.</p>
Distributed File Service	z/OS V1R7	<p>Type: base element, exclusive.</p> <p>Distributed File Service provides:</p> <ul style="list-style-type: none"> • 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. • 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 and z/OS.e 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. <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 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>The zFS component has its own FMID starting with z/OS V1R5 and z/OS.e V1R5.</p> <ul style="list-style-type: none"> • 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 and Windows 2000 Professional workstations. Windows workstation users can also exploit z/OS and z/OS.e printer capabilities using the SMB file/print server interface to the z/OS or z/OS.e Infoprint Server feature. For the software necessary to use the DFS or SMB file/print serving support, as well as the other Distributed File Service functions, see Appendix B, Software requirements for z/OS and z/OS.e elements and features in z/OS Planning for Installation. <p>The DFS and SMB support use the DES 56-bit algorithm for encryption.</p>
EREP	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>
ESCON Director	OS/390 V1R1	Type: base element, exclusive.

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Support		ESCON Director Support enables the reporting of ESCON director device errors to z/OS or z/OS.e.
FFST	OS/390 V1R2	Type: base element, exclusive. First Failure Support Technology (FFST) provides immediate notification and first failure data capture for software events.
GDDM (z/OS only)	OS/390 V1R2 (GDDM/MVS V3R2, 5695-167)	Type: base element, nonexclusive. This element is supported with z/OS but not with z/OS.e. With z/OS.e, you install the code but it is not functional and you are not licensed to use it. 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 (z/OS only)	OS/390 V1R2 (GDDM/PGF V2R1.3, 5668-812)	Type: optional feature, nonexclusive, priced, can be dynamically enabled. This feature is supported with z/OS but not with z/OS.e. With z/OS.e, you install the code but it is not functional and you are not licensed to use it. 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 (z/OS only)	OS/390 V1R2 (GDDM-REXX/MVS V3R2, 5664-336)	Type: optional feature, nonexclusive, priced, can be dynamically enabled. This feature is supported with z/OS but not with z/OS.e. With z/OS.e, you install the code but it is not functional and you are not licensed to use it. 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.
HCD	z/OS V1R7	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 V1R7	Type: optional feature, exclusive, priced, can be dynamically enabled. Hardware Configuration Manager (HCM) is a PWS-based client/server interface to the base element HCD.
HLASM	z/OS V1R6 (HLASM for MVS & VM & VSE V1R5, 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 V1R6 (Toolkit feature of HLASM for MVS & VM & VSE V1R5, 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.

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IBM HTTP Server	OS/390 V2R10 (but see description)	Type: base element, exclusive. IBM HTTP Server is the Web server for z/OS and z/OS.e. 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. Prior to V1R6, it was an optional feature of z/OS and z/OS.e. This packaging change was the only change to IBM HTTP Server in V1R6; there was no functional change.
ICKDSF	z/OS V1R4 z990 Compatibility Support feature (ICKDSF for z/OS, z/OS.e, and OS/390 R17, 5655-257)	Type: base element, nonexclusive. The Device Support Facility (ICKDSF) enables you to perform functions needed for the installation and use of IBM DASD. 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, z/OS V1R6, and z/OS V1R7, and is functionally equivalent to the R17 level of the ICKDSF product.
Infoprint Server	z/OS V1R5	Type: optional feature, exclusive, priced, can be dynamically enabled. Infoprint Server allows you to print files on z/OS and z/OS.e printers from any workstation that has TCP/IP access. This feature consists of the following components: <ul style="list-style-type: none"> • IP PrintWay. This component has its roots in the IP PrintWay feature of PSF/MVS V2R2 and the IP PrintWay/NetSpool feature of OS/390 V1R3. In z/OS V1R5, IP PrintWay extended mode was introduced. • NetSpool. This component has its roots in the NetSpool feature of PSF/MVS V2R2 and the IP PrintWay/NetSpool feature of OS/390 V1R3. • Print Interface, new in OS/390 V2R5. • Printer Inventory Manager, new in OS/390 V2R8. • Transform Manager, new in OS/390 V2R8. • z/OS Infoprint Central, new in z/OS V1R5. 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.
Integrated Security Services	z/OS V1R7	Type: base element, exclusive. Integrated Security Services provides base security functions for z/OS and z/OS.e. This base element was new in z/OS V1R5. It consists of five components that used to be in optional feature Security Server plus one new component, Enterprise Identity Mapping. The components are: <ul style="list-style-type: none"> • DCE Security Server, 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.

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		<ul style="list-style-type: none"> • Enterprise Identity Mapping (EIM), introduced by a PTF in z/OS V1R4 and z/OS.e V1R4, and last changed in z/OS V1R7 and z/OS.e V1R7. This component allows you to map a user's identity on one system to the user's identity on another system. • Firewall Technologies, last changed in z/OS V1R4 and z/OS.e V1R4. The Internet Security Association and Key Management Protocol (ISAKMP) server of Firewall Technologies implements the required elements of Internet Key Exchange (IKE) as defined by Request for Comments (RFC) 2409. The configuration server of Firewall Technologies communicates with the firewall configuration graphical user interface (GUI) that is shipped within Firewall Technologies. Firewall Technologies uses the DES algorithm for encryption. • LDAP Server, last changed in z/OS V1R6 and z/OS.e V1R6. LDAP Server uses the System SSL component of base element Cryptographic Services for encryption. The RDBM DB2 backend function of the LDAP Server is removed as of z/OS V1R4. You are encouraged to migrate to the enhanced TDBM DB2 backend because of its improved scalability and availability. For instructions, see <i>z/OS Integrated Security Services LDAP Server Administration and Use</i>. • Network Authentication Service, last changed in z/OS V1R6 and z/OS.e V1R6. Network Authentication Service uses the DES algorithm for encryption. Prior to z/OS V1R2, this component was named Network Authentication and Privacy Service. • Open Cryptographic Enhanced Plug-ins (OCEP), last changed in OS/390 V2R10. <p>Prior to z/OS V1R5, the five moved components (DCE Security Server, Firewall Technologies, LDAP Server, Network Authentication Service, and OCEP), although packaged with the priced feature Security Server, were unpriced (that is, were licensed with the base operating system and could be used without ordering or enabling Security Server). Now that these five components are in base element Integrated Security Services, the packaging and pricing are consistent.</p>
ISPF	z/OS V1R7	<p>Type: base element, exclusive. ISPF provides facilities for all aspects of host-based software development. ISPF has four major components:</p> <ul style="list-style-type: none"> • 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. • 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.

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		<ul style="list-style-type: none"> • Software Configuration and Library Manager (SCLM). SCLM is a tool that automatically controls, maintains, and tracks all of the software components of the application throughout the development cycle. • 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. <p>As of z/OS V1R2, the Library Management Facility (LMF) of ISPF was removed.</p>
JES2	z/OS V1R7	<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> <p>Prior levels of JES2 can be used with z/OS V1R7 but not with z/OS.e V1R7.</p>
JES3	z/OS V1R7	<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> <p>Prior levels of JES3 can be used with z/OS V1R7 but not with z/OS.e V1R7.</p>
Language Environment	z/OS V1R7	<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. z/OS.e Language Environment does not support (but z/OS Language Environment does support) the following:</p> <ul style="list-style-type: none"> • COBOL, except for execution of precompiled COBOL DB2 stored procedures and other precompiled applications that use the Language Environment preinitialization interface (CEEPIPI). The applications could be compiled on a z/OS system, then run on a z/OS.e system. Stated another way, compiling COBOL programs on z/OS.e is not supported, and only precompiled COBOL DB2 stored procedures and other precompiled applications that use the Language Environment CEEPIPI (no other kinds of COBOL programs) can run on z/OS.e. • Fortran. • PL/I, except for execution of precompiled PL/I applications. As with COBOL, the applications could be compiled on a z/OS system, then run on a z/OS.e system. • Compatibility preinitialization for C and PL/I. • The library routine retention (LRR) function. (In z/OS, LRR can improve the performance of applications and subsystems.) <p>Inclusion of Language Environment as a base element in z/OS and z/OS.e does not replace the need for separate compilers.</p> <p>As of z/OS V1R2, Language Environment supports the ISO '98 C++ Standard Library.</p> <p>Language Environment uses the limited DES algorithm for encryption.</p>
Library Server	z/OS V1R7	<p>Type: base element, exclusive.</p>

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		Library Server converts BookManager documents to HTML for display through a web browser. Prior to z/OS V1R5, this element was named BookManager BookServer.
MICR/OCR (z/OS only)	OS/390 V1R1	Type: base element, exclusive. This element is supported with z/OS but not with z/OS.e. With z/OS.e, you install the code but you are not licensed to use it. This element provides the device support code for various magnetic and optical devices.
msys for Operations	z/OS V1R6	Type: base element, exclusive (but see note below). Managed System Infrastructure for Operations (msys for Operations) simplifies the day-to-day operation of z/OS and z/OS.e Parallel Sysplex configurations by automating typical operator tasks and events. msys for Operations was new in z/OS V1R2. As of z/OS V1R7, IBM Health Checker for z/OS is no longer part of msys for Operations. It is now part of the BCP base element. Note: Parts of two products are included in msys for Operations: Tivoli NetView for OS/390 V1R4 (5697-B82) and System Automation for z/OS V2R3 (5645-006 or 5698-A14). If you already have the NetView and System Automation products installed (at the V1R4 and V2R3 levels, respectively), you can install z/OS V1R7 or z/OS.e V1R7 (including msys for Operations) in the same SMP/E zone as the NetView and System Automation products. In this case, it is recommended that you order the NetView and System Automation products in your z/OS V1R7 ServerPac. They will be installed in the same zones as z/OS V1R7, and will not require separate maintenance and duplication of service work (which they would if they were in separate zones). However, if you have an earlier level of either the NetView or System Automation product installed, you have to put the product into a separate zone before installing z/OS V1R7, and maintain its data sets with different names than the z/OS V1R7 msys for Operations data sets. (Use BUILD MCS to move the NetView or System Automation product or else you will have to reinstall it.) Older levels of NetView and System Automation than what is included in z/OS V1R7 cannot be ordered with a z/OS V1R7 ServerPac. If you plan on moving from z/OS V1R7 msys for Operations NetView to a full-function NetView V1R4, there is a sample job to assist you. This sample job will enlarge the msys for Operations data sets to accommodate the extra space needed for a NetView V1R4 installation. For details, see <i>Tivoli OS/390 Installation: Migration Guide Version 1 Release 4</i> , SC31-8768. You may order the follow-on NetView product, Tivoli NetView V5R1 (5697-ENV), with z/OS V1R7. It is compatible with msys for Operations and will be installed in the z/OS SMP/E zones.
msys for Setup	z/OS V1R4	Type: base element, exclusive. Managed System Infrastructure for Setup (msys for Setup), introduced in z/OS V1R1, offers a new approach for configuring z/OS, z/OS.e, and products that run on z/OS and z/OS.e. The configuration process is driven by a graphical user interface that greatly facilitates the definition of customization parameters. Updates are under the control of the msys for Setup user and are made directly to the system.

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		<p>With each release of z/OS and z/OS.e, additional tasks are supported by msys for Setup:</p> <ul style="list-style-type: none"> • Starting in z/OS V1R1 you could use msys for Setup to set up a Parallel Sysplex resource sharing environment. (For more information, see <i>z/OS MVS Setting Up a Sysplex</i>.) • In z/OS V1R2, usage of msys for Setup was extended to let you: <ul style="list-style-type: none"> <input type="checkbox"/> Create the basic IP configuration files <input type="checkbox"/> Create the ISPF configuration table keyword file and load module <input type="checkbox"/> Perform additional tasks for Parallel Sysplex configuration, such as setting up the system logger <input type="checkbox"/> Set up a base sysplex • As of z/OS V1R3 and z/OS.e V1R3: <ul style="list-style-type: none"> <input type="checkbox"/> You can use msys for Setup to set limits on your UNIX system resources, such as the maximum number of user IDs that can be concurrent at one time and the maximum number of processes that the system will run at one time. These settings are stored in the z/OS UNIX parmlib member BPXPRMxx. The system will do self-discovery and prime with the values that your system already has, and you can use msys for Setup property sheets to do any ongoing customization of BPXPRMxx. <input type="checkbox"/> You can use msys for Setup to configure the default system-wide run-time options for Language Environment. msys for Setup builds the necessary configuration files, through an easy-to-use dialog and accompanying help text, which you then put into production. In addition, you can use msys for Setup to create the region-wide run-time options for both CICS and IMS regions. • As of z/OS V1R4 and z/OS.e V1R4, Communications Server (IP Services) extends its usage of msys for Setup to port reservation and definition of TN3270 servers. • As of z/OS V1R5 and z/OS.e V1R5: <ul style="list-style-type: none"> <input type="checkbox"/> msys for Setup allows you to configure RMF. <input type="checkbox"/> If PTFs UA90013 and UA90015 are installed on z/OS V1R4 or later, IBM Directory Server V5R1 (with FixPack 1) is supported on the workstation as an alternative to the LDAP server on the host.
Network File System	z/OS V1R7	Type: base element, exclusive. Network File System acts as a file server to workstations, personal computers, or other authorized systems in a TCP/IP network. It consists of a client (Network File System Client) and a server (Network File System Server). It supports Berkeley sockets but not TCP/IP sockets.

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		Network File System uses the Network Authentication Service component of Integrated Security Services for encryption. Network File System is always enabled, even when the alternate base configuration is ordered.
OSA/SF	z/OS V1R4 z990 Compatibility Support feature	Type: base element, exclusive. Open Systems Adapter/Support Facility (OSA/SF) provides a user-friendly interface for monitoring and controlling the zSeries Open Systems Adapter feature, which provides zSeries 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 processor on which z/OS runs. For details, see <i>zSeries OSA-Express Customer's Guide and Reference</i> , SA22-7935. 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, z/OS V1R6, and z/OS V1R7. OSA/SF became exclusive with the introduction of the z/OS V1R4 z990 Compatibility Support feature.
RMF	z/OS V1R7	Type: optional feature, exclusive, priced, can be dynamically enabled. Resource Measurement Facility (RMF) gathers data about z/OS and z/OS.e resource usage and provides reports at any system in a sysplex. As of z/OS V1R5 and z/OS.e V1R5, an RMF msys plug-in is available that allows you to configure RMF from msys for Setup. The plug-in guides you through customization and migration tasks and ensures correct and consistent RMF parmlib members. You can customize a new z/OS or z/OS.e RMF installation, modify an existing one, or migrate from previous releases of RMF.
Run-Time Library Extensions	z/OS V1R7	Type: base element, exclusive. Run-Time Library Extensions, introduced in z/OS V1R5 and z/OS.e V1R5, extends the run-time support provided by the Language Environment base element. It consists of : <ul style="list-style-type: none"> • Common Debug Architecture (CDA) libraries and utilities. • UNIX System Laboratories (USL) I/O Stream Library and USL Complex Mathematics Library, previously included in the base element C/C++ IBM Open Class Library. • IBM Open Class dynamic link libraries (DLLs), previously included in the base element C/C++ IBM Open Class Library.
SDSF	z/OS V1R7	Type: optional feature, exclusive, priced, can be dynamically enabled. System Display and Search Facility (SDSF) provides you with information to monitor, manage, and control your z/OS or z/OS.e system. Although prior levels of JES2 may be used with z/OS V1R7, prior levels of SDSF may not. In z/OS.e, BookManager help is not available for SDSF SYSLOG messages. This is because BookManager READ is not available in z/OS.e.
Security Server	z/OS V1R7	Type: optional feature, exclusive, priced, can be dynamically enabled. Security Server lets you control access to protected resources.

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		<p>Security Server now consists of one component, RACF. In z/OS V1R5, its other components were moved to two base elements, Integrated Security Services (which was new in V1R5) and Cryptographic Services. The base element Integrated Security Services received the five components DCE Security Server, Firewall Technologies, LDAP Server, Network Authentication Service, and OCEP. The base element Cryptographic Services received the component PKI Services.</p> <p>Security Server uses the limited DES, CDM, and RC 40-bit algorithms for encryption.</p>
SMP/E	z/OS V1R7 (SMP/E for z/OS V3R4, 5655-G44)	<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. Prior to z/OS V1R2, SMP/E was an exclusive base element. Beginning with z/OS V1R2, SMP/E is nonexclusive because of the introduction of the SMP/E product. The SMP/E product allows customers who are currently licensed for an earlier level of z/OS or z/OS.e 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 or z/OS.e 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, z/OS.e, 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 http://www.ibm.com/eserver/zseries/zos/smpe/pma/.</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 V1R6	<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. In z/OS.e, the number of concurrent TSO/E sessions is limited to eight.</p>
z/OS Security Level 3	z/OS V1R6	<p>Type: optional feature, exclusive, unpriced, cannot be dynamically enabled.</p> <p>z/OS Security Level 3 provides strong encryption for z/OS and z/OS.e.</p> <p>The components in this feature are:</p> <ul style="list-style-type: none"> • LDAP Security Level 3, new in z/OS V1R6 and z/OS.e V1R6. This component works in conjunction with the LDAP Server 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 RC4 algorithms for encryption. • Network Authentication Service Level 3, last changed in z/OS V1R6 and z/OS.e V1R6. This component works in

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		<p>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 algorithm for encryption. This component was new in z/OS V1R2. At that time it was named SecureWay Security Server Network Authentication Service Level 3. As of z/OS V1R3 and z/OS.e V1R3, the word "SecureWay" was dropped from the name. As of z/OS V1R5 and z/OS.e V1R5, the words "Security Server" are dropped from the name.</p> <ul style="list-style-type: none"> • OCSF Security Level 3, last changed in OS/390 V2R10. 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. • System Secure Sockets Layer (SSL) Security Level 3, last changed in z/OS V1R6 and z/OS.e V1R6. 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 Advanced Encryption Standard (AES) algorithms for encryption. <p>Prior to z/OS V1R5, three of the components in z/OS Security Level 3 were separate features. In z/OS V1R5 they were repackaged, for the purpose of simplifying ordering, into the new feature z/OS Security Level 3. The three components are Network Authentication Service Level 3, OCSF Security Level 3, and System SSL Security Level 3.</p> <p>This feature is worldwide exportable subject to U.S. export regulations.</p>
z/OS UNIX	z/OS V1R7	<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 element is made up of four components:</p> <ul style="list-style-type: none"> • Application Services, last changed in z/OS V1R7 and z/OS.e V1R7. This component includes the Shell, Utilities, Debugger, and Parallel Environment. • Connection Manager, last changed in OS/390 V2R7. • Integrated Call Level Interface (ICLI), last changed in z/OS V1R6 and z/OS.e V1R6. • Process Manager, last changed in OS/390 V2R7.
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>

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Appendix B: Coexistence Service for z/OS V1.7

Coexistence and fallback PTFs installed on back-level systems allow those systems to coexist with z/OS V1R7 systems during your migration, and allow backout from z/OS V1R7 to the back-level systems if necessary. Coexistence and fallback are important because they allow you to migrate systems in a multisystem configuration to z/OS V1R7 using rolling IPLs (one system at a time), allowing for continuous application availability.

Depending on which back-level releases your z/OS V1R7 system is coexisting with, install the coexistence and fallback PTFs that are listed in the following tables. The first table is for coexistence and fallback service on z/OS V1R5 for z/OS V1R7. The second table is for coexistence and fallback service on z/OS V1R6 for z/OS V1R7. (For coexistence and fallback service on z/OS V1R4 for z/OS V1R7, see the body of this presentation.)

Table 2. Coexistence and fallback PTFs needed on z/OS V1R5

Apply on z/OS V1R5, the coexistence and fallback service (PTFs) listed in this table:

Element or feature, and reason PTFs are needed	z/OS V1R5 PTFs
BCP: In z/OS V1R5, a console enhancement minimizes the possibility of outages due to exhaustion of system resources used for messaging. The PTFs allow back-level systems to tolerate the enhancement.	UA05643, UA06655
BCP: Prevents the depletion of private storage in the console address space on a receiving system when a large number of WTO/R messages are received on that system from other members of a sysplex.	UA07960, UA07963
BCP: Increased CPU utilization in the console address space might be reported on all systems in a sysplex after introducing a z/OS V1R4 system with the z/OS V1R4 Consoles Enhancements feature, or later-level system, into the sysplex. The coexistence PTF prevents heavy message traffic on the z/OS V1R7 system from impacting the other systems in the sysplex.	UA16512
BCP: Allows a z/OS V1R5 system to correctly handle blank WTOs issued to another system.	UA09964
BCP: APARs OA05025 (PTF UA07361) and OA05391 together provide corrective service for XCF recovery from partial writes to couple data sets. APAR OA05391 introduces a new format for couple data set multi-subrecord check records (MSRCRs), which is required for recovery from partial writes to certain types of couple data set records. APAR OA05025 includes coexistence support that enables systems on which it is installed to interpret the new MSRCR format. Because both APARs have been incorporated into z/OS V1R6 and later, all other systems in the sysplex must be capable of interpreting the new MSRCR format before any V1R6 or later system can be IPLed into the sysplex. V1R5 systems include support for interpreting the new MSRCR format and do not require installation of additional maintenance to provide this capability. You must IPL all other systems in the sysplex with the appropriate PTF for APAR OA05025 (PTF UA07361 for V1R5) before IPLing any V1R6 or later system into the sysplex. Rolling IPLs are sufficient to install the PTFs for APARs OA05025 and OA05391. Note that the recovery provided by these two PTFs is not completely effective until all systems in the sysplex, including z/OS V1R5 systems, have been IPLed with both PTFs or with V1R6 or later.	UA07361
BCP: z/OS V1R6 has a new 64-bit global resource serialization (GRS) ISGQUERY application programming interface (API). The PTF allows a z/OS V1R5 system to tolerate ISGQUERY requests from a z/OS V1R6 or later system.	UA09226
BCP: GRS APAR OA11383 provides compatibility support for the corrected GRS ISGLOCK structure rebuild processing in APAR OA11147 which is contained in z/OS V1R7. OA11383 MUST be installed and IPLed on EVERY system in the sysplex before installing and IPLing z/OS V1R7 on ANY system in the SYSPLEX.	UA18541
BCP: Allows a z/OS V1R5 system to tolerate new resource recovery services (RRS) restart function in z/OS V1R6 (and later).	UA09403, UA09425
BCP: Starting in z/OS V1R6, the sysplex couple data set (CDS) can be expanded to allow up to 2047 members in a cross-system coupling facility (XCF) group. This is an increase	UA09967

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<p>from the previous maximum of 1023 members per XCF group. Formatting a couple data set for more than 1023 members per group creates a Version 4 CDS.</p> <p>The PTF rolls back this function to z/OS V1R5. In terms of coexistence, it provides support for Version 4 sysplex CDSs on z/OS V1R5. This is important because all systems in a sysplex must support Version 4 sysplex CDSs to bring a Version 4 sysplex CDS into use, and once a sysplex is using a Version 4 sysplex CDS, a system that does not support Version 4 sysplex CDSs cannot join the sysplex.</p>	
<p>BCP: A z/OS V1R7 system cannot join a sysplex of lower-level systems, and a lower-level system cannot join a sysplex of z/OS V1R7 systems, without this PTF.</p>	UA16038
<p>BCP: z/OS V1R7 introduces the logger log stream DUPLEXMODE(DRXRC) specification. If DUPLEXMODE(DRXRC) is specified in a z/OS V1R7 system in a sysplex, and prior releases are running in the same sysplex, the PTF must be installed. If DUPLEXMODE(DRXRC) is not specified, installing the PTF is not required but is nevertheless recommended to avoid any complications if the configuration changes.</p>	UA17178
<p>BCP: Allows a pre-z/OS V1R7 system to use an IODF that was created using z/OS V1R7 HCD.</p>	UA17027
<p>BCP: DSNTYPE=LARGE data sets are only supported by z/OS V1R7. The coexistence PTF causes z/OS to detect the accidental specification of such a data set for stand-alone dump output and to reject its use, as has been previously done for such data set organizations as a PDS.</p>	UA18498
<p>BCP, DFSMSdftp, DFSMSdss, DFSMSshsm, DFSMSsrm: In z/OS V1R6, a new function introduced by PTF UA90124 enables DFSMS software support for IBM TotalStorage Enterprise Tape System 3592 and the media types MEDIA6, MEDIA7, and MEDIA8. Coexistence PTFs listed here allow a V1R5 system to coexist with a V1R6 or later system that uses this function.</p>	UA90101, UA90113, UA90121, UA90127, UA90129
<p>DFSMSdftp: z/OS V1R6 has a new PDSE address space, SMSPDSE1, which is restartable. The coexistence PTF allows a z/OS V1R5 system to coexist with a z/OS V1R6 or later system that is exploiting the new address space.</p>	UA09833
<p>DFSMSdftp: An enhancement in the z/OS V1R7 Object Access Method (OAM) component introduces a new valid value ("R") for the object location in the object directory to indicate that the object resides on DB2 disk in recalled status. This PTF enables pre-z/OS V1R7 OAMs to coexist in an OAMplex with OAMs at the z/OS V1R7 level.</p>	UA16995
<p>DFSMSdftp: As part of VSAM extent constraint removal in z/OS V1R7, these PTFs prevent pre-z/OS V1R7 systems from opening data sets that have more than 255 extents. Also, if a data set is open and a z/OS V1R7 job extends it past 255 extents, the close on the pre-z/OS V1R7 system fails. Finally, these PTFs prevent conversion of a data set having more than 255 extents from being converted by DFSMSdss to a non-SMS managed data set on pre-z/OS V1R7 releases.</p>	UA14883, UA16224, UA16797
<p>DFSMSdftp: z/OS V1R7 supports new QNAME and RNAME parameters for VSAM RLS. The coexistence PTFs prevent serialization problems from occurring when the new parameters are used in a GRS complex that includes a pre-z/OS V1R7 system.</p>	UA16634, UA16923, UA17235
<p>DFSMSdftp: z/OS V1R7 supports large format sequential data sets. These PTFs cause pre-z/OS V1R7 systems to issue ABEND 213-14 or 213-16 if a program attempts to open data sets that cannot work on those systems.</p>	UA15870, UA16551
<p>DFSMSdss: z/OS V1R7 supports large format sequential data sets. These PTFs cause pre-z/OS V1R7 systems to issue ABEND213-14 for any large format dump data sets that are provided as input to RESTORE or COPYDUMP, or output for DUMP and COPYDUMP. If DFSMSdss encounters any large format sequential data sets as input to logical data set COPY, logical and physical data set DUMP and RESTORE, data set print, or logical and physical data set RELEASE, the data set will fail with ADR878E rsn 17.</p>	UA16797
<p>DFSMSshsm: z/OS V1R7 supports large format sequential data sets. The PTFs cause pre-z/OS V1R7 systems that might potentially recall, recover, or ARECOVER a data set to first verify that the data set is not a large format data set. If it is, an error message is issued describing the reason for the failure.</p>	UA16797, UA16952

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<p>DFSMSHsm: z/OS V1R7 supports large format sequential data sets. In an HSMplex with more than one DFSMSHsm host, take care when migrating the journal to a large format sequential data set. All DFSMSHsm hosts within an HSMplex must be at z/OS V1R7 before you can migrate the journal to a large format sequential data set.</p> <p>With the PTFs, when a pre-z/OS V1R7 DFSMSHsm host attempts to open a journal, if the journal is a standard format data set, DFSMSHsm initialization continues. If the journal is a large format data set, message MSGARC0509E with the "LARGE" text in the message is issued and DFSMSHsm is stopped. If the journal is a striped data set, message MSGARC0509E with the "STRIPED" text in the message is issued and DFSMSHsm is stopped. If the ARCBJRN utility attempts to use a large format journal data set, it is ended with return code RC40, which indicates an OPEN error.</p>	<p>UA15870, UA16551, UA16955</p>
<p>DFSMSHsm: In z/OS V1R5, DFSMSHsm is enhanced to use volume-level fast replication to create backup versions for sets of storage groups. A set of storage groups is defined through an SMS construct termed "copy pool". In support of fast replication, install the PTF on all z/OS V1R5 systems in a sysplex.</p>	<p>UA07443</p>
<p>DFSMSHsm: z/OS V1R6 and later allow multiple secondary space management (SSM) tasks to run concurrently. The PTF allows a z/OS V1R5 system to tolerate this SSM multitasking.</p>	<p>UA09619</p>
<p>DFSMSHsm: z/OS V1R7 supports fast subsequent migration (FSM) of data sets. The PTFs cause DFSMSHsm to set the appropriate flags during recall processing so that if the data set is later opened for output by either z/OS V1R7 systems or pre-z/OS V1R7 systems, the flags used for reconnection determination are set appropriately.</p>	<p>UA16850, UA16858, UA16861, UA16945</p>
<p>DFSMSHsm: z/OS V1R7 increases the number of data set names supported in a tape table of contents (TTOC). If a system that has the coexistence PTF installed finds that the OCDS RECORDSIZE is 6144 bytes, which indicates that some instances of DFSMSHsm in the HSMplex might be using the extended TTOC, then tape operations on that level of DFSMSHsm are inhibited.</p>	<p>UA16948</p>
<p>Distributed File Service: Allows pre-z/OS V1R7 systems to tolerate new characters (@#\$) allowed in z/OS V1R7 for zFS file systems and aggregates.</p>	<p>UA14529</p>
<p>Distributed File Service: Allows releases to correctly access the new structure in z/OS V1R7 (version 1.4) for zFS aggregates. If you do not install toleration APAR OA11573 on prior releases, prior releases will not be able to correctly access the new structure.</p>	<p>PTF for APAR OA11573</p>
<p>HCD: Provides support for HCD users who share IODF data sets between pre-z/OS V1R7 systems and z/OS V1R7 systems.</p>	<p>PTF for APAR OA07875</p>
<p>JES2: Allows a back-level JES2 to run with z/OS V1R7 JES2 in a multi-access spool (MAS). Apply the PTFs that are appropriate to the JES2 level that you are using.</p>	<p>z/OS V1R5-V1R6 JES2: UA09501, UA90161; z/OS V1R4 JES2: UA03828, UA09500, UA90160</p>
<p>JES2: Fixes a problem on a receiving pre-z/OS V1R7 node that can occur in a rare situation with a large scheduler work block text unit (SWBTU). Data sets have a large SWBTU when MAILTO, MAILCC, and MAILBCC keywords are used in addition to other keywords on OUTPUT JCL statements. The problem is caused by APAR OA09152 (PTF UA16214 on z/OS V1R5-V1R6 JES2 or PTF UA16213 on z/OS V1R4 JES). This is a network-specific problem, not a MAS-specific problem.</p>	<p>z/OS V1R5-V1R6 JES2: UA16217; z/OS V1R4 JES2: UA16216</p>
<p>JES3: Allows a back-level JES3 to run with z/OS V1R7 JES3 in a multisystem complex. Apply the PTFs that are appropriate to the JES3 level that you are using.</p>	<p>z/OS V1R4 JES3: UA04010, UA07715</p>
<p>Language Environment: The /etc/utmpx file contains a user accounting database. In z/OS V1R6, the format of the records in the file was extended to support longer remote host names, 64-bit timestamp structures, and a version indicator. The coexistence PTF prevents the standard interfaces in pre-V1R6 releases from accessing /etc/utmpx databases that use the new format, avoiding confusion and possible data corruption. Attempts to access a /etc/utmpx database in the new format from an earlier release return a null pointer. Applications can use perror() to print the error message.</p>	<p>UQ85892</p>
<p>NFS: Allows a pre-z/OS V1R7 NFS SMF report generator to process an SMF file that</p>	<p>UA16683</p>

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includes NFS V1R7 SMF records. Any records containing TCP/IP version 6 IP addresses will be ignored.	
NFS: Allows a pre-z/OS V1R7 NFS server to read a mount handle data set written by NFS V1R7.	UA19507
SMP/E: Allows back-level SMP/E to tolerate enhancements introduced in z/OS V1R6 SMP/E (which is equivalent to SMP/E V3R3).	UR54451, UR54454 (if Japanese)
SMP/E: Provides support for SMP/E users who share SMPCSI data sets between pre-z/OS V1R7 systems and z/OS V1R7 systems.	UO00115

Table 3. Coexistence and fallback PTFs needed on z/OS V1R6

Apply, on z/OS V1R6, the coexistence and fallback service (PTFs) listed in this table.:

Element or feature, and reason PTFs are needed	z/OS V1R6 PTFs
BCP: A z/OS V1R7 system cannot join a sysplex of lower-level systems, and a lower-level system cannot join a sysplex of z/OS V1R7 systems, without this PTF.	UA16036
BCP: z/OS V1R7 introduces the logger log stream DUPLEXMODE(DRXRC) specification. If DUPLEXMODE(DRXRC) is specified in a z/OS V1R7 system in a sysplex, and prior releases are running in the same sysplex, the PTF must be installed. If DUPLEXMODE(DRXRC) is not specified, installing the PTF is not required but is nevertheless recommended to avoid any complications if the configuration changes.	UA17179
BCP: Allows a pre-z/OS R7 system to use an IODF that was created using z/OS R7 HCD.	UA17028
BCP: GRS APAR OA11383 provides compatibility support for the corrected GRS ISGLOCK structure rebuild processing in APAR OA11147 which is contained in z/OS V1R7. OA11383 MUST be installed and IPLed on EVERY system in the sysplex before installing and IPLing z/OS V1R7 on ANY system in the SYSPLEX.	UA18542
BCP: Increased CPU utilization in the console address space might be reported on all systems in a sysplex after introducing a z/OS V1R4 system with the z/OS V1R4 Consoles Enhancements feature, or later-level system, into the sysplex. The coexistence PTF prevents heavy message traffic on the z/OS V1R7 system from impacting the other systems in the sysplex.	UA16510
BCP: Allows a z/OS R6 system to correctly handle blank WTOs issued to another system.	UA09962
BCP: DSNTYPE=LARGE data sets are only supported by z/OS V1R7. The coexistence PTF causes z/OS to detect the accidental specification of such a data set for stand-alone dump output and to reject its use, as has been previously done for such data set organizations as a PDS.	UA18499
DFSMSdfp: An enhancement in the z/OS V1R7 Object Access Method (OAM) component introduces a new valid value ("R") for the object location in the object directory to indicate that the object resides on DB2 disk in recalled status. This PTF enables pre-z/OS V1R7 OAMs to coexist in an OAMplex with OAMs at the z/OS V1R7 level.	UA16996
DFSMSdfp: As part of VSAM extent constraint removal in z/OS V1R7, these PTFs prevent pre-z/OS V1R7 systems from opening data sets that have more than 255 extents. Also, if a data set is open and a z/OS V1R7 job extends it past 255 extents, the close on the pre-z/OS V1R7 system fails. Finally, these PTFs prevent conversion of a data set having more than 255 extents from being converted by DFSMSdss to a non-SMS managed data set on pre-z/OS V1R7 releases.	UA14884, UA16225, UA16798
DFSMSdfp: z/OS V1R7 supports new QNAME and RNAME parameters for VSAM RLS. The coexistence PTFs prevent serialization problems from occurring when the new parameters are used in a GRS complex that includes a pre-z/OS V1R7 system.	UA16635, UA16924, UA17236
DFSMSdfp: z/OS V1R7 supports large format sequential data sets. These PTFs cause pre-z/OS V1R7 systems to issue ABEND 213-14 or 213-16 if a program attempts to open data sets that cannot work on those systems.	UA15871, UA16552
DFSMSdss: z/OS V1R7 supports large format sequential data sets. These PTFs cause pre-z/OS V1R7 systems to issue ABEND213-14 for any large format dump data sets that are provided as input to RESTORE or COPYDUMP, or output for DUMP and COPYDUMP.	UA16798

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If DFSMSdss encounters any large format sequential data sets as input to logical data set COPY, logical and physical data set DUMP and RESTORE, data set print, or logical and physical data set RELEASE, the data set will fail with ADR878E rsn 17.	
DFSMSHsm: z/OS V1R7 supports large format sequential data sets. The PTFs cause pre-z/OS V1R7 systems that might potentially recall, recover, or ARECOVER a data set to first verify that the data set is not a large format data set. If it is, an error message is issued describing the reason for the failure.	UA16798, UA16953
DFSMSHsm: z/OS V1R7 supports large format sequential data sets. In an HSMplex with more than one DFSMSHsm host, take care when migrating the journal to a large format sequential data set. All DFSMSHsm hosts within an HSMplex must be at z/OS V1R7 before you can migrate the journal to a large format sequential data set. With the PTFs, when a pre-z/OS V1R7 DFSMSHsm host attempts to open a journal, if the journal is a standard format data set, DFSMSHsm initialization continues. If the journal is a large format data set, message MSGARC0509E with the "LARGE" text in the message is issued and DFSMSHsm is stopped. If the journal is a striped data set, message MSGARC0509E with the "STRIPED" text in the message is issued and DFSMSHsm is stopped. If the ARCBJRN utility attempts to use a large format journal data set, it is ended with return code RC40, which indicates an OPEN error.	UA15871, UA16552, UA16956
DFSMSHsm: z/OS V1R7 supports fast subsequent migration (FSM) of data sets. The PTFs cause DFSMSHsm to set the appropriate flags during recall processing so that if the data set is later opened for output by either z/OS V1R7 systems or pre-z/OS V1R7 systems, the flags used for reconnection determination are set appropriately.	UA16851, UA16859, UA16862, UA16946
DFSMSHsm: z/OS V1R7 increases the number of data set names supported in a tape table of contents (TTOC). If a system that has the coexistence PTF installed finds that the OCDS RECORDSIZE is 6144 bytes, which indicates that some instances of DFSMSHsm in the HSMplex might be using the extended TTOC, then tape operations on that level of DFSMSHsm are inhibited.	UA16949
Distributed File Service: Allows pre-z/OS V1R7 systems to tolerate new characters (@#)\$ allowed in z/OS V1R7 for zFS file systems and aggregates.	UA14530
Distributed File Service: Allows releases to correctly access the new structure in z/OS V1R7 (version 1.4) for zFS aggregates. If you do not install toleration APAR OA11573 on prior releases, prior releases will not be able to correctly access the new structure.	PTF for APAR OA11573
HCD: Provides support for HCD users who share IODF data sets between pre-z/OS V1R7 systems and z/OS V1R7 systems.	PTF for APAR OA07875
JES2: Allows a back-level JES2 to run with z/OS V1R7 JES2 in a multi-access spool (MAS). Apply the PTFs that are appropriate to the JES2 level that you are using.	z/OS V1R5-V1R6 JES2: UA09501, UA90161; z/OS V1R4 JES2: UA03828, UA09500, UA90160
JES2: Fixes a problem on a receiving pre-z/OS V1R7 node that can occur in a rare situation with a large scheduler work block text unit (SWBTU). Data sets have a large SWBTU when MAILTO, MAILCC, and MAILBCC keywords are used in addition to other keywords on OUTPUT JCL statements. The problem is caused by APAR OA09152 (PTF UA16214 on z/OS V1R5-V1R6 JES2 or PTF UA16213 on z/OS V1R4 JES). This is a network-specific problem, not a MAS-specific problem.	z/OS V1R5-V1R6 JES2: UA16217; z/OS V1R4 JES2: UA16216
JES3: Allows a back-level JES3 to run with z/OS V1R7 JES3 in a multisystem complex. Apply the PTFs that are appropriate to the JES3 level that you are using.	z/OS V1R4 JES3: UA04010, UA07715
NFS: Allows a pre-z/OS V1R7 NFS SMF report generator to process an SMF file that includes NFS V1R7 SMF records. Any records containing TCP/IP version 6 IP addresses will be ignored.	UA16683
NFS: Allows a pre-z/OS R7 NFS server to read a mount handle ds written by NFS R7.	UA19507
SMP/E: Provides support for SMP/E users who share SMPCSI data sets between pre-z/OS V1R7 systems and z/OS V1R7 systems.	UO00116