z/OS Migration: z/OS 1.4 to z/OS 1.6

Special thank you to Marna Walle for sharing her foils.

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Trademarks

e - logo
e-business
z/Architecture
z/OS
z/VM
zSeries
AnyNet
AD/Cycle

BookManager
C/370
CICS
COBOL/370
DB2
DB2 Universal Database

DFS

DFSMS/MVS

DFSMSdfp
DFSMSdss
DFSMShsm
DFSMSrmm
Encina
DFSORT
ESCON
First Failure Support Technology

FunctionPac
FFST
FICON
GDDM
Hiperspace
Infoprint

Intelligent Miner

IBM

IBMLink
IMS
IP PrintWay
Language Environment
Multiprise
MVS
MVS/ESA
Net.Data

NetSpool
Open Class
OpenEdition
OS/2
OS/390
Parallel Sysplex

Processor Resource/Systems Manager

ProductPac
RACF
RMF
RS/6000
S/390
S/390 Parallel Enterprise Server
SecureWay
System/390

SOM
SOMobjects
SP
VisualAge
VM/ESA
VSE/ESA

VTAM

WebSphere

Domino (Lotus Development Corporation)
Java (Sun Microsystems, Inc.)
JDBC (Sun Microsystems, Inc.)
JDK (Sun Microsystems, Inc.)
Lotus (Lotus Development Corporation)
Notes (Lotus Development Corporation)
Pentium (Intel)
Tivoli (Tivoli Systems Inc.)
UNIX (X/Open Company Limited)
Windows (Microsoft Corporation)
Windows NT (Microsoft Corporation)

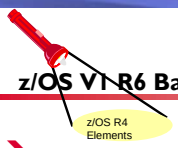
Topics

- **Content of z/OS Version 1 Release 6**
  - Elements and Features Added, Changing, and Withdrawn
- **z/OS R6 Ordering and Deliverables**
  - Products Related to z/OS R4
- **z/OS Policies**
  - z/OS Coexistence-Migration-Fallback
- **Positioning for z/OS R6**
  - Ensuring System Requirements are Satisfied
    - Driving System Requirements
    - Target System Requirements
  - Migrating to z/Architecture
    - Hardware First Path and Software First Path
  - Coexistence Requirements
  - Migration actions You Can Do Now
- **Summary**

z/OS

- **Program Number: 5694-A01**
- **From an installation/migration perspective it:**
  - Contains Elements and optional priced/unpriced Features
  - Is delivered in customized offerings
    - ServerPac
    - Customized Fee Deliverables
    - CBPDO

z/OS V1R6 Base Elements and Optional Features Changing (from V1R4)



- BCP
- C/C++ without Debug
- Communications Server
  - IP and SNA
- *Communications Server Security Level 3*
- Cryptographic Services
  - ICSF (FMID HCR770A)
  - PKI Services
  - SSL
- DFSMSdfp
- DFSMSdss
- DFSMShsm
- DFSMSrmm,
- DFSMStvs
- DFSORT
- Distributed File Service
- HCM
- HLASM (V1R5)
- HLASM Toolkit (V1R5)
- Infoprint Server
- Integrated Security Services*
  - Enterprise Identity Mapping
  - LDAP Server
  - Network Authentication Service
- ISPF
- JES2
- JES3
- Language Environment
- Library Server
- msys for Operations
  - System Automation (part of V2R3)
- Network File System
- RMF
- Run-Time Library Extensions*
- SDSF
- Security Server
  - RACF
- SMP/E (V3R3)
- TSO/E
- *z/OS Security Level 3*
  - *LDAP Security Level 3 **
  - *Network Authentication Service Level 3*
  - *SSL Level 3*
- z/OS UNIX
  - Application Services
  - Integrated Call Level Interface

KEY:

- **Black** (in **bold**) are base elements
- **Green** (also in **bold**) are optional priced features
- ***Brown*** (also in ***italics***) are optional unpriced features with export controls
- * indicates a new element since z/OS R4
- _ indicates this element changed in z/OS R6 **(from z/OS R5)**
- This element changed in z/OS R6 **(from z/OS R4)**

All other elements not listed have not changed since z/OS R4

IBM

Where are they now since z/OS V1.4?

●Cryptographic Services:

- PKI Services (formerly from Security Server and was licensed with the base)
- ICSF
- OCSF
- System SSL

★Integrated Security Services

- ★Enterprise Identity Mapping (introduced as a PTF on z/OS R4)
- DCE Security Server (formerly from Security Server and was licensed with the base)
- Firewall Technologies (formerly from Security Server and was licensed with the base)
- LDAP Server (formerly from Security Server and was licensed with the base)
- Network Authentication Service (formerly from Security Server and was licensed with the base)
- OCEP (formerly from Security Server and was licensed with the base)

★Run-Time Library Extensions

- ★Common Debug Architecture
- UNIX System Lab I/O Stream Library and Complex Math Library (formerly part of C/C++ IBM Open Class Library)
- IBM Open Class DLLs (formerly part of C/C++ IBM Open Class Library)

●Security Server:

- RACF

★z/OS Security Level 3

- ★LDAP Server Security Level 3
- Network Authentication Service Level 3 (formerly its own feature Security Server Network Authentication Service Level 3)
- OCSF Security Level 3 (formerly its own feature)
- System SSL Security Level 3 (formerly its own feature)

Elements and Functions Withdrawn from z/OS R5

C/C++ IBM Open Class Library	Base Element - use the C++ Standard Library (shipped with Language Environment) instead
C/C++ with Debug Tool	Optional Feature - use z/OS R5 C/C++ without Debug Tool feature and also the independent standalone program product - IBM Debug Tool for z/OS V4.1 (5655-I24)
OAM support for Filenet 9246, optical libraries, 9247 optical drives, and 12" optical media (from DFSMSdfp)	Base Element - if optical is required, replace Filenet devices and media with IBM 3995 optical devices and media. If optical is not required, use tape media or DB2 tables on disk.
IBM License Manager	Base Element - use the Sub-Capacity Reporting Tool (SCRT) for subcapacity software pricing

Elements and Functions Withdrawn from z/OS R6

C/C++ ISPF panels (from C/C++)	Priced Feature - invoke the C/C++ compiler via UNIX, JCL, or TSO/E.
Run-time Library Services (RTLS) (from Lang Env)	Base Element - no longer required due to stability and upward compatibliity
Dynamic Link Library (DLL) Rename Utility (from Lang Env)	Base Element - no longer needed due to C/C++ DLLs being licensed with the z/OS base
SMIv1 version of the IBM MVS Enterprise-specific MIB module (from Communications Server)	Base Element - if you want to continue to use SMIv1, publicly available available tools can convert SMIv2 to SMIv1
DCE Application Support	Base Element - no replacement necessary. Evaluate WebSphere for similar function
Encina Toolkit Executive	Base Element - no replacement offered. Marketplace has moved to other technologies
Text Search	Base Element - available via web deliverable if still necessary for certain usage

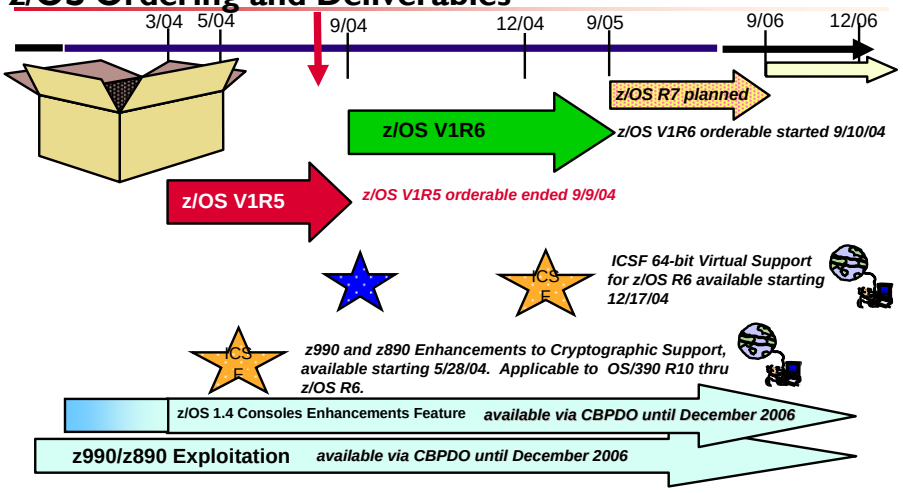
Functions Planned to be Withdrawn in z/OS R7...

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
JOBCAT and STEPCAT facilities (from DFSMSdfp)	Base Element - any remaining JCL that use JOBCAT or STEPCAT must change
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)
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)
z/OS Optional Source media feature	(not an element, an z/OS orderable feature)

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)
OROUTED (from Communications Server)	Base Element - use OMPROUTE as the dynamic routing daemon
AnyNet (from Communications Server)	Base Element - implement Enterprise Extender as a replacement
English and Japanese panels from DFSORT	Priced Feature - no replacement offered
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.

z/OS Ordering and Deliverables



z890 and z990 Support for z/OS R4, R5, and R6

Release	Support Provided
z/OS R6	z990 Exploitation Support is incorporated z990 Cryptographic Support (FMID HCR770A) is incorporated. However, z990 and z890 Enhancements to Cryptographic Support (FMID HCR770B) is available for z/OS R6 as a web deliverable.
z/OS R5	z990 Exploitation Support is incorporated. z990 Cryptographic CP Assist Support (FMID HCR7708) is incorporated. z990 Cryptographic Support (FMID HCR770A) was a web deliverable for z/OS R5. However, z990 and z890 Enhancements to Cryptographic Support (FMID HCR770B) is available for z/OS R5 as a web deliverable, and replaces z990 Cryptographic Support.
z/OS R4	z990 Exploitation Support is incorporated into z/OS R4 after Feb 24, 2004. z990 Exploitation Support remains available separately in CBPDO until December 2006. z990 Cryptographic CP Assist Support (FMID HCR7708) is incorporated via z990 Exploitation Support. z990 Cryptographic Support (FMID HCR770A) was a web deliverable for z/OS R4. However, z990 and z890 Enhancements to Cryptographic Support (FMID HCR770B) is available for z/OS R4 as a web deliverable, and replaces z990 Cryptographic Support.

z/OS V1R6 Ordering

- **Program Number: 5694-A01**
  - Ensure you order the optional priced and unpriced features that you were using before!
  - Especially remember your export controlled features, if you desire. Here's the complete list:
    - *z/OS Security Level 3*
    - *Communications Server Security Level 3*
- **z990 and z890 Enhancements to Cryptographic Support NOT in R6**
  - Use your R10-R5 z890 and z990 Enhancements to Cryptographic Support web deliverable, or get it from the Download web site for z/OS R6
- **Tivoli Netview and System Automation users take note!**
  - z/OS msys for Operations contain parts of these products, ...see next foil
- ***(Bimodal Migration Accommodation:***
  - *Applicable to z/OS R2, R3, and R4, NOT applicable to z/OS R5 or l*
  - *Only orderable via the Download web site...more later!)*
- **Order z/OS V1R6 electronically via ShopzSeries!**

Products Related to z/OS R6

- ***IBM SMP/E for z/OS and OS/390, V3.3*** **(5655-G44)**
  - **SMP/E is non-exclusive! incorporated into R6**
    - –Planned availability is September 24, 2004, at no charge to z/OS licensed users
    - –Also available for download.
- ***IBM Debug Tool for z/OS V4 R1*** **(5655-L24)**
  - Debug Tool no longer incorporated, as of z/OS R5
- ★ **z/OS R6 msys for Operations contains parts of:**
  - **Tivoli Netview for OS/390 V1 R4 (5697-B82)**
  - **System Automation for OS/390 V2 R3 (5645-006)**
- ***Tivoli NetView for OS/390 V5 R1*** **(5697-ENV)**
  - Can be ordered with, and is compatible with z/OS R6 msys for Ops
- ***System Automation for z/OS V2 R3*** **(5645-006)**
  - Can be ordered with, and is compatible with z/OS R6 msys for Ops
- ***XML Toolkit for z/OS V1 R7*** **(5655-J51)**
  - Contains XML V1R6 and V1R5 levels, as well
  - May download *XML C++ Parser for the OS/390 V2.10 C++ Compiler* for z/OS deliverable
- ***IBM 64-bit SDK for z/OS, Java 2 Technology Edition V1 R4*** **(5655-M30)**
  - Can be ordered with, and can coexist with IBM SDK for z/OS, Java 2 Technology Edition V1 R4 (5655-I56)
- ***IBM Ported Tools for z/OS*** **(5655-M23)** - provides OpenSSH function!

z/OS Policies

- **Release Frequency**
  - z/OS V1 R6 is generally available and is the only orderable z/OS release
    - First annual release
    - All subsequent releases are planned for GA in September
- **Installation**
  - All elements must be installed except for JES2, JES3, or SDSF (depending on which JES you use) and any unpriced features you order
- **Coexistence-Migration-Fallback**
  - consistent policy
- **Service Support**

z/OS R6 Coexistence

- **Starting with z/OS R6, IBM has aligned the coexistence, fallback, and migration policy with the service policy.**
  - **z/OS R3, z/OS R4, z/OS R5, and z/OS R6** are supported for coexistence, migration, and fallback
  - Prepare now! **z/OS R4, z/OS R5, z/OS R6, and z/OS R7** are planned to be supported for coexistence, migration, and fallback
  - **OS/390 R10 can NOT coexist with z/OS V1 R5 or z/OS V1R6**
- **Only JES2/JES3 that can coexist with the shipped JES can be "staged" on z/OS. This is enforced in z/OS V1 R6. That means:**
  - z/OS R2/R3 JES2 thru z/OS R5/R6 JES2 are supported for coexistence, migration, and fallback
  - z/OS R2/R3 JES3 thru z/OS R5/R6 JES3 are supported for coexistence, migration, and fallback

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
- Service policy supercedes the Coexistence Policy

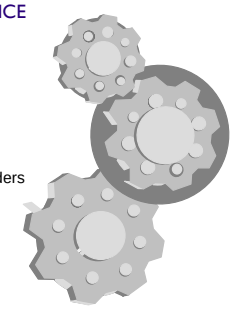
	General Availability	Service Expiration
z/OS V1 R3	29 March 2002	**31 March 2005**
z/OS V1R4	27 September 2002	Announced to be 31 March 2007
z/OS V1R5	26 March 2004	Planned to be 31 March 2007
z/OS V1R6	24 September 2004	Planned to be September 2007

Positioning for z/OS R6

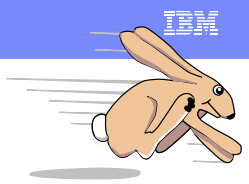
- **Read Documentation and PSP buckets**
  - ***z/OS Migration*** and ***z/OS and z/OS.e Planning for Installation***
  - Software PSP buckets: ZOSV1Rx: ZOSGEN, SERVERPAC, ...
  - Hardware PSP buckets: 2084DEVICE, 2086DEVICE, 2064DEVICE, 2066DEVICE
- **DASD Storage Requirements**
  - –Use SMP/E V3R2 or higher to reduce SMPLTS size on z/OS R4!

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

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**



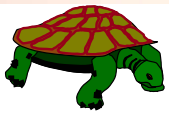
Driving System Requirements - ServerPac

- **Minimum to Install z/OS R6 ServerPac via tape:**
  1. Any one of the following:
     - z/OS R3 with PTFs (many for LE since ServerPac uses LE runtime!)
     - Customized Offerings Driver (subset of z/OS R4, with SMP/E V3.3)
  2. Activated OMVS address space with UNIX kernel services operating in full function mode for unloading the HFS via the *pax* utility
  3. Install from a user id that is permitted to the system resources defined in ServerPac job RACFDRV. You can install from a superuser (UID=0), ***or*** be a member of the facility class resource BPX.SUPERUSER
  4. **Do not specify these LE run-time options as nonoverridable (NONOVR) in the CEEDOPT CSECT: ALL31, ANYHEAP, BELOWHEAP, DEPTHCONDLIMIT, ERRCOUNT, HEAP, HEAPCHK, INTERRUPT, LIBSTACK, PLITASKCOUNT, STACK, ...**
- **Minimum to Service the New Target System:**
  - See CBPDO Wave 2 **(includes shipped levels of program binder, SMP/E, and HLASM, and UNIX System Services requirements)**
  - If you order a product with your z/OS ServerPac that uses ++JAR, you'll need Java 2 Technology Edition (5655-D35). *z/OS itself does **NOT** need Java as a driving system requirement!*

Driving System Requirements - electronic ServerPac

- **General availability for electronic delivery is Jan 10, 2005**
  - **Can choose between tape and electronic delivery**
- **Minimum to Install z/OS R6 ServerPac via electronic delivery:**
  2. Must meet the tape requirements (on the previous foil)
  3. SMP/E V3.3
  4. Cryptographic Services ICSF set up for RECEIVE FROMNETWORK processing

Driving System Requirements - CBPDO (and to service your ServerPac target system)



- **Minimum for Wave 0 (Driving System Elements):**
  - z/OS R3 with PTFs
- **Minimum for Wave 1 and Wave 2 (JES):**
  - z/OS R3 with PTFs, along with **latest Program Binder, SMP/E, and HLASM**, and PTFs
    - May STEPLIB to Wave 0 target system's MIGLIB and SASMMOD1.
  - Activated OMVS address space, in full function mode
  - SMP/E Link Edit UTILITY entry for the program binder
  - Language Environment Run Time Library SCEERUN access.
  - Install from a user id that is a superuser (UID=0), or be a member of the facility class resource BPX.SUPERUSER
  - Install from a user id that is permitted read access to facility class resources BPX.FILEATTR.APF, BPX.FILEATTR.PROGCTL, and BPX.FILEATTR.SHARELIB (or BPX.FILEATTR.*)
  - **Group IDs uucpg and TTY, and user ID uucp, must be defined in your security database**
  - (Wave 1 and Wave 2 may be combined.)
- **May also use the Customized Offerings Driver to satisfy any wave**

Target System Requirements for z/OS R6

- **Software Requirements**
  - Coexistence Software (on Other Target Systems)
  - Correct Levels of IBM Non-z/OS and Non-IBM Products
  - Functional Requirements
    - z/OS R6 must run in z/Architecture mode
    - Some z/OS R6 functions (like zAAP) require z9-109, z990 or z890
  - VM Guest considerations
    - **Only on z800 or z890: cannot IPL OS/390 or z/OS under an LPAR named ZOSExxxx (includes as a VM guest).**

- **Hardware Requirements**
  - Processor Requirements:
    - **an IBM @server zSeries: z9-109, z990, z890, z900, or z800**
  - Coupling Facility: see http://www.ibm.com/eserver/zseries/pso/cftable.html

Some IBM SW Target System Requirements for z/OS R6

product name	minimum supported level
CICS TS	V2 R2 for determining zAAP execution potential, can use V2 R2. •for zAAP exploitation, minimum level is V2 R3.
DB2	V6 with PTFs for determining zAAP execution potential and exploitation, minimum level is V7
IMS	V7 with PTFs for determining zAAP execution potential and exploitation, minimum level is V7
WebSphere Application Server	V5.0 **(Note: WAS V4.0.1 is not supported on z/OS R6!)** for determining zAAP execution potential, can use V5.02 •for zAAP exploitation, minimum level is V5.1

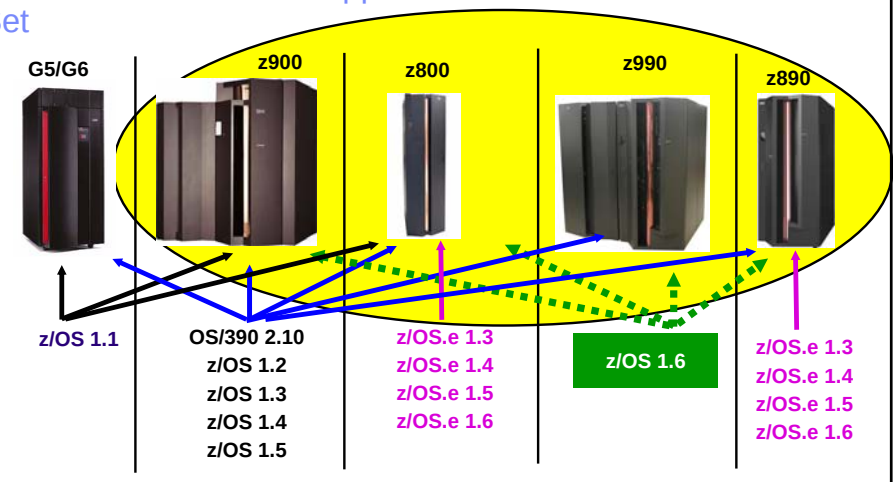
➔zAAP exploitation requires z/OS R6 and the IBM Solution Developers Kit (SDK) for z/OS, Java 2 Technology Edition, V1.4 with PTF (or later) for APAR PQ86689

➔The zAAP Projection Tool for Java 2 Technology Edition, SDK1.3.1 can be used to assist in zAAP capacity planning.

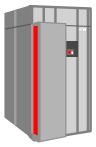
PSP Buckets

- **Upgrade ZOSV1R6**
  - Subset ZOSGEN
  - Subset SERVERPAC
  - Subset fmid or fmid/yymm, or name
- **Upgrade for non-exclusive elements**
  - Same as standalone program product
- **Upgrade CUSTOMPAC for fee deliverables**
- **Upgrade xxxxDEVICE for hardware**
  - For z9-109, is 2094DEVICE subset 2094/ZOS
  - for z990, is 2084DEVICE subset 2084/ZOS
  - for z900, is 2064DEVICE subset 2064/ZOS
  - for z890, is 2086DEVICE subset 2086/ZOS
  - for z800, is 2066DEVICE subset 2066/ZOS
- **PSP Buckets available on Internet**
  - http://techsupport.services.ibm.com/s390/suppo...

OS/390 and z/OS HW support and z/OS Architectural Level Set



A Brief History of Supported Architecture Modes



G5/G6 MP3000

z800, z900, z890, z990

OS/390 R10	ESA/390	ESA/390 or z/Architecture
z/OS R1	ESA/390	z/Architecture
z/OS R2 - R4	ESA/390	z/Architecture
z/OS R2 - R4 *	ESA/390	ESA/390 or z/Architecture
z/OS R5	ESA/390	z/Architecture
z/OS R6	not supported	z/Architecture

* using z/OS Bimodal Migration Accommodation within terms of offering

This means Bimodal Migration Accommodation not available on z/OS R6 (or R5)!

ESA/390 is 31-bit, z/Architecture is 64-bit

Migrating to z/Architecture

z/OS R6 in 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 R6 from z/OS R4:**
  - Hardware First (**recommended!**)
  - Software First from G5/G6/MP3000 (**disallowed!**)
- **64-bit Migration Checklist available**
  - **http://www-03.ibm.com/support/techdocs/atsmastr.nsf/WebIndex/FLASH10185**

Coexistence System Requirements for z/OS R6 *from z/OS R4*

- **Documented in *z/OS Migration***
- ***From z/OS R4*** **Coexistence PTFs for z/OS R6:**
  - **BCP** - GRS, RRS, Console, Program Binder, XCF, z990
  - **Communications Server** - z990
  - **DFSMS** - dfp, hsm, and rmm, and ICKDSF support
  - **JES2** - for MAS support down to z/OS R2/R3 JES2
  - **JES3** - for multisystem complex support down to z/OS R2/R3 JES3
  - **Language Environment** - downward compatibility
  - **RMF** - z990
  - **SDSF** - Console
  - **SMP/E** - toleration of z/OS R6 (SMP/E V3R3) enhancements

Elements with Migration Actions from z/OS R4 to z/OS R6

- Documented in *z/OS Migration*
  - *For complete migration tasks for z/OS R6, see this book!*
    - *from R4 to R6, and R5 to R6 (R3 to R6 is the entire book)*
    - *"When behaviors aren't the same anymore, migration actions are called for.*
- *From z/OS R4* to z/OS R6:
  - →BCP
  - →C/C++ without Debug
  - →Communications Server
  - ◆Cryptographic Services
  - →DFSMS
  - ◆DFSORT
  - ◆HCD
  - →HLASM
  - ◆ICKDSF
  - ◆Infoprint Server
  - ◆Integrated Security Services (LDAP Server)
  - ◆ISPF
  - →JES2
  - →JES3
  - →Language Environment
  - ◆Library Server
  - ◆OSA/SF
  - ◆RMF
  - ◆SDSF
  - ◆Security Server (RACF)
  - →SMP/E
  - ◆TSO/E
  - →z/OS UNIX System Services
  - →*means the migration actions follow within this presentation*
- Migration Actions that follow are divided by :
  - ◆ELEMENT, and then
    - ◆WHEN you can do the action: Now, Pre-First IPL, or Post-First IPL

Elements with Migration Actions from z/OS R4 to z/OS R6

- **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)**
  - **Remove customization for ILM (Required)**
  - **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

General Migration Actions from z/OS R4 to z/OS R6

- **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)**
  - **Remove customization for ILM (Required)**
  - **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)**
  - **Use IBM-supplied PARMLIB and PROCLIB (Required)**
  - **Migrate /etc and /var system control files (Required)**
  - **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 overriden by specifying REGION= or MEMLIMIT on JOB or EXEC in JCL
    - –Use IEFUSI to set limits on virtual storage above the line
- ***Continued on next foil...***

General Migration Actions from z/OS R4 to z/OS R6

- ***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, shared by multiple elements
  - **Accommodate new address spaces (Recommended)**
    - –New in R6, SMSPDSE1, restartable PDSE address space that allows you to recover from some PDSE problems without having to re-IPL. By default, not created during IPL.
  - **Rework and install user modifications (Required-IF)**
  - **Reconnect subsystems and non-IBM products (Required-IF)**
  - **Update operational and other procedures (Required)**
  - **Make z/Architecture changes (Required)**
- **Migration Actions Post-First IPL:**
  - **<none>**

BCP Migration Actions from z/OS R4 to z/OS R6

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

- 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.
- Update operatior procedures for brining CPUs online (Required-IF via OA03335)
  - Prior to R5 (and rollback), number of CPUs brought online for IPL was number online at the end of the last IPL. Now, number of CPUs brought online for IPL is number defined in the initial processor count for the LPAR profile.
- 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.
  - Make sure the MAXCAD value you have defined (or defaulted to) in IEASYSxx is large enough to accommodate the three new common area dataspaces created by the Consoles Enhancements. Default MAXCAD value changed in z/OS R6 from 25 to 50.
  - 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.

► *Continued on next foil...*

BCP Migration Actions from z/OS R4 to z/OS R6

► *Continued from previous foil...*

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

- Create IPL text (Required)
- Reassemble the stand-alone dump program (Required)
- Evaluate the need to reallocate stand-alone dump data sets (Recommended, as of R6)
  - R6 introduces support for extended format ds that use > 64k tracks per volume. If you have spread SA dump ds over more volumes than you desire, you can gain better control over the number of volumes.
- Update programs that use SMF record type 90, subtypes 5,9,13, and 15 (Required-IF, as of R6)
  - The "IPL SMF/SET SMF/SETSMF" section of SMF record type 90 has changed.
- Accommodate CMB and MAXCAD changes in IEASYSxx (Required-IF, as of z990 Supp)
  - Update programs and ISV products to support the ECMB. As a temporary bypass, may use ECMB=NO in IEAOPTxx.
  - May need to increase by one the limit for the number of SCOPE=COMMON data spaces. Note new MAXCAD default in z/OS R6 is 50.
- 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 R6

- *Continued from previous foil...*
- Migration Actions Post-First IPL:
  - Modify code that uses 1-byte console IDs (Recommended - before R7!)
    - 1-byte console IDs for macro interfaces and commands are planned to be removed in z/OS R7.
    - (1-byte console IDs will be completely removed in the release after z/OS R7.)
    - Use Console ID Tracking facility to identify 1-byte console ID usage
    - Modify code to use console names instead of the 1-byte IDs
    - Contact ISVs for identified 1-byte console ID usage
  - 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 data set and issue a D23 abend for diagnostic purposes.
      - If affected, likely that your program will get different return code 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.)

DFSMS Migration Actions from z/OS R4 to z/OS R6

- 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.
  - Evaluate the need to increase DFSMSrmm control data set size (Required, as of R5 APAR)
- Migration Actions Pre-First IPL:
  - Make ISAM-related updates (Recommended)
    - In the release after z/OS R7, ISAM data sets will no longer be accessible.
    - ISAM compatibility interface allows you to run an ISAM program against a VSAM key-sequenced data set. There are no plans to drop support for this interface.
  - 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 BUILDSA command to create the Stand-Alone Services IPL-capable core image
  - Ensure SYS1.IMAGELIB is customized for your printing environment (Required-IF)
    - ServerPac delivers a new SYS1.IMAGELIB, and you may have had line mode printer information in your previous SYS1.IMAGELIB
  - Tune DFSMShsm 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 V1R6, the default was 1. Now the default is 3.
- *Continued on next foil...*

HLASM Migration Actions from z/OS R4 (V1R4) to z/OS R6 (V1R5)

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

<None>

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

- Migrate from use of SYSUT1 (Required, as of R6)
  - Will no longer use SYSUT1 DD statements (will ignore them).
    - Remove SYSUT1 DD statements from JCL, procs, and execs. Keeping them in allows them to continue to work on older HLASM levels.
  - May need to increase amount of virtual storage allocated to assemblies.
    - Last page of each assembly gives an estimate of amount of storage needed to assemble without SYSUT1. If REGION is less than this amount, increase it.
- Accommodate changes to the HLASM's associated data file format (Required-IF, as of R6)
  - ADATA has changed. (ADATA is the assembler language program details.)
    - Any programs that read this file may need to accommodate the new format.
    - ISV debug products may be affected.
    - Optional reformatting exit, ASMAXADR, converts new format to old format.

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

<None>

JES2 Migration Actions from z/OS R4 to z/OS R6

► **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.
- Migrate to z2 mode (Recommended, before z/OS R7!)
  - Compatibility mode (R4) is planned to be removed in z/OS R7.
  - Before $ACTIVATE,LEVEL=z2 is done, analyze exit routines, how your system processess control block changes, job numbers, and macro services.

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

- Correctly process ENF58 records for SYSOUT checkpoints (Required-IF, as of R5/R6)
  - Previously, there was no status updates on a data set as it was printing, until it completed. Now, JES2 will generate an ENF58 record whenever a SYSOUT data set is checkpointed.
- Update exit 34 to support PSO unallocation flagging (Required-IF, as of R5/R6)
  - Contains the address of a peripheral data definition block, which previously could only be 0 if the data set type is a regular internal reader or unknown data set type. Now, it can also be 0 a PSO unallocation was performed after the job step TCB ended.
- Update exit routines to recognize null service class for WLM processing (Required-IF, as of R5/R6)
  - Previously, batch jobs in a WLM-managed job class that were assigned a null service class would not be selected for execution. Now they are eligible for execution.

► **Migration Actions Post-First IPL**

(None)

Language Environment Migration Actions from z/OS R4 to z/OS R6

- **Migration Actions You Can Do NOW:**
  - Migrate from use of RTLS (Required-IF, as of R6)
    - Function no longer required, due to stability and upward compatibliity of Language Environment run-time library.
    - Ensure that your customized run-time options do NOT have RTLS, VERSION, or LIBRARY.
  - Migrate from use of DLL Rename Utility (Required-IF, as of R6)
    - C/C++ DLLs have been licensed with the z/OS base, therefore the DLL Rename Utility is no longer required.
- **Migration Actions Pre-First IPL:**
  - Update the CICS system definition file based on the newest CEECCSD sample (Required)
    - In each release, load modules are added/deleted to this file.
  - Review Language Environment load modules in LPA (Required-IF)
  - Update applications that do not use standard interfaces to process a utmpx data base (Required-IF, as of R6)
    - Existing apps that do NOT use the standard interface must be rewritten for use of z/OS R6.
    - Standard interfaces include: setutxent(), getutxent(), getutxid(), putxtline(), and endutxent().
  - Determine the impact of changes to default run-time options (Required-IF, as of R5)
    - Changes to the run-time options:
      - HEAPCHK now has a pool depth suboption
      - HEAPPOOLS has several new suboptions that allow you to define six additional pools.
    - Update your existing CEEDOPT and CEECOPT, noting the changes above.
- **Migration Actions Post-First IPL:**
  - Accept new putenv() default (Recommended, as of R5 and rolled back)
    - Now, the string passed to putenv() is placed directly into the array of environment variables.
    - Can restore previous behavior of putenv().

z/OS V1 R6 Install-Related Enhancements

- **Documentation:**
  - *z/OS Migration* contains all supported migration paths to z/OS R6!
    - z/OS R3 to z/OS R6 (the whole book), z/OS R4 to z/OS R6, and z/OS R5 to z/OS R6
  - *z/OS Migration* can be used just for your particular path!
    - Only seeing actions associated with your migration
- **Deliverables**
  - ServerPac:
    - ★ **ServerPac can be delivered electronically!!!**
    - Fewer jobs to run
    - Only mount RIM tape once
    - Automated retrieval of DASD volume information
    - Automatic block size optimization
    - Support for zFS file systems
    - ***...and lots of other goodies!***

Summary of Enhancements of System Programmer Interest

- ★**BCP (and rolled back): Parallelize IOS Initialization Processing**
- ★**HCD (via PTFs, ok, not really just z/OS R6!): Support for renaming LPARs without an outage**
- ★**SMP/E V3R3: Goody Grab Bag**
- ★**Security Server RACF: Dynamic Class Descript… able**
- ★**UNIX: Automove System List Enhancemen…**
- ★**UNIX: Automount Enhancements**
- ★**UNIX: HFS to zFS Automount**

BCP Parallellize IOS Initialization

- ★**IOS will minimize impact on system initialization by executing functions in parallel for device initialization.**
- ★**Can significantly reduce IPL times!**
- ★**Support rolled back to z/OS R4 via APAR OA07335.**
- **– Known impacts to:**
  - – All EMC Symmetrix 8000 and Symmetrix DMX Storage processor models
  - – Reference EMC knowledge base entry EMC93649 for current details
- ★**To see how much IPL time you saved, do this before and after:**
  - ★Issue the following IPCS subcommand: *IPCS STATUS IPLDATA* on any SVC or stand-alone dump.
  - ★Look at the IECVIOSI entry.

z/OS R6 Install-Related Enhancements

HCD Support for Dynamically Renaming LPAR

- ★**You can define LPARs using a placeholder ID (*) so that the LPARs can be added dynamically to a configuration and activated at a later time.**
- ★**Requires z890 or z990 GA3.**
- ★**Function provided in HCD/HCM via APAR (need APAR on z/OS R6 too)**
- ★**To use:**
  - ★In the Add Partition dialog, you specify an '*' as the placeholder partition name for reserved partitions.
  - ★You specify a partition number, a usage type and optionally a description
  - ★Reserved partitions will appear with this '*' at the end of the Partition List
  - ★To activate a partition dynamically, you need to change the '*' name to a valid partition name and to define the appropriate partition configuration before building a new production IODF
- **– Note: You cannot change the partition number dynamically.**

z/OS R6 Install-Related Enhancements

SMP/E V3R3 Goody Grab Bag

- ★**RECEIVE FROMNETWORK with FTP Client**
  - •Allow SOCKS firewall navigation
  - •Secure transport using Transport Layer Security (TLS)
  - •IPv6 networks
- ★**RECEIVE SOURCEID for Existing SYSMODS**
  - •SOURCEID will be assigned when the sysmod has already been RECEI
- ★**IEBCOPY COPYMOD Support**
  - •Will use COPYMOD automatically to reblock load modules on RECEIVE, APPLY, ACCEPT, and RESTORE.
- ★**REJECT Check Support**
  - •Will not update any data sets or zones. Reports will be produced.
- ★**Wildcard Entry Name Support on Query 3.1**

```
Specify the zone, entry type, and name to be queried:

   ZONE NAME   ===> GLOBAL   Name of the zone to be queried.
                             To display a list of all zones, leave blank

   ENTRY TYPE  ===> SYSMOD   Entry type to be queried.
                             To display a list of all valid entry types, leave ENTRY TYPE and ENTRY NAME blank

   ENTRY NAME  ===> UA90*    Entry name to be queried.

                             Leave blank or use a wildcard (entry name pattern) to display a selection list.
```

z/OS R6 Install-Related Enhancements

RACF Dynamic Class Descriptor Table

★Previously, to update the RACF class descriptor table and router table, the installation must:

- ➔Write assembler code, and linkedit modules into LINKLIB
- ➔IPL the system

★Now, using the new functions of the Dynamic CDT, you can:

- ➔**Avoid an IPL** when you add, change, or delete an installation-defin
- ➔Easier to change attributes of a class
- ➔No assembler coding required

Exploitation:

- **Use RDEFINE CDT command to define a new class with segment CDTINFO to define class attributes**
- **Use SETROPTS RACFLIST command to build the Dynamic CDT**

Issue:

RDEFINE CDT *dyn-class-name* UACC(NONE) CDTINFO(*class-attribute-1 class-attribute-2 …*)
SETROPTS CLASS(CDT) RACLIST(CDT)

✪Use the RACF migration tool at: http://www.ibm.com/servers/eserver/zseries/zos/racf

z/OS R6 Install-Related Enhancements

AUTOMOVE System List Enhancements

★Previously, all system names MUST be defined in the automove include system list in order to participate in the sysplex that are permitted to take over the filesystem if the original server system goes down.

★Now, a Wildcard (*) character support is added:

- ➔**Systems do not have to be explicitly listed in the include system list**
- ➔Reduce typo errors of system names
- ➔Easy to maintain a large number of systems in a sysplex

Exploitation:

- **ONLY works on all systems in a sysplex that are at z/OS V1.6 level**
- **Update your BPXPRMxx parmlib member:**

e.g. AUTOMOVE(INCLUDE,SY2,*)

- OR –

- **Issue Console command:**

e.g. SETOMVS FILESYS, FILESYSTEM='X,Y,Z',AUTOMOVE-(I,SY2,*)

z/OS R6 Install-Related Enhancements

AUTOMOUNT Enhancements

★Previously, you could not make temporary change to add new automount managed directories to existing automount policy

- maintained multiple copies of master and map files of the automount policy in the /etc directory

★Now, with this support you can:

- ➔Add new automount managed directory to existing automount policy
- ➔Use the master and map files from either a sequential data set or PDS member

Exploitation:

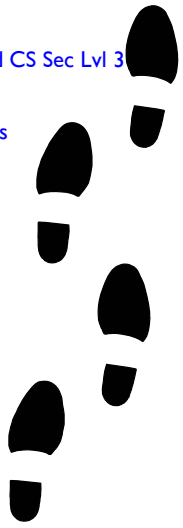
- **New function can be used in a shared HFS environment at R6 and up**
- **Issue:**

  e.g. /usr/sbin/automount -a

  where "-a" option means the automount policy being loaded is to be appended to the existing policy
- Master file from a member of PDS data set:

  e.g. /usr/sbin/automount -a "//sys1.sample(ATSM1)"

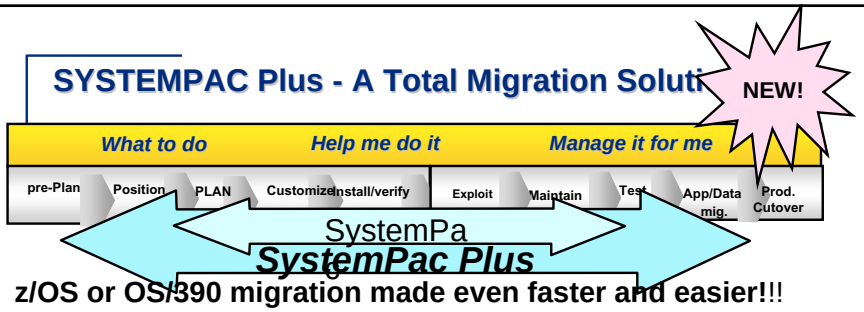
Migrating to z/OS Summary: Preparation Can Be Priceless



- **Content of z/OS R6**
  - Remember the only export contolled features are now z/OS Sec Lvl 3 and CS Sec Lvl 3
- **z/OS Ordering and Deliverables**
  - Remember msys for Operations consideration, and other related products
- **z/OS Policies**
  - z/OS R4 Coexistence-Migration-Fallback from OS/390 R10
  - z/OS R5 Coexistence-Migration-Fallback from z/OS R2
  - z/OS R6 Coexistence-Migration-Fallback from z/OS R3
  - If you're on z/OS R4, the max migration stretch is to z/OS R7, prepare!
- **Ensuring System Requirements are Satisfied**
  - Driving System Requirements - z/OS R3 + PTFs, ...
  - Target System Requirements - **Arch Level Set in R6!**
- **Migrating to z/Architecture**
  - Migrating to z/OS R6 from R4: **Hardware First Path** is the way to go!
- **Coexistence Requirements**

Related Publications

- z/OS and z/OS.e Planning for Installation (GA22-7504)
- z/OS Introduction and Release Guide (GA22-7502)
- z/OS Planning for Workload License Changes (GA22-7506)
- z/OS Summary of Message Changes (SA22-7505)
- z/OS Program Directory
- z/OS Parallel Sysplex Test Report (n/a)
- z/OS License Program Specifications (GA22-7503)
- z/OS MVS Migration (GA22-7580)
- z/OS MVS Planning: Operation (SA22-7601)
- z/OS MVS Initialization and Tuning Reference (SA22-7592)
- z/OS MVS Data Areas, Vol 1 (ABEP-DALT) (GA22-7581)
- z/OS MVS Data Areas, Vol 2 (DCCB-ITZYRETC) (GA22-7582)
- z/OS MVS Programming: Workload Management Services (SA22-7619)
- File Server Consolidation on S/390 (SG24-5330)
- 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)



z/OS or OS/390 migration made even faster and easier!!!

- IBM Specialists perform the migration for you and will:
  - Conduct and document your planning meeting
  - Order and SMP/E RECEIVE your toleration maintenance
  - Order your Full Volume Dump SystemPac, including subsystems and ISV products
  - Install and verify your SystemPac
  - Complete setup of z/OS Communications Server, z/OS UNIX System Services, and z/OS Security Server
  - Customize HTTP Server/WebSphere Application Server
  - Implement z/OS UNIX sysplex support for shared HFS
  - Activate z/OS and OS/390 Distributed File Service Server Message Block
  - Install and activate IBM Electronic Service Agent for zSeries
  - Document and turn over your new z/OS system
  - To order, contact your IBM Specialist or IBM Sales Specialist