Migrating to z/OS V2.1: Part 1 of 2

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Abstract: Migrating to z/OS V2.1: Part 1 of 2
This is part one of a two-part session that will be of interest to system programmers and their managers who are migrating to z/OS 2.1 from either z/OS 1.12 or z/OS 1.13. It is strongly recommended that you attend both sessions for a complete migration picture.

In part one, the speaker will focus on preparing for your z/OS 2.1 migration. She will discuss the changed content of z/OS 2.1. She will cover ordering and delivery options, and will explain the coexistence, migration, fall back, and service policies. Driving and target system requirements for both software and hardware will be highlighted along with some migrations actions you can perform now on your current z/OS release..

The general availability date for z/OS V2.1 was September 30, 2013.

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Migrating to z/OS V2.1: Part 1 of 2 Agenda

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- **Content of z/OS V2R1**
  - Added, Changed, and Withdrawn Elements and Features
- **z/OS Ordering and Deliverables**
  - Products Related to z/OS
- **z/OS Policies**
  - Two-year release frequency
  - z/OS End of Service dates
  - z/OS Coexistence-Migration-Fallback
- **Planning for z/OS V2R1:**
  - Ensuring System Requirements are Satisfied
    - Driving and Target System Requirements
    - Software Acquisition Changes
  - Coexistence System Requirements
    - Programmatic Assistance is Available!
  - Some Migration Actions You Can Do NOW
  - Programmatic Verification of Migration Actions for z/OS V2R1
- 3 Some Installation Enhancements in SMP/E and ServerPac

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Scope   IBM

- **Focus on z/OS migration, not HW migration.** If migrating to a new server level, see:

    - for z10 EC and BC: migration action in *z/OS Migration "Migrate to a System z10 server"*

    - for z196 and z114: migration action in *z/OS Migration "Migrate to an IBM zEnterprise server"*

    - for zEC12 and zBC12: migration action in *z/OS Migration "Migrate to an IBM zEnterprise zEC12 or zBC12 server"* or attend session *"z/OS Software Support for IBM zEnterprise EC12 or zBC12 Server "* (Tues, 4:30pm)

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Related Publications:

IBM Publications Center zipped PDF publications number: SK4T-4949
z/OS Planning for Installation (GA32-0890)
z/OS Migration (GA32-0889)
z/OS Introduction and Release Guide (GA32-0887)
z/OS Program Directory (n/a)
System z Platform Test Report for z/OS and Linux Virtual Servers (available from
http://www.ibm.com/servers/eserver/zseries/zos/integtst/)
z/OS Summary of Interface and Message Changes (SA23-2300)
z/OS MVS Initialization and Tuning Reference (SA23-1380)
z/OS UNIX System Services Planning (GA32-0884)
ServerPac: Installing Your Order (no order number; custom-built to your order)
ServerPac: Using the Installation Dialog, (SA22-7815*)*

URL	**DESCRIPTION**
http://www.ibm.com/systems/z/os/zos/	IBM z/OS home page
http://www.ibm.com/systems/z/os/zos/bkserv/v2r1pdf/	z/OS V2R1 Elements and Features PDF downloads
http://www.elink.ibmlink.ibm.com/public/applications/publications/cgibin/pbi.cgi	IBM Publications Center
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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/software/support/lifecycle/index_a_z.html	End of Service dates for IBM Software
http://www.ibm.com/servers/eserver/zseries/zos/integtst/	zSeries Platform Test web page
http://www.redbooks.ibm.com/	IBM Redbooks web page
http://www.ibm.com/support/techdocs/atsmastr.nsf/Web/Flashes	IBM Systems Center Flashes
http://www.ibm.com/servers/eserver/zseries/zos/support/	z/OS Technical Support
http://www.ibmlink.ibm.com/	IBMLink web page
http://www.ibm.com/systems/z/advantages/pso/cftable.html	Coupling Facility Level (CFLEVEL)

	Considerations web page
http://service.boulder.ibm.com/390holddata.html	Enhanced HOLDDATA web page
http://www14.software.ibm.com/webapp/set2/psp/srchBroker	PSP buckets web page
http://www.ibm.com/software/shopzseries	ShopzSeries home page
http://www.ibm.com/systems/z/os/zos/features/software/isv210.html	Software Dev. Supporting z/OS V2.1
http://www.ibm.com/servers/eserver/zseries/swprice/	IBM System z Software Pricing
http://www.ibm.com/systems/z/os/zos/support/zos_eos_dates.html	z/OS marketing and service announce, availability, and withdrawal dates
http://www.ibm.com/systems/z/os/zos/features/unix/bpxa1ty1.html	IBM Ported Tools for z/OS web page

z/OS V2R1 Performance Information
Over several z/OS releases we have provided system level performance improvements and V2.1 continues the trend – performance tests show up to a 2% CPU reduction when migrating from z/OS V1.13 to V2.1.

At z/OS V2R1 GA, the SOFTCAP tool which can be downloaded from the web site: http://w3.ibm.com/support/americas/wsc/cpsproducts.html provides more specific capacity planning information for the migration to z/OS V2R1.

IBM Education:
IBM courses are available for z/OS. For schedules and enrollment on the world wide web, IBM Global Campus URL: http://www.ibm.com/services/learning/ .

z/OS V2R1 Elements (changing in z/OS R13 and <u>V2R1</u>)   IBM

- → <u>BCP</u>
- → <u>Common Information Model (CIM)</u>
- → <u>Communications Server</u>
- → *<u>Communications Server Security Level 3</u>*
- → <u>Cryptographic Services:</u>
    - →<u>ICSF (FMID HCR77A0)</u>
    - →<u>PKI Services</u>
    - →<u>System SSL</u>
- → <u>DFSMSdfp</u>
- → <u>DFSMSdss</u>
- → <u>DFSMShsm</u>
- → <u>DFSMSrmm</u>
- → <u>DFSMStvs</u>
- → <u>DFSORT</u>
- → <u>Distributed File Service</u>
- → <u>HCD</u>
- → <u>HCM</u>
- → <u>IBM Tivoli Directory Server</u>
- → <u>Infoprint Server</u>

- → <u>Integrated Security Services:</u>
    - →<u>Network Authentication Service</u>
- → <u>ISPF</u>
- → <u>JES2</u>
- → <u>JES3</u>
- → <u>Language Environment</u> NEW!
- → <u>Library Server</u>
- → <u>Metal C Runtime Library</u>
- → <u>Network File System</u>
- → <u>RMF</u>
- → <u>Run-Time Library Extensions</u>

- → <u>SDSF</u>
- → <u>Security Server - RACF</u>
- → <u>SMP/E (V3R6)</u>
- → <u>TSO/E</u>
- → <u>XL C/C++</u>
- → <u>z/OS Font Collection</u>
- → *<u>z/OS Security Level 3:</u>*
    - →*<u>IBM Tivoli Directory Server Security Level 3</u>*
    - →*<u>Network Authentication Service Level 3</u>*
    - →*<u>SSL Level 3</u>*
- → <u>z/OS UNIX</u>
- NEW! → <u>zEnterprise Data Compression (zEDC) for z/OS</u>

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
- → This element changed in z/OS V1R13
- → This element changed in z/OS V2R1

All other elements not listed have not changed since z/OS R12.
New in V2R1: z/OS Font Collection, and zEDC.

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

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

Listed in the foil above are the changing elements within z/OS V2R1 since z/OS R12.

New priced feature in z/OS V2.1: zEDC

zEnterprise Data Compression (zEDC) Overview:

- Runs on zEC12 and zBC12 systems with the zEDC Express adapter.
  - Designed to support a new data compression function, providing high-performance, low-latency compression without significant CPU overhead.
- IFAPRDxx: … FEATURENAME(ZEDC) …
- Initially exploited by SMF compressing data written to log streams. And now,
  - Exploitation in updates to IBM 31-bit and 64-bit SDK for z/OS Java Technology Edition, Version 7 (5655-W43 and 5655-W44) (IBM SDK 7 for z/OS Java)
  - IBM Encryption Facility for z/OS (5655-P97) APAR OA43869, with the above Java updated.
  - IBM Sterling Connect:Direct® for z/OS V5.2 (5655-X01 and 5655-X09) also supports file compression using the zEDC Express feature
- Additional planned exploiters announced in a Statement of Direction*:
  - Support for the BSAM and QSAM access methods (APAR OA42195 in 1Q2014)
  - DFSMSdss to exploit zEDC (3Q2014)
- Toleration PTFs on z/OS V1R12 and V1R13 for software decompression.
- PTFs for zEDC exploitation or software decompression have a fix category of `IBM.Function.zEDC`.

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zEnterprise Data Compression (zEDC)

zEnterprise Data Compression (zEDC) for z/OS V2.1, running on zEC12 and zBC12 servers with the zEDC Express adapter (FC #0420), is designed to support a new data compression function designed for low-latency compression. Initially, z/OS is designed to allow you to specify that SMF data written to log streams be compressed.

In addition, support for Extended Format BSAM and QSAM data set compression is provided. This support, using the zEDC Express feature on the zEC12 and zBC12 servers, and zEnterprise Data Compression (zEDC) for z/OS V2.1 feature, is designed to offer a new option for compressed-format data sets. A new COMPACTION option in the SMS DATACLAS definition and a new COMPRESS option in an IGDSMSxx member of parmlib is designed to allow you to specify use of zEDC compression for data sets larger than a minimum size. This function is designed to help you save disk space and reduce the CPU usage required for compression compared to existing generic and tailored compression functions. This support is provided by the PTF for APAR OA42195 in the first quarter of 2014.

IBM 31-bit and 64-bit SDK for z/OS Java™ Technology Edition, Version 7 Release 1 (5655-W43 and 5655-W44) (IBM SDK 7 for z/OS Java) now provides exploitation of the zEDC Express feature, as well as exploitation of Shared Memory Communications-Remote Direct Memory Access (SMC-R), which is utilized by the 10GbE RoCE Express feature. In addition, this update is designed to provide improved integration of Java with core z/OS workload management facilities with new Java APIs that allow you to use the Workload Manager (WLM) query contention service (SYSEVENT QRYCONT). These programming interfaces are designed to support adaptive concurrent online and batch workloads in Java-based processing environments such as WebSphere Compute Grid.

With the Java update above and the PTF for APAR OA43869, the IBM Encryption Facility for z/OS (5655-P97) now exploits the zEDC Express feature on the zEC12 and zBC12 servers and the zEnterprise Data Compression (zEDC) for z/OS V2.1 feature. This complements the software compression support available with the Encryption Facility OpenPGP support, and is designed to help decrease encryption time by using the zEDC Express feature rather than software compression.

Version 5.2 of IBM Sterling Connect:Direct® for z/OS (5655-X01 and 5655-X09) supports new performance-related functions; high-speed file transfer capabilities using a combination of Extended Count Key Data (ECKD™) and Fixed Block Architecture (zFBA) interfaces to the IBM System Storage® DS8000® series with the z/OS Distributed Data Backup (zDDB) feature. In addition, z/OS support for large data sets and Extended Address Volumes (EAVs). IBM Sterling Connect:Direct also supports file compression using the zEDC Express feature available for zEC12

and zBC12 servers and the zEnterprise Data Compression (zEDC) for z/OS V2.1 feature. For more information regarding Version 5.2 of IBM Sterling Connect:Direct for z/OS, refer to Software Announcement 214-021, dated 2014-02-11.

IBM plans to provide support for DFSMSdss to exploit zEDC by the end of the third quarter 2014. This function is designed to be available for dumping and restoring data, and also when DFSMShsm uses DFSMSdss to move data. This is intended to provide efficient compression with lower CPU overheads than the processor- and software-based compression methods already available.*

If you intend to use the **zEDC Express data compression feature**, then similar to what you might be doing today to enable other z/OS priced features, you need to notify IBM that you are starting to use the feature, update the IFAPRDxx PARMLIB member to specify that the z/OS ZEDC software feature is ENABLED, and follow the z/OS V2R1 documentation to customize the exploiting functions. An example of such an IFAPRDxx statement may be:

```
          PRODUCT OWNER('IBM CORP')
          NAME('z/OS')
          ID(5650-ZOS)
          FEATURENAME(ZEDC)
          STATE(ENABLED)
```

You should also ensure that all z/OS V1R12 or z/OS V1R13 systems that will access zEDC compressed data have the required toleration maintenance installed to enable software decompression. PTFs for zEDC exploitation or software decompression have a fix category of **IBM.Function.zEDC**.

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New base element in z/OS V2.1: z/OS Font Collection

z/OS Font Collection Overview:

- By having fonts in the z/OS base, fonts are always available on z/OS systems!
- No need to separately order what is included below!
  1. **AFP Font Collection for S/390** (5648-B33)
     - Includes Japanese, Korean, Traditional Chinese, and Simplified Chinese
  2. **IBM Infoprint Fonts for z/OS** (5648-E76)
     - Includes Japanese, Korean, Traditional Chinese, and Simplified Chinese
  3. **PSF Compatibility Font feature** (5655-M32)
     - NOT the executable code or entire product, just the PSF feature for the compatibility fonts
  4. **Selected object fonts (*not source!*)**
     - Pi and Special (5771-ABC), Math and Science (5771-ADT).
     - (Some publications documented other fonts, incorrectly.)
  5. **World type fonts** that were not previously available in the z/OS environment.
     - Were part of the InfoPrint Font Collection V3.1 available on other platforms. Subset of TrueType fonts are in Infoprint Transforms to AFP for z/OS V2.3 (5655-N60).
     - Can be found the z/OS UNIX file system

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New base element in z/OS V2.1: z/OS Font Collection

- **z/OS Font Collection** installation information
  - Uses these syslibs and path:
    - SYS1.FONT300 (previously existing, new to z/OS)
    - SYS1.FONTLIB (previously existing, new to z/OS)
    - SYS1.FONTLIBB (previously existing, new to z/OS)
    - SYS1.SFNTILIB (previously existing, new to z/OS)
    - SYS1.SFONDLIB (previously existing, new to z/OS)
      - These data sets use approx. 2000 cylinders
    - /usr/lpp/fonts/worldtype/IBM/ **new!**

  - Some fonts will use a new separately provided file system:
    - Mounted at /usr/lpp/fonts
    - Approx. allocation size of new font file system:
      - zFS: 2048 3390 cylinders
      - HFS: 2028 3390 cylinders

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z/OS Font Collection
The z/OS Font Collection (FMID HFNT110 and HFNT11J) provides selected fonts for the z/OS environment in one package. Double-byte fonts for Chinese, Japanese and Korean (CJK) are included with all z/OS orders. Fonts that are included in z/OS Font Collection are not available for ordering with z/OS V2R1, because they are provided with z/OS V2R1. The fonts in the z/OS Font Collection are:
- AFP Font Collection for S/390 (5648-B33), includes Japanese, Korean, Traditional Chinese, and Simplified Chinese,
- IBM Infoprint Fonts for z/OS (5648-E76), includes Japanese, Korean, Traditional Chinese, and Simplified Chinese,
- PSF Compatibility Font feature (5655-M32), includes just the PSF feature for the compatibility fonts, not the executable code or the entire product,
- World type fonts that were not previously available in the z/OS environment. These fonts were part of the InfoPrint Font Collection V3.1 available on other platforms. A Subset of TrueType fonts from the Worldtype libary are provided in Infoprint Transforms to AFP for z/OS V2.3 (5655-N60) also.
- Selected object fonts (not source), Pi and Special (5771-ABC), Math and Science (5771-ADT). Some documentation incorrectly identified the following fonts as being part of the z/OS Font Collection base element: Data1 Fonts (5771-ADA), APL R1.2 Bounded Box (5771-ADB), Son Serif Headline (5771-ADW), Senoran Serif (5771-ABA), Son San Serif (5771-ABB), Son San Serif Headline (5771-ADX), Son San Serif Cond (5771-AFL), Son Serif Expanded R1 (5771-AFN).

From a z/OS standpoint, this new element is assuming ownership of the parts using SMP/E SUP/DELETE logic, and therefore you no longer need to order the previous standalone products as of z/OS V2R1.

## Element and Functions Withdrawn from z/OS R13

z/OS UNIX Connection Manager and Process Manager	Base Element	**In z/OS R13**
DCE and DCE Security Server	Base Elements – IBM WebSphere Application Server, the IBM Network Authentication Service, and/or the IBM Directory Server as replacement strategies for each of the DCE technologies.	**In z/OS R13**
DFS support that utilizes the DCE architecture	Base Element support – z/OS Network File System (NFS) implementation as the replacement	**In z/OS R13**

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Withdrawn in z/OS R13 (last delivered in z/OS R12)

This section lists items that were withdrawn in z/OS R13. You should take this into account if you are migrating from z/OS R12 to z/OS V2.1. The removal of these functions may have migration actions which you can perform now, in preparation for z/OS V2.1.

- z/OS R12 is the last release to include the z/OS UNIX System Services Connection Scaling, specifically the Connection Manager and Process Manager components.   This support was provided in SMP/E FMIDs HCMG100 (for Connection Manager, and JCMG1J0 if Japanese) and HPMG110 (for Process Manager, and JPMG1J0 if Japanese).
- z/OS R12 is the last release to include z/OS Distributed Computing Environment (DCE) and Distributed Computing Environment Security Server (DCE Security Server). IBM recommends the IBM WebSphere Application Server, the IBM Network Authentication Service, and the IBM Directory Server as replacements. See the DCE Replacement Strategies Redbook for more details: *http://www.redbooks.ibm.com/redbooks/pdfs/sg246935.pdf*
- z/OS R12 is the last release to include z/OS Distributed File Service support using the Distributed Computing Environment (DCE) architecture. IBM recommends the z/OS Network File System (NFS) as a replacement. Support in Distributed File Service for Server Message Block (SMB) architecture remains, and is not affected by this withdrawal of support.

Element and Functions Withdrawn from z/OS V2R1

zFS multi-file system aggregates (from Distributed File Service)	Base Element – copy zFS multi-file system aggregates to zFS compatibility mode aggregates.	**z/OS V2**
zFS cloning support (such as `zfsadm clone` and `zfsadm clonesys` commands). Do not mount file systems containing a cloned file system (.bak).	Base elements – when support for cloning is removed, only zFS capability mode aggregates will be supported. Find (with `modify zfs,query` command) and copy any cloned files to compatibility mode aggregates.	**z/OS V2.1**
BIND 9.2.0 function (from the Communications Server)	Base Element support – for use as a caching-only name server, use Resolver cache function (in z/OS R11). For use as a primary or secondary authoritative name server, consider using BIND on Linux for System z.	**z/OS V2.1**
BPX.DEFAULT.USER	Base Element support – use BPX.UNIQUE.USER instead (as of R11) or assign unique UIDs and GIDs. **Use RACF OA42554 to help with home directory set up!**	**z/OS V2**
Capacity Provisioning using System z API with SE and HMC	Base Element support – will use BCPii instead. System z API will still be supported on the SE and HMC. Use Tracking Facility with OA35284. Look for "CPO-W:SNMP *usage domain name*".	**z/OS V2.1**
Language Environment runtime options via USERMOD	Base Element support – use CEEPRMxx instead (with z/OS R12 NONOVR support, if necessary)	**z/OS V2.1**
Windows-based tools: Capacity Provisioning Control Center and Configuration Assistant for Communications Server	Base Element support – Use the z/OSMF-based Capacity Provisioning application to allow you to control your Capacity Provisioning function. For configuration assistance for Communications Server, use the z/OSMF-based Configuration Assistant.	**z/OS V2.1**
ICLI (Integrated Call Level Interface, from z/OS UNIX)	Base Element support – Investigate changing from ICLI to standard IBM DB2 Connect for data base connectivity. Use Tracking Facility with PTF UA67900. Look for "ICLI Server for SAP…"	**z/OS V2.1**

Withdrawn in z/OS V2R1 (last delivered in z/OS R13)

This section lists items that were withdrawn in z/OS V2R1. You should take this into account if you are migrating from z/OS R12 or R13 to z/OS V2.1. The removal of these functions may have migration actions which you can perform now, in preparation for z/OS V2.1.

- z/OS V1R13 is the last release to support multi-file system zSeries File System (zFS) aggregates, including zFS clones. Support for the zfsadm clone command and mount support for zFS file system data sets containing a cloned (.bak) file system has been removed. IBM recommends that you use copy functions such as pax and DFSMSdss to back up z/OS UNIX file systems to separate file systems. Support for zFS compatibility mode aggregates will remain.
- z/OS V1R13 is the last release that zFS will support cloning file systems. In anticipation of this removal of support, you should discontinue using zFS clone functions, such as the **zfsadm clone** and **zfsadm clonesys** commands. You should also discontinue mounting any zFS file system aggregates that contain a cloned (.bak) file system. When support for cloning file systems is withdrawn, only zFS compatibility mode aggregates will be supported.
  Steps to take:
  1. Determine if cloned file systems (.bak) have been created or are in the process of being created on your system.
     a. Issue the **modify zfs,query** command and review the contents of the FILE report. The Flg field in the report will indicate the status of the file system aggregate.
  2. If your system contains cloned file systems, copy that data to a compatibility mode aggregate.
- z/OS R13 is the last release in which the BIND 9.2.0 function will be available. If you currently use or plan to use the z/OS BIND 9.2.0 function as a caching-only name server, you should use the resolver function, which became generally available in z/OS R11, to cache Domain Name Server (DNS) responses. If you currently use or plan to use the z/OS BIND 9.2.0 function as a primary or secondary authoritative name server, you should investigate using BIND on Linux for System z or BIND on an IBM blade in an IBM zEnterprise BladeCenter Extension (zBX).
- z/OS R13 is the last release to support BPX.DEFAULT.USER. IBM recommends that you either use the BPX.UNIQUE.USER support that was introduced in z/OS R11, or assign unique UIDs to users who need them and assign GIDs for their groups. Use IBM Health Checker for z/OS migration check

ZOSMIGV2R1_DEFAULT_UNIX_ID. Further information on this check can be obtained from
ftp://public.dhe.ibm.com/eserver/zseries/zos/racf/pdf/oa37164.pdf .

RACF APAR OA42554 provides assistance with the conversion to BPX.UNIQUE.USER on z/OS V1R13 and z/OS V1R12. With this APAR you can model the user's home directory path by specifying &racuid in the model user's OMVS segment. Then, when the user's OMVS segment is automatically created, RACF will substitute the correct user ID. For more information on this capability, see the information in APAR OA42554.

- z/OS R13 is the last release to provide the z/OS Capacity Provisioning support that utilizes the System z API for communication with the Support Element (SE) or Hardware Management Console (HMC). This protocol is based on IP network connection using SNMP. IBM recommends configuring the Capacity Provisioning Manager for communication via the z/OS BCP Internal Interface (BCPii) protocol. The SE and HMC support for the System z API remains, and is not affected by this withdrawal of support. You can use the tracking facility to help with this migration action. In tracking facility output, look for violations that start with CPO-W:SNMP usage *domain name*, where *domain name* is replaced with the actual name of the affected domain. Exploit the z/OS tracking facility on z/OS V1R12 or z/OS V1R11 by installing the PTF for APAR OA35284.
    - If you are using the tracking facility and have no instances of affected domains after starting Capacity Provisioning Manager, then this migration action is not applicable to you.
    - Set up BCPii as described in z/OS MVS Programming: Callable Services for High-Level Languages.
    - Define the required security profiles to allow the Capacity Provisioning Manager user to access the hardware information.
    - Add the Topology.Protocol=INTERNAL key to the Capacity Provisioning Manager parameter file. Using the default values, the file is the member CPO.DOMAIN1.PARM(PARM).
- z/OS R13 is last release to support specification of the default Language Environment run-time options settings via SMP/E installable USERMODs. Use the CEEPRMxx parmlib member to change the default Language Environment run-time options for the system.
- z/OS R13 is the last release to provide enhancements to the Windows-based Capacity Provisioning Control Center (CPCC) function for use with z/OS MVS Capacity Provisioning. IBM provides support in the z/OSMF-based Capacity Provisioning application to allow you to control your Capacity Provisioning function. Partial support of this Capacity Provisioning function has been rolled back in z/OSMF APAR PM74519.
- Starting in z/OS V2R1, IBM Configuration Assistant for z/OS Communications Server is no longer offered as a stand-alone application that runs on the Windows operating system. IBM Configuration Assistant for z/OS Communications Server is available as a fully supported task in the z/OSMF product. Use the task available in z/OSMF. The Windows-based Configuration Assistant for Communications Server will not be supported with z/OS V2.1, and will not be enhanced. This function is now available with z/OS Management Facility. Note: The windows based version for z/OS V1R13 is expected to work if no new enhancements are to be exploited.
- z/OS R13 is the last release to provide support for Integrated Call Level Interface (ICLI). The PTF UA67900 for APAR OA41143 provides the ability to track the usage of ICLI on your systems. On pre-z/OS V2R1 systems, the operator command DISPLAY OPDATA,TRACKING shows the following tracking information for the ICLI servers 3.1I, 4.0B, 4.5B and 4.6D when these servers have been started on your system after you have activated the tracking facility through the SETCON TRACKING=ON command:
   ICLI server for SAP 3.1I .... FOME31IS ...
      ICLI server for SAP 4.0B .... FOME40BS ...
      ICLI server for SAP 4.5B .... FOME45BS ...
      ICLI server for SAP 4.6D .... FOME46DS ...
You can display the tracking information to determine if your system is using an ICLI server, and whether you will be affected by its removal in z/OS V2R1.

Documentation Withdrawn from z/OS V2R1

- **BookManager® books withdrawn**
  - Instead, use Information Centers or PDFs
    - Use now for V2R1: http://publib.boulder.ibm.com/infocenter/zos/v2r1/index.jsp
- Physical DVDs withdrawn
  - Instead, use electronic delivery of documentation over the Internet
- Downloadable publications Information Center publications and PDFs:
  - At IBM Publications Center zipped PDFs: SK4T-4949.

11
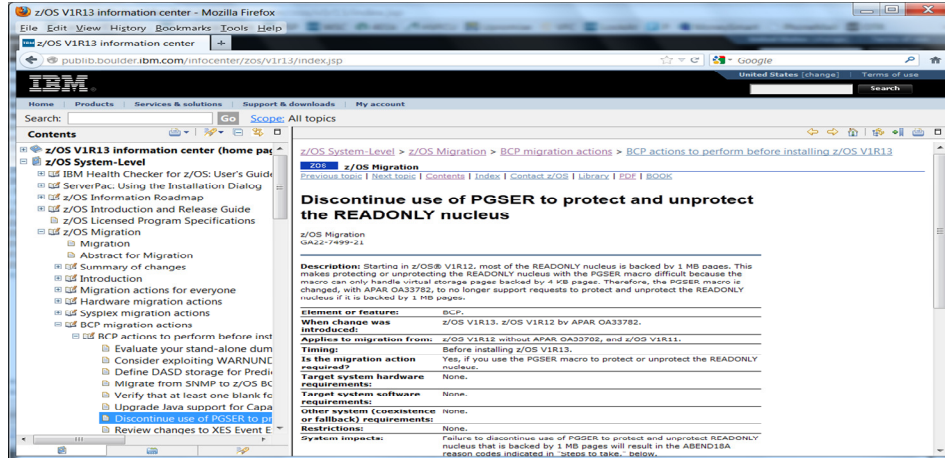
Documentation Withdrawn in z/OS V2R1 (last delivered in z/OS R13)

With z/OS V2.1, product documentation is planned to "go green" with electronic delivery of documentation over the Internet, replacing delivery of documentation using physical DVDs. This change is intended to result in higher quality documentation and better information currency. To meet customer requirements for easier search and access of information and to modernize our documentation delivery processes, we will focus on Information Center delivery of the z/OS product documentation and discontinue the use of BookManager® format.

Among the many advantages of information centers are that their content can be found using search engines such as Google and often represent the most current content. For customers requiring offline access to documentation, IBM plans to provide a downloadable version of the documentation in the Information Center. For users who do not need the entire product library, IBM plans to continue to provide PDFs for individual documentation download. The local Information Center provides built-in functions to keep content up-to-date and is also planned to contain a predefined search scope for z/OS Elements and Features message information.

Functions Planned to be Withdrawn
in the releases after z/OS V2R1…

TSO/E-based DNET function, a diagnostic tool for VTAM dump analysis (from Communications Server)	Base Element support – use similar functions available in IPCS for VTAM diagnosis instead.	**In the release after z/OS V2R1**
BookManager Build	Optional Feature.	**In the release after z/OS V2R1**
IBM HTTP Server powered by Domino	Base Element. Use the IBM HTTP Server Powered by Apache, which is available in z/OS Ported Tools – HTTP program product feature as a replacement Use Redbook for assistance.	**In the release after z/OS V2R1**
Version 1 of the Standards Based Linux Instrumentation for Manageability (SBLIM) CIM client for Java	Base Element support. Convert to Version 2, which is included in z/OS V1R13.	**In the release after z/OS V2R1**
JES2 z2 checkpoint level	Base Element support – migrate to z11 checkpoint level (in R11)	**In the release after z/OS V2R1**
Several TCP/IP device drivers: Async Transfer Mode (ATM), Common Link Access to Workstation (CLAW), HYPERChannel, Channel Data Link Control (CDLC), SNALNK (both LU0 and LU6.2), and X.25.	Base Element support – migrate to more recent device types such as OSA Express QDIO and Hipersockets. *Support for SNA device drivers is not affected.*	**In the release after z/OS V2R1**
Simple Mail Transport Protocol Network Job Entry (SMTPD NJE) Mail Gateway and Sendmail mail transports	Base Element support: See presentation notes for replacement suggestions.	**In a future release**
Consoles shared mode (from the BCP)	Base Element support – migrate to distributed mode (in R10)	**In *two releases* after z/OS V2R1**

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Planned for removal in the releases following z/OS V2R1

This section lists items that IBM has announced it intends to remove in the release after z/OS V2R1. 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 V2.1 Communications Server is planned to be the last release to include the TSO/E-based DNET function, one diagnostic tool for use in VTAM dump analysis. IBM recommends that you use similar functions available in IPCS for VTAM diagnosis instead.
- z/OS V2.1 is planned to be the last release to include Version 1 of the Standards Based Linux Instrumentation for Manageability (SBLIM) CIM client for Java. Version 1 support for the SourceForge open source project was sunset in 2010. Version 2 of the SBLIM client, which is designed to be a JSR48-compliant implementation, is included in z/OS V1.13 and planned to be included in z/OS V2.1. IBM recommends that users of SBLIM Version 1 convert to Version 2.
- z/OS V2.1 is planned to be the last release to include the IBM HTTP Server Powered by Domino (IHS powered by Domino). IBM recommends you use the IBM HTTP Server Powered by Apache, which is available in z/OS Ported Tools as a replacement. IHS powered by Apache supports IPv6, 64-bit execution, and includes security authentication and authorization capabilities similar to those provided in IHS powered by Domino. Also, a refresh of IBM HTTP Server powered by Apache is planned later in 2013. Use the Redbook, *IBM HTTP Server on z/OS Migrating from Domino-powered to Apache-powered* (http://www.redbooks.ibm.com/redpapers/pdfs/redp4987.pdf), for assistance in migration to IBM HTTP Server Powered by Apache.
- z/OS V2.1 is planned to be the last release to support the z/OS BookManager Build optional feature.
- z/OS V2.1 is planned to be the last release in which JES2 will support the z2 level for checkpoint data sets. z11 mode was introduced in z/OS V1.11. IBM recommends you migrate to z11 mode if you have not already done so.
- z/OS V2.1 is planned to be the last z/OS release to provide software support for several TCP/IP device drivers. IBM recommends that customers using any of these devices migrate to more recent device types, such as OSA Express QDIO and Hipersockets. The TCP/IP device drivers planned to be removed are: Asynchronous Transfer Mode (ATM), Common Link Access To Workstation (CLAW), HYPERChannel, Channel Data Link Control (CDLC), SNALINK (both LU0 and LU6.2), and X.25. Note: Support for SNA device drivers is not affected.

- The release of z/OS following z/OS V2.1 is planned to be the last release in which the consoles component will support shared mode. IBM recommends that you migrate to distributed mode, which was introduced in z/OS V1.10. A "best practices" health check was added in z/OS V1.13 to help you identify systems on which shared mode is in use. Distributed mode is designed to improve operations in sysplex environments by helping reduce the time required to IPL and for systems to join a sysplex, improve availability, and allow more MCS, SMCS, and subsystem consoles to be configured.
- IBM intends to remove the Simple Mail Transport Protocol Network Job Entry (SMTPD NJE) Mail Gateway and Sendmail mail transports from z/OS Communications Server in the future. If you use the SMTPD NJE Gateway to send mail, IBM recommends you use the existing CSSMTP SMTP NJE Mail Gateway instead. CSSMTP provides significant functional and performance improvements. The Sendmail client program can also be used to send mail messages; a replacement function using CSSMTP as the SMTP transport is planned. This function will be designed so that it does not require application programming changes. No replacement function is planned in z/OS Communications Server to support using SMTPD or Sendmail as a (SMTP) server for receiving mail for delivery to local TSO/E or z/OS UNIX System Services user mailboxes, or for forwarding mail to other destinations.
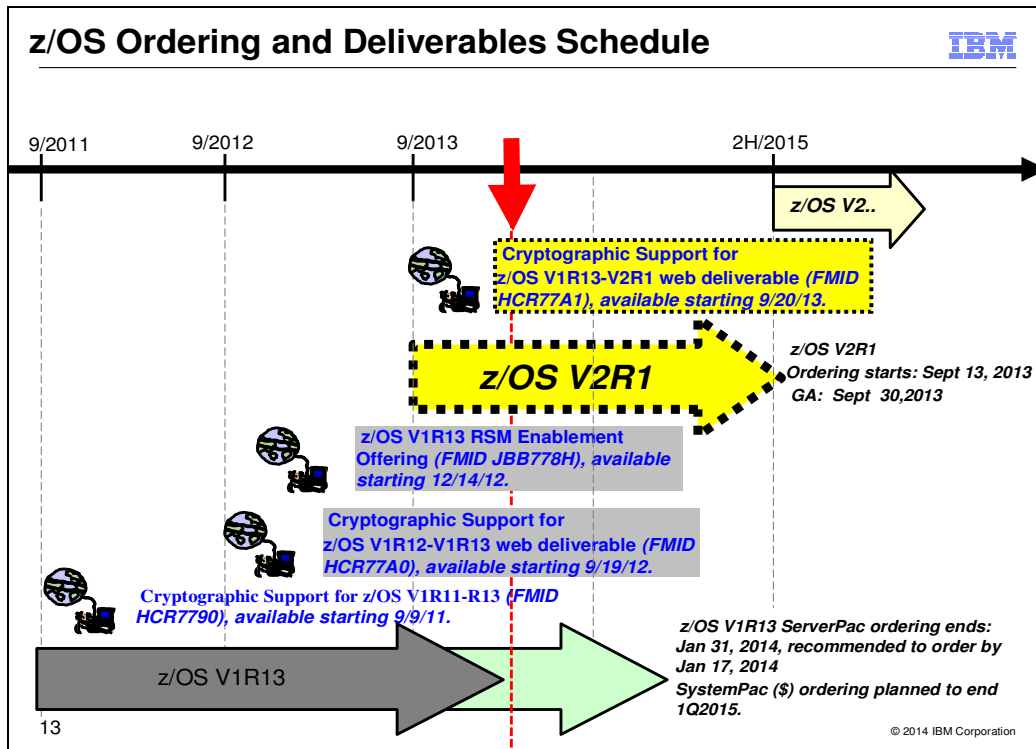
z/OS Ordering and Deliverable Key Dates

Key Dates for recent z/OS releases and functions:

- **September 9, 2011**: General availability of Cryptographic Support for z/OS V1R11-R13 Web deliverable. This Web deliverable will support z/OS V1.11 through z/OS V1.13.
- **September 19, 2012:** Availability date for the Cryptographic Support for the z/OS V1R12-V1R13 web deliverable. (The FMID is HCR77A0.)
- **October 15, 2012:** Availability date of Product ServerPac ordering capability in Shopz.
- **December 14, 2012**: Availability date for the z/OS V1R13 RSM Enablement Offering web deliverable. (The FMID is JBB778H, and Japanese is JBB778K.)
- **September 13, 2013:** z/OS V2R1 ordering starts.
- **September 20, 2013:** Availability date for the Cryptographic Support for the z/OS V1R13-V2R1 web deliverable. (The FMID is HCR77A1.)
- **September 30, 2013:** z/OS V2R1 general availability.
- **January 17, 2014:** Recommended last date for ordering z/OS V1R13.
- **January 31, 2014**: Last date for processing orders for z/OS V1R13 via ServerPac and CBPDO.
- **2H2015:** planned general availability for the release after z/OS V2R1 (from two-year release cycle).

Web deliverables

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

- A **readme** file, which contains a sample job to uncompress the second file, transform it into a format that SMP/E can process, and invoke SMP/E to RECEIVE the file. This file must be downloaded as text.

- A **pax.z** file, which contains an archive (compressed copy) of the FMIDs to be installed. This file needs to be downloaded to a workstation and then uploaded to a host as a binary file.

For Web downloads, you perform the SMP/E installation work yourself.
Cryptographic Support for z/OS V1R12-R13 Web deliverable (ICSF FMID HCR77A0) was available on September 19, 2012. This web deliverable supports z/OS V1.12 and z/OS V1.13. The new ICSF functions in this

web deliverable are intended to help banking and finance sector clients meet standards and provide better cryptographic security with:
- DUKPT for MAC and Data Encryption
- A new cipher text translate CCA verb
- Support for wrapping keys with strong keys
- Random Number Cache

Similarly, ICSF has enhancements designed to provide new functions for public sector clients, including industry-standard APIs for System z for better interoperability with other platforms to help improve application portability and simplify system setup:
- Enterprise Security PKCS #11 Hardware Security Module (HSM) support for Crypto Express 4S
- FIPS on Demand to verify FIPS 140-2 Level 1 compliance at the application level

Last, ICSF is designed to improve I/O performance for the public key data set (PKDS) and PKCS #11 token key data set (TKDS), and to provide a random number cache to help improve performance for applications that use random number generation functions.

Cryptographic Support for z/OS V1R13-V2R1 Web deliverable (ICSF FMID HCR77A1) was available September 20, 2013. This web deliverable supports z/OS V1.13 and z/OS V2.1. The new functions are intended to help banking and finance sector clients meet standards and provide better cryptographic security with designs for:
- Support for emerging standards for American Express, JCB, MasterCard, and Visa payment systems (EMVCo) in CCA-based callable services for key management, generation, transport, and derivation. This support relies on enhanced CCA firmware in the CryptoExpress3 coprocessor with a minimum microcode level and on the CryptoExpress4S coprocessor.
- Enhanced support in the Remote Key Export callable service to allow you to specify the desired key-wrapping method to be used for key generation and transport. This support relies on enhanced CCA firmware available with a minimum microcode level for the CryptoExpress3 and CryptoExpress4S coprocessors.
- Support for AES MAC enhancements to the Symmetric MAC Generate and Symmetric MAC Verify callable services, allowing for key lengths greater than 128 bits for XCBC-MAC processing.
- Support for these frequently used User Defined Extensions (UDX) callable services into the CCA firmware base support expected to help you reduce costs associated with UDX maintenance. This support, which relies on enhanced CCA firmware available with a minimum microcode level for the CryptoExpress3 and CryptoExpress4S coprocessors, is designed to provide these services:
  - Recover PIN From Offset, which can be used to calculate the encrypted customer-entered PIN from PIN generating key, account information, and an IBM-PIN0 Offset.
  - Symmetric Key Export with Data, which can be used to generate an authentication parameter (AP) and return it encrypted using a supplied key.
  - Authentication Parameter Generate, which can be used to export a symmetric key, along with application supplied data, encrypted using an RSA key.
- Additional ICSF enhancements in Cryptographic Support for z/OS V1R13 - z/OS V2R1 are designed to provide new functions for public sector customers, including industry standard APIs for System z, intended to provide better interoperability with other platforms and help improve application portability and simplify system setup:
  - Enhanced Enterprise PKCS #11 mode support designed to add secure key support for the Diffie-Hellman, Elliptic Curve Diffie-Hellman, and RSA-PSS algorithms and Secure DSA Domain Parameter Generation.
  - Support for Enterprise PKCS #11 applications, intended to allow them to change a key's compliance mode using the Set Attribute Value function
  - Support for ECC keys generated using Brainpool curves while executing in FIPS mode

These enhancements rely on enhanced EP11 firmware available with a minimum microcode level for the CryptoExpress4S coprocessors.

Lastly, Cryptographic Support for z/OS V1R13 - z/OS V2R1 has enhancements designed to optionally allow for improved performance of applications that call the One Way Hash and Random Number Generate services, provide improvement with cryptographic processor configuration, provide improved CTRACE implementation greatly enhancing the ability to debug problems, provide a new callable service to retrieve status information about the cryptographic environment as known to ICSF without requiring SAF authorization or calling any cryptographic processors, and update the key records in the Key Data Stores to contain usage information.

z/OS V1R13 RSM Enablement Offering Web deliverable (BCP FMID JBB778H and BCP Japanese FMID JBB778K) was available on December 14, 2012. The RSM Enablement Offering web deliverable is designed to help improve system availability and responsiveness by using Flash Express across transitional workload events such as market openings and diagnostic data collection on z/OS V1R13.

With RSM Enablement Offering and Flash Express, z/OS is also designed to help improve processor performance by supporting middleware such as IMS™, with its exploitation of pageable large (1 MB) pages. With additional planned PTFs (available 1Q2013), this function is also designed to help improve processor performance by enabling middleware to use 2 GB pages. Along with that support, z/OS will be designed to make the pageable link pack area (PLPA) and common page data sets optional, used only for quick and warm start IPLs.

Exploitation of pageable 1 MB pages is planned for:
- z/OS V1.13 Language Environment® when used with a run-time option.
- Java, with the IBM 31-bit SDK for z/OS , Java technology Edition, V7.0.0 (5655-W43) and SDK7 IBM 64-bit SDK for z/OS, Java Technology Edition, V7.0.0 (5655-W44).
- The IMS Common Queue Server, which is designed to use pageable large pages for selected buffers when running IMS 12 (5635-A03) on an IBM zEnterprise EC12 server (zEC12) with the PTF for APAR PM66866.
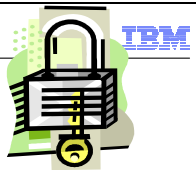
Exploitation of 2 GB pages is planned for:
- IBM 31-bit SDK for z/OS, Java technology Edition, V7.0.0 (5655-W43) and SDK7 IBM 64-bit SDK for z/OS, Java Technology Edition, V7.0.0 (5655-W44).

Crypto Support in z/OS Releases

Your ICSF migration actions depend on where you are coming from, and where you are going…

Release   Level Integrated and Available

Release	Level Integrated and Available
z/OS V2R1	**ICSF FMID HCR77A0 is incorporated.** ▪**Cryptographic Support for z/OS V1R13-V2R1 Web deliverable (FMID HCR77A1) available on 9/20/13. Does NOT support IBM z800 and z900 servers.**
z/OS R13	**ICSF FMID HCR7780 is incorporated.** ▪**Cryptographic Support for z/OS V1R11-R13 Web deliverable (FMID HCR7790) available on 9/9/11.** ▪**Cryptographic Support for z/OS V1R12-R13 Web deliverable (FMID HCR77A0) available on 9/19/12. The last level of ICSF to support IBM z800 and z900 servers.** ▪**Cryptographic Support for z/OS V1R13-V2R1 Web deliverable (FMID HCR77A1) available on 9/20/13. Does NOT support IBM z800 and z900 servers.**
z/OS R12	**ICSF FMID HCR7770 is incorporated.** ▪**Cryptographic Support for z/OS V1R10-R12 Web deliverable (FMID HCR7780) available on 9/10/10.** ▪**Cryptographic Support for z/OS V1R11-R13 Web deliverable (FMID HCR7790) available on 9/9/11.** ▪**Cryptographic Support for z/OS V1R12-R13 Web deliverable (FMID HCR77A0) available on 9/19/12. The last level of ICSF to support IBM z800 and z900 servers.**

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z/OS ICSF Release Levels

The support for cryptography (z/OS base element ICSF) has been delivered via Web deliverables and release incorporations over the years.

z/OS Releases and Crypto Web Deliverables

Deliverable	General availability	Delivery method
z/OS V1R12, FMID HCR7770 Incorporated	September 24, 2010	New release of products
Cryptographic Support for z/OS V1R10-R12 (FMID HCR7780)	September 10, 2010	Web deliverable
Cryptographic Support for z/OS V1R11-R13 (FMID HCR7790)	September 9, 2011	Web deliverable
Cryptographic Support for z/OS V1R12-R13 (FMID HCR77A0)	September 19, 2012	Web deliverable
z/OS V1R13, FMID HCR7780 Incorporated	September 30, 2010	New release of products
Cryptographic Support for z/OS V1R11-R13 (FMID HCR7790)	September 9, 2011	Web deliverable
Cryptographic Support for z/OS V1R12-R13 (FMID HCR77A0)	September 19, 2012	Web deliverable
Cryptographic Support for z/OS V1R13-V2R1 (FMID HCR77A1)	September 20, 2013	Web deliverable
z/OS V2R1, FMID HCR77A0 Incorporated	September 30, 2013	New release of products
Cryptographic Support for z/OS V1R13-V2R1 (FMID HCR77A1)	September 20, 2013	Web deliverable

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

The Cryptographic Support for z/OS V1R12-R13 web deliverable (FMID HCR77A0) is the last level of ICSF to support IBM eServer zSeries z800 and z900 servers. The Cryptographic Support for z/OS V1R13-V2R1 web deliverable (FMID HCR77A1) requires IBM eServer zSeries z890, z990, or later server.

Note: The Cryptographic Support for z/OS V1R12-R13 web deliverable (HCR77A0) includes the level of ICSF planned to be incorporated in z/OS V2.1. However, z/OS V2.1 itself is planned to require an IBM System z9 EC, IBM System z9 BC, or later server.

Some popular (no-charge!) products for z/OS (5650-ZOS)
That will still be in service on March 2014.

- *IBM z/OS Management Facility, V2 R1 (5610-A01)*
  - Use of the Liberty profile in WebSphere® Application Server for z/OS, V8.5 is intended to provide significant reductions in resource requirements!
- *IBM Ported Tools for z/OS V1 R2 (5655-M23, 5655-M29)*
  - V1R2 is updated with newer versions of the associated open source code; specifically OpenSSH 5.0p1, OpenSSL 0.9.8k, and zlib 1.2.3. *and features (all the same prior level): IBM Ported Tools for z/OS:* Perl Feature* *, *IBM Ported Tools for z/OS: PHP Feature * *, IBM Ported Tools for z/OS: Suppl Toolkit Feature ** (bzip2*, cURL*, sudo*), *IBM Ported Tools for z/OS: IBM HTTP Server V8.5 Feature*
    - * A port of these tools can also be found at http://www.rocketsoftware.com/portedtools/ .
    - * To be withdrawn from IBM marketing on April 30, 2014.
- *XML Toolkit for z/OS V1 R10 (5655-J51, 5655-I30)* – **only** contains XML V1R10 level.

- *IBM 64-bit SDK for z/OS, Java 2 Technology Edition, V6 (5655-R32, 5655-I48)*
- *IBM 31-bit SDK for z/OS, Java 2 Technology Edition, V6 (5655-R31, 5655-I48)*
- *IBM 64-bit SDK for z/OS, Java 2 Technology Edition, V6.0.1 (5655-R32, 5655-I48)*
- *IBM 31-bit SDK for z/OS, Java 2 Technology Edition, V6.0.1 (5655-R31, 5655-I48)*
- *IBM 64-bit SDK for z/OS, Java 2 Technology Edition, V7 (5655-W44 , 5655-I48)*
- *IBM 31-bit SDK for z/OS, Java 2 Technology Edition, V7 (5655-W43, 5655-I48)*

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IBM z/OS Management Facility Version 2 Release 1 (5610-A01)
The latest release of z/OSMF V2.1 offers several enhancements designed to:
- Use the Liberty profile in WebSphere® Application Server for z/OS, V8.5 is intended to provide significant reductions in resource requirements.
- Manage your software service levels with new reporting and display capabilities, to help you determine at a glance the currency of your installed system software portfolio
- Use a new workflow application intended to help with simplification of configuration tasks
- Manage On/Off Capacity on Demand in an intuitive way

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

IBM Ported Tools for z/OS Version 1 Release 2 (5655-M23, 5655-M29)
IBM Ported Tools for z/OS is a program product available at no cost to you (for the product or for the features). It is designed to deliver ported tools and utilities (modified to operate within the z/OS environment) which are useful for application development on, and secure communications to, the z/OS platform. IBM Ported Tools for z/OS includes utilities such as OpenSSH, Perl, PHP, bzip2, cURL, Xvfb, and IBM HTTP Server 7.0 where OpenSSH is in the product base and the remaining items are separate features. See note below about withdrawal from marketing on April 30, 2014 for certain features.

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

- Authorization
- Forwarding or tunneling
- An optional feature of compression

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

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

Xvfb support is provided through FMID HVFB111 instead of being in the base of IBM Ported Tools for z/OS which is FMID HOS1120. The Xvfb for z/OS code is provided as a separate FMID in order to allow IBM to provide more efficient support. However, Xvfb (FMID HVFB111) is delivered whenever the base of IBM Ported Tools for z/OS (FMID HOS1120) is ordered. FMID HVFB111 is the same code that was available as PTFs UA21819 and UA32671 with the base of IBM Ported Tools for z/OS V1.1 which was FMID HOS1110.

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

Important information! There is a port of selected software available by Rocket Software that offers some ported tools for z/OS. Rocket Software is currently offering (http://www.rocketsoftware.com/portedtools/) a download of bzip2, cURL, Perl, sudo, and PHP.

IBM Ported Tools for z/OS: Perl for z/OS Feature (5655-M23)

Note: This feature of IBM Ported Tools will be withdrawn from marketing on April 30, 2014.
IBM Ported Tools for z/OS: Perl for z/OS Feature provides a port of the Perl (version 5.8.7) scripting language to the z/OS UNIX platform. Perl (Practical Extraction and Report Language) is a very popular general-purpose programming language that is widely used on UNIX and other computing platforms.

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

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

IBM Ported Tools for z/OS: PHP for z/OS Feature (5655-M23)

Note: This feature of IBM Ported Tools will be withdrawn from marketing on April 30, 2014.

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

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

Note: This feature of IBM Ported Tools will be withdrawn from marketing on April 30, 2014.
IBM Ported Tools for z/OS: Supplementary Toolkit for z/OS Feature has been created to provide miscellaneous utilities that are commonly used on other platforms, and now on the z platform as well. The initial delivery contained bzip2. bzip2 is a powerful data compression tool. It is widely used on other platforms in the industry and has now been made available to run on z/OS UNIX System Services. Its usage syntax is intuitive and therefore makes it

attractive for a wide audience. As with most compression utilities, it provides both compression and decompression capabilities. Additional utilities and updates to the Supplementary Toolkit may be made via the service stream, in order to provide a seamless delivery mechanism – watch for them on
http://www.ibm.com/servers/eserver/zseries/zos/unix/suptlk/

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

IBM Ported Tools for z/OS: IBM HTTP Server V8.5 Feature (5655-M23, 5655-M29)
IBM Ported Tools for z/OS: IBM HTTP Server V8.5 provides an HTTP Server, or Webserver (based on Apache Software Foundation's Apache HTTP Server (version 2.2.8)) for the z/OS UNIXTM System Services environment. The IBM Ported Tools for z/OS: IBM HTTP Server V8.5 feature has the same functionality found in the IBM HTTP Server for WebSphere® Application Server for z/OS V8.5.5 component.

IBM HTTP Server V8.5 is an unpriced feature of the IBM Ported Tools for z/OS unpriced licensed program, and was generally available on February 7, 2014.

XML Toolkit for z/OS Version 1 Release 10 (5655-J51, 5655-I30)
The XML Parser, C++ Edition has been updated with the following support:
- Ability to optionally utilize z/OS XML System Services (z/OS XML) as an underlying parsing technology when performing DOM (Document Object Model) and SAX2 (Simple API for XML) based parsing operations. Support is provided for both non-validating parsing as well as validating parsing utilizing schema based on the W3C Schema recommendation. This enhancement is provided by way of a set of new z/OS-specific parser C++ classes that are similiar in name to and closely mimic the existing DOM and SAX2 interfaces. Utilizing z/OS XML provides redirection to zAAP specialty processors of the portion of the XML parsing operation performed by z/OS XML and may result in significant improved raw performance as well.
- A new feature that supports importing multiple schemas with the same namespace.
- Improved source offset support, enhancing the ability to obtain information that correlates parsed output with the associated data in the input document being parsed. This new support is included in the new z/OS-specific parser classes described above.

IBM 31-bit SDK for z/OS, Java 2 Technology Edition, V6 (5655-R31, 5655-I48)
31-bit SDK for z/OS, Java Technology Edition, V6 provides a software development kit (SDK) at the Java technology level, designed to be compliant with the Sun SDK 6 application programming interfaces (APIs). With 31-bit SDK for z/OS, Java Technology Edition, V6 you can:
- Test and deploy Java applications in a 31-bit environment
- Continue the "write once, run anywhere" Java paradigm
- Use your System z Application Assist Processors (zAAPs) available on z9 BC, z9 EC, z990, and z890 servers to run eligible Java work
- Leverage traditional System z benefits: scalability, reliability, availability, and serviceability.

IBM 64-bit SDK for z/OS, Java 2 Technology Edition, V6 (5655-R32, 5655-I48)
64-bit SDK for z/OS, Java Technology Edition, V6 provides a software development kit (SDK) at the Java technology level, designed to be compliant with the Sun SDK 6 application programming interfaces (APIs). With 64-bit SDK for z/OS, Java Technology Edition, V6 you can:

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

IBM 31-bit SDK for z/OS, Java 2 Technology Edition, V6.0.1 (5655-R31, 5655-I48)
The 31-bit SDK for z/OS, Java Technology Edition Version 6 Release 0 Modification 1 has been enhanced to:
- Use enhanced z/OS Java unique security and JZOS functionality
- Have Java exploit added z196 instructions

IBM 64-bit SDK for z/OS, Java 2 Technology Edition, V6.0.1 (5655-R32, 5655-I48)
The 64-bit SDK for z/OS, Java Technology Edition Version 6 Release 0 Modification 1 has been enhanced to:
- Use enhanced z/OS Java unique security and JZOS functionality
- Have Java exploit added z196 instructions

End of Service Dates for Older IBM XML and SDK levels:

- **XML V1R9** was out of service on September 30, 2013.

- **IBM 64-bit SDK for z/OS, Java 2 Technology Edition, V1 Release 4 (5655-I56):** was out of service as of September 30, 2008.

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

- **IBM 64-bit SDK for z/OS, Java 2 Technology Edition, V1 Release 5 (5655-N99):** was out of service as of September 30, 2013.

- **IBM 31-bit SDK for z/OS, Java 2 Technology Edition, V1 Release 5 (5655-N98):** was out of service as of September 30, 2013.

z/OS Policies
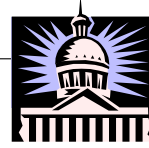
- **Two-Year Release Frequency**
  - z/OS release V2R1 GA was <u>September 30, 2013</u>.
    - New z/OS and z/OSMF releases available approximately every two years.
    - Next release planned for 2H2015.
  - z/OS V1 R13 GA was <u>*Sept 30, 2011*</u>
- **Service Support Policy**
- **Coexistence-Migration-Fallback Policy**
- ***Policy Change!***
  - z/OS V1R13 is the last release to support a staged migration for JES2 and JES3. As of z/OS V2R1, you must migrate to all elements of z/OS at the same time, including JES2, JES3, or both.

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Release Frequency

Since August 2002 the release schedule for z/OS had been a 12-month cycle. At that time, IBM had aligned the coexistence, migration, and fallback policy with the service policy, with the annual releases. As of z/OS V2, IBM intends to make new z/OS and z/OSMF releases available approximately every two years.

Customers have indicated that they would prefer a release schedule providing more time to plan and install new features. Also, many have told us significant time is spent on efforts related to remaining current to retain software support, and they would prefer to spend more time exploiting new z/OS functional enhancements for business value. In addition, customers have expressed a preference for installing and leveraging the value of related enhancements in one upgrade cycle rather than deploying enhancements delivered incrementally over several z/OS releases. IBM's intent is that a new release cycle may help you focus resources more on leveraging business value from z/OS and improve operational efficiency, while preserving your z/OS investments.

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

z/OS Service Policy

IBM

- **Some z/OS releases have had lengthened support, for migration to z/OS V2R1:**
  - z/OS R12: increased from 30 Sept 2013 to 30 Sept 2014
  - z/OS R13: increased from 30 Sept 2014 to 30 Sept 2016
- **Lifecycle Extensions available for older releases, for up to two years:**
  - IBM Lifecycle Extension for z/OS V1.10 (5656-A01), expired 30 Sept 2013.
  - IBM Lifecycle Extension for z/OS V1.11 (5657-A01), planned to exp 30 Sept 2014
- **With the new release cycle on V2, IBM plans to provide 5 years of z/OS support, with 3 years of optional extended service (5+3) !!**

	GA Date	End of Service Date
z/OS V1R10	26 Sept 2008	Occurred on 30 Sept 2011 Lifecycle Extension, until 30 Sept 2013.
z/OS V1R11	25 Sept 2009	Occurred on 30 Sept 2012 Lifecycle Extension, until 30 Sept 2014
z/OS V1R12	24 Sept 2010	Announced to be 30 Sept 2014
z/OS V1R13	30 Sept 2011	Now planned to be Sept 2016 (was Sept 2014)
z/OS V2R1	30 Sept 2013	Planned to be Sept 2018 (5 years!) ← LOOK!

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Service Policy

IBM's previous policy was to provide maintenance (service) for each release of z/OS for three years following its general availability (GA) date. A z/OS Lifecycle Extension had been offered, which would allow you to purchase up to two additional years of correction service. With the new z/OS release frequency the z/OS support policy is changing to five years of z/OS support, with three years of optional extended service (5+3). Note that similar to z/OSMF Version 1, optional extended support is not planned to be available for z/OSMF Version 2, meaning that z/OSMF support will only be for five years (5+0).

IBM plans to provide enhancements to current z/OS and z/OSMF releases during the transition to the new support model as follows:

- z/OS and z/OSMF V1R12 support has been increased from three years to four years. Thus, support for V1R12 has been extended from September 30, 2013, to September 30, 2014.
- z/OS and z/OSMF V1R13 support has been increased from three years to five years. Thus, support for V1R13 is planned to be extended from September 30, 2014, to September 30, 2016.

Prior to withdrawing service for any version or release of z/OS or z/OSMF, IBM intends to provide at least 12 months notice. The service policy for z/OS also applies to any enhancements (including but not limited to web deliverables), such as the *System REXX Support for z/OS V1.8* download that was provided for z/OS R8.

See the table below for expiration dates for service support.

Version and release	General availability (GA)	End of service (EOS)
OS/390 V2R8	24 September 1999	Occurred 30 September 2002
OS/390 V2R9	31 March 2000	Occurred 31 March 2003
OS/390 V2R10	29 September 2000	Occurred 30 September 2004
z/OS V1R1	30 March 2001	Occurred 31 March 2004
z/OS V1R2	26 October 2001	Occurred 31 October 2004
z/OS V1R3	29 March 2002	Occurred 31 March 2005
z/OS V1R4	27 September 2002	Occurred on 31 March 2007
z/OS V1R5	26 March 2004	Occurred on 31 March 2007
z/OS V1R6	24 September 2004	Occurred on 30 September 2007

z/OS V1R7	**30 September 2005**	**Occurred on 30 September 2008 *** ***The "z/OS V1.7 Lifecycle Extended Service" offering expired on 30 September 2010.**
z/OS V1R8	**29 September 2006**	**Occurred 30 September 2009 *** ***The "z/OS V1.8 Lifecycle Extended Service" offering expired on 30 September 2011.**
z/OS V1R9	**28 September 2007**	**Occurred 30 September 2010 *** ***See "z/OS V1.9 Lifecycle Extended Service" offering expired on 30 September 2012.**
z/OS V1R10	**26 September 2008**	**Occurred 30 September 2011 *** ***See "z/OS V1.10 Lifecycle Extended Service" below for a fee-based accommodation, through 30 September 2013.**
z/OS V1R11	**25 September 2009**	**Occurred 30 September 2012 *** ***See "z/OS V1.11 Lifecycle Extended Service" below for a fee-based accommodation, through 30 September 2014.**
z/OS V1R12	**24 September 2010**	**Announced to be 30 September 2014**
z/OS V1R13	**30 September 2011**	**Extended from September 2014 to September 2016 (planned)**
z/OS V2R1	**30 September 2013**	**Planned for September 2018**

z/OS V1.7 Lifecycle Extended Service - through September 30, 2010
If you require support for defects for z/OS V1R7 beyond September 2010, contact an IBM representative for a special bid.

z/OS V1.8 Lifecycle Extended Service - through September 30, 2011
If you require support for defects for z/OS V1R8 beyond September 2011, contact an IBM representative for a special bid.

z/OS V1.9 Lifecycle Extended Service - through September 30, 2012
If you require support for defects for z/OS V1R9 beyond September 2012, contact an IBM representative for a special bid.

z/OS V1.10 Lifecycle Extended Service - through September 30, 2013
If you require support for defects for z/OS V1R10 beyond September 2013, contact an IBM representative for a special bid.

IBM Lifecycle Extension for z/OS V1.11 - through September 30, 2014
Starting October 1, 2012, IBM will offer a fee-based, corrective service extension for up to a two-year period following the z/OS V1.11 discontinuance of program services (September 30, 2012). This support enables users who have not completed their migration to z/OS V1.12 or z/OS V1.13 to continue to receive corrective service for z/OS V1.11 in the two-year period of October 1, 2012, through September 30, 2014. This does not alter the z/OS coexistence, migration, fallback, or service policy. The IBM Lifecycle Extension for z/OS V1.11 (5657-A01) applies specifically to z/OS V1.11 (5694-A01) and is not applicable to any other program products, such as z/OS Management Facility (z/OSMF) (5655-S28).

The Lifecycle Extension for z/OS V1.11 is flexible, with a minimum three-month purchase and a maximum period of duration through September 30, 2014. This supports variable migration plans, where you could have differing migration schedules for either single machines or machines within a Parallel Sysplex. Lifecycle Extension must be ordered for all machines running z/OS V1.11 at a physical location, either for individual IBM z/Architecture machines or for one or more IBM z/Architecture machines within a qualified Parallel Sysplex, in which case MSU aggregation may apply. However, you can add or remove machines running z/OS V1.11 as your migration plans progress.
You must notify IBM if:
- The permanent MSUs change for any IBM z/Architecture machine running z/OS V1.11
- You add or remove an IBM z/Architecture machine that is running z/OS V1.11
- You add or remove z/OS V1.11 from any IBM z/Architecture machine
You must notify IBM within the same calendar month that the changes occur as these changes may affect the pricing for that machine or qualified Parallel Sysplex.

z/OS V2R1 Coexistence

z/OS
R11

z/OS
R12

z/OS
R13

z/OS
V2R1

With z/OS V1.11 Lifecycle Extended Service

- **With new release frequency, <u>three consecutive releases for coexistence remains</u>, for both z/OS and z/OSMF.**

- **z/OS R12, z/OS R13, and z/OS V2R1 are planned for coexistence, migration, and fallback support.**

- If you are running z/OS R11 and would like coexistence support, plan for a migration to z/OS R13.

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z/OS V2R1 Coexistence

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

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

- A single processor that is time-sliced to run different levels of the system, such as during different times of the day

- A single processor running multiple images by means of logical partitions (LPARs)

- Multiple images running on several different processors

- Parallel Sysplex or non-Parallel Sysplex configurations

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

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

You should complete the migration of all earlier-level coexisting systems as soon as you can. Keep in mind that the objective of coexistence PTFs is to allow existing functions to continue to be used on the earlier-level systems when run in a mixed environment that contains later-level systems. Coexistence PTFs are not aimed at allowing new functions provided in later releases to work on earlier-level systems.

Rolling z/OS across a multisystem configuration

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

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

- The release to which you're migrating falls is supported for coexistence, fallback, and migration with the releases running on the other systems.

- The appropriate coexistence PTFs have been installed on the other systems in the multisystem configuration.

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

Understanding fallback

Fallback (backout) is a return to the prior level of a system. Fallback can be appropriate if you migrate to z/OS V2R1 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.

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 V2R1 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 V2R1 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?
- IBM plans to continue to support an n-2 (three consecutive release) coexistence, fallback, and migration policy.
- Do note that with the new two-year release cycle that z/OS support is intended for five years with three optional extended service years (5+3). You should plan on completing your migration plans during the period of time while your older z/OS release is still in service. There are no plans for z/OSMF to provide optional extended service, meaning that z/OSMF support is planned for five years only (5+0).
- **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 coexistence, fallback, and migration support for those releases which are still in support. **As a general rule, this means that three z/OS and z/OSMF releases will be supported for coexistence, fallback, and migration over a period of five years.**

Thus, **z/OS V2R1 is coexistence, fallback, and migration supported with the following two z/OS releases: V1R13 and V1R12**. This means that:

- Coexistence of a V2R1 system with a V1R13 or V1R12 system is supported.

- Fallback *from* V2R1 *to* V1R13 or V1R12 is supported.

- Migration *to* V2R1 *from* V1R13 or V1R12 is supported.

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

- For JES2: If the JES2 release level for a system that is initializing is not compatible with the other active systems in the JES2 MAS, message HASP710 is issued and the JES2 address space for the initializing system is terminated.

- For JES3: If the JES3 release level for a local is not compatible with the global in a JES3 multisystem complex, message IAT2640 is issued and the JES3 local is not allowed to connect to the global.

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

See the table below for a summary of current and planned coexistence, fallback, and migration support. These statements represent IBM's current intentions. IBM reserves the right to change or alter the coexistence, fallback, and migration policy in the future or to exclude certain releases beyond those stated. IBM development plans are subject to change or withdrawal without further notice. Any reliance on this statement of direction is at the relying party's sole risk and does not create any liability or obligation for IBM.
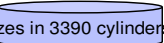
Releases that are coexistence, fallback, and migration supported with z/OS V1R6 and beyond

z/OS release	Releases that are coexistence, fallback, and migration supported with the release in column	Explanation
R10	R10, R9, R8	General availability of R10 was September 26, 2008. R8 is the oldest release that is service supported at that time and therefore the oldest release that is coexistence, fallback, and migration supported with R10.
R11	R11, R10, R9	General availability of R11 was September 25, 2009. R9 is the oldest release that is service supported at that time and therefore the oldest release that is coexistence, fallback, and migration supported with R11.
R12	R12, R11, R10	General availability of R12 was September 24, 2010. R10 is the oldest release that is service supported at that time and therefore the oldest release that is coexistence, fallback, and migration supported with R12.
R13	R13, R12, R11	General availability for R13 was September 30, 2011. R11 is the oldest release that is service supported at that time and therefore the oldest release that is coexistence, fallback, and migration supported with R13.
V2R1	V2R1, R13, R12	General availability for V2R1 is September 30, 2013. At that time, R12 will be the oldest release that is service supported and therefore the oldest release that is coexistence, fallback, and migration supported with V2R1.

Positioning for z/OS V2.1
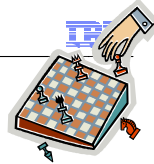
- **Read Documentation and PSP buckets**
  - *z/OS V2.1 Migration* and *z/OS V2.1 Planning for Installation*
  - Software PSP buckets: ZOSV2R1: ZOSGEN, SERVERPAC, ...
  - Must use FIXCATs for coexistence verification.
  - Remember: V2.1 publications are in InfoCenter and PDFs!

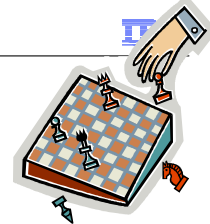- Approximate **DASD Storage Requirements for z/OS:**

sizes in 3390 cylinders	z/OS R12	z/OS R13	z/OS V2R1
Target libraries (PDS and PDSE)	5,891	5,868	**11,051**
DLIB	8,599	8,941	**17, 960**
Root file system	3,100	3,293 (HFS)	**3,300 (HFS)**
		3,309 (zFS)	**3,319 (zFS)**
Font file system	-	-	**2,048 (HFS or zFS)**

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The 3390-9 capacity is 10,017 cylinders.

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Positioning for z/OS V2.1

- **Ensuring System Requirements Are Satisfied**
  - *Driving System Requirements*
    - Requirements to install z/OS V2.1
    - No change there:
      - A coexisting system level suffices:
        - z/OS R12, or z/OS R13
      - Customized Offerings Driver V3 (5751-COD)
        - Subset of z/OS R13
    - **Revised FTPS delivery direction announced!** (next slide)

  - *Target System Requirements*
    - Product requirements for running on z/OS V2.1
    - Hardware and Software

  - *Coexistence System Requirements*
    - Allows z/OS V2.1 to coexist with other z/OS systems

- **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 V2R1 Migration*
* *z/OS V2R1 Planning for Installation*
* *zSeries Platform Test Report for z/OS and Linux Virtual Servers* (formerly, the *z/OS Parallel Sysplex Test Report*)
* *z/OS V2 R1 Introduction and Release Guide* - great for finding new functions in a release to exploit!

To install z/OS, review Preventive Service Planning (PSP) Buckets for:
* ServerPac (if using ServerPac to install)
* z/OS and individual elements (including ZOSGEN, which helps you with general z/OS level information)
* Hardware, if you will using specific HW functions or upgrading your server

In addition, to install z/OS using ServerPac, review:
* *ServerPac: Using the Installation Dialog (SC28-1244)*
* The custom-built installation guide, *ServerPac: Installing Your Order*
To install z/OS using CBPDO, review the *z/OS Program Directory.*

PSP Buckets

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

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

At the beginning of each PSP bucket is a change index. For each subset, the change index identifies the date of the latest entries in each section. You can quickly determine whether there are new entries you need to read by checking the change index. Since z/OS V1R7, the contents of PSP buckets are no longer shipped with CBPDO and ServerPac orders. Instead of the actual PSP information, you now receive the names of relevant upgrades and subsets, and you're directed to the PSP Web site (http://www14.software.ibm.com/webapp/set2/psearch/search?domain=psp) 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 V2.1 PSP bucket is ZOSV2R1. 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 ZOSV2R1 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:
* 2828DEVICE for the zBC12 server.
  * The FIXCAT name is IBM.Device.Server.zBC12-2828.
* 2827DEVICE for the zEC12 server.
  * The FIXCAT name is IBM.Device.Server.zEC12-2827.
* 2818DEVICE for the z114 server.
  * The FIXCAT name is IBM.Device.Server.z114-2818.
* 2817DEVICE for the z196 server.
  * The FIXCAT name is IBM.Device.Server.z196-2817.

- For an IBM zEnterprise BladeCenter Extension (zBX) attached to your zBC12, zEC12, z196, or z114 CPC, the PTFs are identified in the 2458DEVICE PSP bucket.
  - The FIXCAT name is IBM.Device.Server.zBX-2458.
- 2097DEVICE for the z10 EC server.
  - The FIXCAT name is IBM.Device.Server.z10-EC-2097.

- 2098DEVICE for the z10 BC server

  - The FIXCAT name is IBM.Device.Server.z10-BC-2098.

- 2094DEVICE for the z9 EC server

  - The FIXCAT name is IBM.Device.Server.z9-EC-2094.

- 2096DEVICE for the z9 BC server

  - The FIXCAT name is IBM.Device.Server.z9-BC-2096.

Specific functions for each server also have corresponding FIXCATs.

Verifying the PTFs in the PSP buckets are installed
- To simplify finding the appropriate PSP bucket and identifying which PTFs listed in the PSP bucket need to be installed on your system, use the SMP/E REPORT MISSINGFIX command in conjunction with the FIXCAT type of HOLDDATA. For complete information about the REPORT MISSINGFIX command, see *SMP/E Commands*. For a description of what FIXCATs are available, go to http://www.ibm.com/systems/z/os/zos/smpe/ and click on **"Guide to fix category values and descriptions".**

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

The total storage required for z/OS data sets is listed in the space table in the *z/OS Program Directory*. For z/OS V2.1, an estimate of the DASD storage requirements is provided below.

For z/OS V2R1:

- The total storage required for all the target data sets is approximately 11,051 cylinders on a 3390 device. **It is strongly recommended that you review the size of your existing target volumes and plan for the required target volume storage for z/OS V2R1.**

- The total storage required for all the distribution data sets is approximately 17,960 cylinders on a 3390 device.

-   The total root file system storage is approximately at 3,300 cylinders on a 3390 device when it is an HFS and 3,319 when it is a zFS. You will need 50 cylinders for the /etc file system (either HFS or zFS). For the CIM element, the space required for the /var VARWBEM file system is 50 cylinders (either HFS or zFS).   It is strongly recommended that you put your root file system data set on multiple 3390-3 volumes (a multi-volume data set) or on a volume larger than a 3390-3. Use IBM Health Checker for z/OS check ZOSMIGREC_ROOT_FS_SIZE to determine whether a volume has enough space for the z/OS version root file system, available back to z/OS R9 in APARs OA28684 and OA28631.

- z/OS V2.1 introduces the z/OS Font Collection base element. This element installs into a separate file system (the "font file system"). You may choose to merge the font file system and root file system if you desire. ServerPac will provide you both file systems to you. The total font file system storage is estimated at 2,048 cylinders on a 3390 device when it is an HFS or a zFS.

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

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

Customized Offerings Driver (5751-COD)

The Customized Offerings Driver V3 (5751-COD) is an entitled driving system you can use if:
- you don't have an existing system to use as a driving system, or
- your existing system does not meet driving system requirements and you don't want to upgrade it to meet those requirements.

At z/OS V2R1 GA, this driver is a subset of a z/OS R13 system (with the level of SMP/E at V3R6).

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

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

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

Identifying Driving System Software Requirements for ServerPac for z/OS V2R1

Driving system requirements for installing z/OS V2R1 by way of ServerPac or dump-by-data-set SystemPac are:

- *An operating system:* Use either of the following:
  - A supported z/OS release (V1R12 or later), or
  - The Customized Offerings Driver V3 (5751-COD).

- *A terminal:* A locally-attached or network-attached terminal that can be used to establish a TSO/E session on the IPLed system is required.

- *Proper authority:* Use the RACFDRV installation job as a sample of the security system definitions required so that you can perform the installation tasks.

- Proper security:
  In order for you to install into the zFS, the user ID you use must have read access to the SUPERUSER.FILESYS.PFSCTL resource in the RACF FACILITY class.
  In order for you to install the z/OS UNIX files, the following is required:
  - The user ID you use must be a superuser (UID=0) or have read access to the BPX.SUPERUSER resource in the RACF facility class.
  - The user ID you use must have read access to facility class resources BPX.FILEATTR.APF, BPX.FILEATTR.PROGCTL, and BPX.FILEATTR.SHARELIB (or BPX.FILEATTR.* if you choose to use a generic name for these resources). The commands to define these facility class resources are in SYS1.SAMPLIB member BPXISEC1.
  - Group IDs uucpg and TTY, and user ID uucp, must be defined in your security database. These IDs must contain OMVS segments with a GID value for each group and a UID value for the user ID. (For ease of use and manageability, define the names in uppercase.)
    The group ID and user ID values assigned to these IDs cannot be used by any other IDs. They must be unique.
- You must duplicate the required user ID and group names in each security database, including the same user ID and group ID values in the OMVS segment. This makes it easier to transport the HFS data sets from test systems to production systems. For example, the group name TTY on System 1 must have the same group ID

value on System 2 and System 3. If it is not possible to synchronize your databases you will need to continue running the FOMISCHO job against each system after z/OS UNIX is installed.

> If names such as uucp, uucpg, and TTY are not allowed on your system, or if they conflict with existing names, you can create and activate a user ID alias table. For information about defining these group and user IDs to RACF and about creating a user ID alias table (USERIDALIASTABLE), see *z/OS UNIX System Services Planning*. Other sources of information are SYS1.SAMPLIB member BPXISEC1. (**Note:** You can use the RACFDRV installation job as a sample of the security system definitions required to perform the installation tasks.)

- *Language Environment run-time options:*   As of z/OS R7, ServerPac requires that the following Language environment run-time options are **not** specified as nonoverrideable (NONOVR) in the CEEDOPT CSECT: ALL31, ANYHEAP, BELOWHEAP, DEPTHCONDLIMIT, ERRCOUNT, HEAP, HEAPCHK, HEAPPOOLS, INTERRUPT, LIBSTACK, PLITASKCOUNT, STACK, STORAGE, THREADHEAP, and THREADSTACK .

- *Language Environment:* The CustomPac Installation Dialog uses the Language Environment run-time library SCEERUN. If SCEERUN is not in the link list on the driving system, you must edit the ServerPac installation jobs to add it to the JOBLIB or STEPLIB DD statements.

- *OMVS address space active:* For ServerPac only (not SystemPac), an activated OMVS address space with z/OS UNIX kernel services operating in full function mode is required.

- *SMS active:* The Storage Management Subsystem (SMS) must be active to allocate HFS and PDSE data sets, whether they are SMS-managed or non-SMS-managed. Also, the use of HFS data sets is supported only when SMS is active in at least a null configuration, even when the data sets are not SMS-managed. Do either of the following:

  > To allocate non-SMS-managed HFS and PDSE data sets, you must activate SMS on the driving system in at least a null configuration. You must also activate SMS on the target system.

  > To allocate SMS-managed HFS and PDSE data sets, you must activate SMS on the driving system in at least a minimal configuration. Then you must define a storage group, create SMS-managed volumes, and write, translate, and activate a storage class ACS routine that allows the allocation of PDSE and HFS data sets with the names in the ALLOCDS job. You must also activate SMS on the target system.

- *SMP/E ++JARUPD Support:* If your ServerPac order contains any product that uses the ++JARUPD support introduced in SMP/E V3R2, then your driving system will require IBM SDK for z/OS, Java 2 Technology Edition. z/OS V2R1 itself does not use the ++JARUPD support.

- *zFS configuration requirements (optional):* If you will specify that you will use a zFS for ServerPac installation, then you must be sure that the zFS has been installed and configured, as described in *z/OS Distributed File Service zSeries File System Administration*.

- *Electronic delivery requirements (optional):* If you intend to receive your ServerPac order by way of the Internet, you need the following:
  - ICSF configured and active so that it can calculate SHA-1 hash values in order to verify the integrity of data being transmitted. If ICSF is not configured and active, SMP/E calculates the SHA-1 hash values using an SMP/E Java application class, provided that IBM SDK for z/OS, Java 2 Technology Edition, V1 (5655-I56) or later is installed. IBM recommends the ICSF method because it is likely to perform better than the SMP/E method. (To find out how to configure and activate ICSF, see *z/OS Cryptographic Services ICSF System Programmer's Guide*. For the required SMP/E setup, see *SMP/E User's Guide*.)
  - A download file system. Your order is provided in a compressed format and is saved in a download file system. The size of this file system should be approximately twice the compressed size of your order to accommodate the order and workspace to process it.
  - Firewall configuration. If your enterprise requires specific commands to allow the download of your order using FTP through a local firewall, you must identify these commands for later use in the CustomPac Installation Dialog, which manages the download of your order.
  - Proper dialog level. ServerPac installs using the CustomPac Installation Dialog. The CustomPac Installation dialog must be upgraded to install z/OS V2.1. Follow the instructions provided in the ServerPac Using the Installation Dialog book, which is provided with your z/OS V2.1 ServerPac order. Failure to update your CustomPac Dialog will mean that you will not be able to receive your ServerPac order.

- *DVD requirements (optional):* If you intend to receive your ServerPac or SystemPac dump-by-data-set order by way of DVD, you need the following:
    - Order available on z/OS host system. To make the order available on your z/OS host system, upload the order to the z/OS host from the DVD(s). Refer to readme.pdf on the first DVD to find the various methods for making your order available on your z/OS host system.
    - Space requirements on z/OS. Ensure you have the required space on your z/OS host system. To get the actual size of the order, refer to dialog.txt on the first DVD.
    - Space requirements on a workstation. If you chose to copy your order from the DVD(s) to a workstation before uploading the contents to your z/OS host system, ensure you have the required space available on your workstation.

- *Proper level for service:* In order for you to install service on the target system that you're building, your driving system must minimally meet the driving system requirements for CBPDO Wave 1 and must have the current (latest) levels of the program management binder, SMP/E, and HLASM. The service jobs generated by the CustomPac Installation Dialog use the target system's (and therefore current) level of the binder, SMP/E, and HLASM. If you choose to use your own jobs, model them after the jobs provided by ServerPac or dump-by-data-set SystemPac by adding STEPLIB DD statements to access MIGLIB (for the binder and SMP/E) and SASMMOD1 (for HLASM). Be sure that the SASMMOD1 and SYS1.MIGLIB data sets are APF authorized. Another way to install service is from a copy of your target system.

Identifying Driving System Software Requirement for Servicing z/OS V2R1 (and Installing CBPDO)

After installing via ServerPac, you will eventually want to install service on your z/OS V2R1 system. The driving system to install service on your z/OS V2R1 ServerPac system are the same as to install with the CBPDO method. For servicing your ServerPac system, you must meet the driving system requirements for "Wave 1" below.

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

z/OS V2R1 CBPDO: Driving System Wave 0

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

You can use either of the following as the driving system for installing z/OS V2R1 Wave 0:

- z/OS R12 or later.

- The Customized Offerings Driver V3 (5751-COD).

z/OS V2R1 CBPDO: Driving System Wave 1 (and to service a ServerPac system)

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

- *An operating system:* Use any of the following:

    - *z/OS R12, except that the **program binder**, **HLASM**, and **SMP/E** must be at the current (V2R1) levels. The HLASM level hasn't changed since z/OS R10. To satisfy the binder and SMP/E requirements, you can use a STEPLIB DD statement to access the z/OS V2R1 program binder and z/OS V2R1 SMP/E (V3R6) in the Wave 0 target system's SYS1.MIGLIB data set. You should STEPLIB to z/OS V2R1 HLASM's (V1R6) ASM.SASMMOD1 data set. Ensure that the target system's SYS1.MIGLIB and ASM.SASMMOD1 data sets are APF authorized on the driving system.

    - The Customized Offerings Driver V3 (5751-COD).
- *Proper security:* In order for you to install into the file system, the security definitions described previously for ServerPac are required.
- *Binder entry in SMP/E UTILITY:* The SMP/E UTILITY must have an entry for the binder. You can specify any of these program names in the UTILITY entry: IEWBLINK, HEWL, IEWL, LINKEDIT, or HEWLH096. (The linkage

editor, which uses the names HEWLKED, HEWLF064, IEWLF440, IEWLF880, and IEWLF128, cannot be used.)

- *Language Environment:* You must add SCEERUN (the run-time library provided by Language Environment) to your program search order because many elements and features require it. If you wish, add SCEERUN to your LNKLST concatenation. If you don't add SCEERUN to your LNKLST, you must access SCEERUN by using STEPLIB DD statements in the individual element and feature procedures that require them. The BCP's Program Management Binder is one function that requires access to SCEERUN; it has been required since OS/390 R10. This means that you must make available SCEERUN (via the LNKLST or STEPLIB, for instance) to any JCL and procedures (such as SMP/E procedures) that invoke the binder. This ensures that processing, such as conversion of long names to short names, is successful.
- *OMVS address space active:* Before you install the elements and features in Wave 1, you must activate the OMVS address space in full function mode on the driving system. To activate OMVS, complete the required customization (for example, SMS and RACF setup) as described in *z/OS UNIX System Services Planning*.
- *Target system's file system mounted:* The target system's file system must be mounted.

z/OS V2R1 CBPDO: Driving System Wave 2

In Wave 2 you install the z/OS V2R1 level of JES2 or JES3. Wave 2 is optional and can be combined with Wave 1. The driving system requirements for Wave 2 are the same as for Wave 1.

Electronic Delivery Positioning

- **Originally, Oct 1, 2013:** IBM planned to *require* the use of FTPS (FTP using Secure Sockets Layer) for Internet delivery of ServerPac, CBPDO, and Internet delivery of PTFs ordered using Shopz and the SMP/E RECEIVE ORDER command.

- **Revised!:   Based on customer feedback and to allow more time, IBM plans to extend the date for eliminating the withdrawal of standard FTP.**

- Prepare now if you would like to use:
  1. RECEIVE FROMNET using FTP,
  2. RECEIVE FROMNET using FTPS (FTP using SSL), or
  3. Download Director with encryption.
     - No change is required for Download Director with encryption.

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Electronic Delivery Positioning

Verify any of the previous three methods on the prior slide with the Connectivity Test at
https://www14.software.ibm.com/webapp/iwm/web/preLogin.do?&source=cbct

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Electronic Delivery Positioning for Secure z/OS Software Delivery
Previously, IBM announced that support for standard FTP connections used for z/OS software and service delivery would be discontinued October 1, 2013. Based on customer feedback and to allow more time to transition to secured FTP connections, IBM plans to extend the date before this option is eliminated.

You should take steps now to position your enterprise for the required withdrawal of standard FTP connections for z/OS software and service delivery downloads. Secured connections will require use of implementations such as FTPS (FTP using Secure Sockets Layer) or of Download Director with encryption.

To aid in this transition, in October 2012, the option to download your order direct to host using FTPS was provided on the Shopz download page. If you plan to use FTPS, IBM recommends that you visit the Connectivity Test website to verify your system setup and start using FTPS to download your order. No change is required for Download Director with encryption; however, you can also verify Download Director with the Connectivity Test. The Connectivity Test can be found at

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

Changes to preventive service acquisition   IBM

- **Planned for 3Q2014:** Because we would like the order content to better reflect what is installed on your system and only deliver what you need, we intend to remove some **preventive service ordering** methods:
  - From Shopz:
    - The z/OS "all licensed products" service package type will be removed.
    - z/OS Internet delivery service subscriptions will be removed.
  - ServiceLink z/OS ESO packages will be supported only when used to order service for selected FMIDs.
  - **Corrective** service remains unchanged.
  - IBM recommends use of the SMP/E RECEIVE ORDER command.
    - If you can't upload the inventory of your system, you can use ServiceLink ESO package with selected FMIDs.

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Preventive service ordering changes

IBM plans a number of changes to z/OS preventive service ordering for third quarter of 2014:
- In Shopz, the z/OS "all licensed products" service package type will be removed.
- In Shopz, z/OS Internet delivery service subscriptions will be removed.
- ServiceLink z/OS ESO packages will be supported only when used to order service for selected FMIDs.

z/OS preventive service orders will be based on installed products, which is intended to make order content a better reflection of the systems to be serviced. If you currently order z/OS service based on licensed products, you are encouraged to begin using the other available service options at this time.

IBM recommends use of the SMP/E RECEIVE ORDER command, the simplest method of acquiring z/OS service, which lets customers who are able to connect their z/OS host to the Internet fully automate service acquisition using local batch scheduling tools. SMP/E RECEIVE ORDER can be run using scheduled jobs to replace the current Shopz z/OS service subscription capabilities. Also, the ServiceLink z/OS ESO option is an alternative method you can use for ordering z/OS service if you are unable to upload a software inventory (bitmap or CSI) to IBM to identify installed software. Corrective service ordering remains unchanged.

For more information on Shopz service options, visit http://www.ibm.com/software/shopzseries .
For more information on ServiceLink service options, visit http://www.ibm.com/ibmlink .
For more information on the SMP/E RECEIVE ORDER command, see the *z/OS SMP/E Users Guide.*

Target System HW Requirements for z/OS V2R1
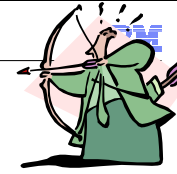
- **Hardware Requirements**
  - Processor Requirements:
    - IBM System z server: **zBC12, zEC12, z114, z196, z10, z9**
    - Remember, as of R13 *when running on z196 or later*, IEAOPT*xx* keyword HIPERDISPATCH will default to YES, if not specified.

  - Coupling Facility: see http://www.ibm.com/eserver/zseries/pso/cftable.html
    - zBC12 ships with CFCC level 19.
    - zEC12 initially shipped with CFCC level 18, after Sept 2013 it has CFCC level 19.
      - The preconditioning and exploitation PTFs for CFCC Level 17 are required to be installed throughout your sysplex before implementing CFCC Level 18 or 19.
    - z114 and z196 shipped with CFCC level 17
      - CFCC level 17 support required coexistence. See handout notes for FIXCAT categories.
    - Larger CF structure sizes may be necessary for CFCC level 17, 18, or 19. Use CFSIZER for planning structure sizes.
    - Starting at CFCC 17, ensure that the CF LPAR has at least 512MB of storage

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Target System Hardware Requirements
The minimal hardware requirements for z/OS, as well as additional hardware needed by specific z/OS elements and features, are documented in *z/OS Planning for Installation*.

Identifying Processor Requirements
z/OS V2R1 supports these System z server models:
- IBM zEnterprise zBC12 and zEC12
- IBM zEnterprise 196 (z196) and IBM zEnterprise 114 (z114)
- IBM System z10 EC and System z10 BC
- IBM System z9 EC and System z9 BC

The following IBM System z servers, and earlier servers, are not supported with z/OS V2R1 and later releases:
- IBM eServer zSeries 990 (z990) and IBM eServer zSeries 890 (z890)
- IBM eServer zSeries 900 (z900) and IBM eServer zSeries 800 (z800). Note that the last level of ICSF to support the z800 and z900 is the Cryptographic Support for z/OS V1R12-R13 Web deliverable (FMID HCR77A0).

Important: If you IPL z/OS V2R1 on a server that it does not support, you might receive wait state 07B-1E (decimal 30). The number of IEA434I messages is limited to 32 during IPL/NIP to avoid exhausting initial ESQA. An IEA444I message will be reported one time during IPL/NIP to indicate that additional IEA434I messages have been suppressed: IEA444I NUMBER OF IEA434I MESSAGES EXCEEDS NIP MAXIMUM .

In addition, beginning with z/OS V2R1, IBM requires the functionality of these storage control units and later control units:
- 3990 Model 3 and 3990 Model 6
- 9393
- 2105
- 2107
- 2421, 2422, 2423, and 2424
(*z/OS V2.1 requires control units that support the ECKD command set*).

Identifying Coupling Facility Requirements

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

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

IBM zEnterprise zEC12 servers initially shipped with CFCC level 18. After Sept 2013, the zEC12 and zBC12 will ship at CFCC level 19.   If, as part of your migration to a zEC12 or zBC12 server, you change CFCC levels, you might have larger structure sizes than you did previously. If your CFCC levels are identical, structure sizes are not expected to change when you migrate from a previous server to a newer generation server. In addition, similar to CF Level 17, ensure that the CF LPAR has at least 512MB of storage. If you have not installed the preconditioning and exploitation PTFs for CFCC Level 17, note that those PTFs are required to be installed throughout your sysplex before you can implement CFCC Level 18 or 19. (Use the FIXCAT for the z196 to identify the coexistence CFCC Level 17 PTFs.)

z114 and z196 servers ship with CFCC level 17. If, as part of your migration to a z114 or z196 server, you change CFCC levels (either by placing a coupling facility on the z114 or z196 server or by moving the coupling facility to a z10 EC or z10 BC at a later CFCC level), you might have larger structure sizes than you did previously. If your CFCC levels are identical, structure sizes are not expected to change when you migrate from a previous server to a newer generation server. At CFCC Level 17, ensure that the CF LPAR has at least 512MB of storage.

The PTFs to support CF Level 17, have coexistence (or sysplex preconditioning) PTFs that are required to be installed on z/OS R11 throughout your sysplex prior to implementing CF Level 17. These PTFs have been identified with the SMP/E FIXCATs of IBM.Device.Server.z196-2817, IBM.Device.Server.z114-2818, IBM.Function.SYSPLEXDataSharing, IBM.Coexistence.z/OS.V1R12, and IBM.Coexistence.z/OS.V1R13.

Accommodate HiperDispatch default of YES on IBM zEnterprise (zBC12, zEC12, z196, or z114)
Not required, but recommended. You should be aware of changes in how system resources are being managed.
Beginning with z/OS V1R13 when running on a zBC12, zEC12, z196, or z114 server, the IEAOPT*xx* keyword HIPERDISPATCH will default to YES. If HIPERDISPATCH=NO is specified, the specification will be honored as it was on previous z/OS releases.
Action: Examine the IEAOPT*xx* member(s) used for each image that will be IPLed on zEnterprise server. Then find the HIPERDISPATCH keyword and take one of the following actions:
- For HiperDispatch=YES, no action is required.
- When the HiperDispatch keyword is omitted, note that the image will take the default of HiperDispatch=YES and IPL with HiperDispatch enabled. Decide if you wish to accept that HiperDispatch will be enabled by default by reviewing the subsequent steps, and the "HiperDispatch=YES considerations" section.
- For HiperDispatch=NO, investigate why that image was running in HiperDispatch=NO and choose one of the following:
  - Define a plan to migrate that image to HiperDispatch=YES. See the "HiperDispatch=YES considerations" section for further information.
  - Continue to run the image with HiperDispatch=NO (IBM does not recommend this option for LPARs where the LPAR weight guarantees a share of two or more physical processors without a compelling reason for running HiperDispatch=NO).

  To get the SUP_HiperDispatch health check to succeed, add the machine type to the MachTypes parameter and verify that the HIPERDISPATCH parameter is NO.

HiperDispatch=YES considerations:
- Before enabling HiperDispatch review the WLM policy and make appropriate changes as needed that are described in the "WLM Policy Considerations" in the "Planning Considerations For HiperDispatch Mode" white paper at http://www-03.ibm.com/support/techdocs/atsmastr.nsf/WebIndex/WP101229.
- Verify that the LPAR profiles of the partitions in which the system may be IPLed allow for "Global Performance Data Control". See the *Processor Resource/Systems Manager Planning Guide* for a description of this capability. If this capability is not allowed, WLM will be unable to understand capacity that is used by other LPARs and will use all logical processors. Using all logical processors will result in suboptimal use of cache, reducing the capacity of the partition when more logical processors are defined compared to the share of the partition. This can also result in the "short CP" effect where a logical processor

may have a unit of work dispatched while removed from a physical processor for significant intervals. This can lead to response time problems.

Reference information: *"Planning Considerations for HiperDispatch Mode" white paper* at IBM Techdocs http://www-03.ibm.com/support/techdocs/atsmastr.nsf/WebIndex/WP101229.

Software Requirements for z/OS V2R1

- **Software Requirements:**
  - **Coexistence Software** (on other z/OS systems)

  - **Target Software** (correct levels of IBM non-z/OS and non-IBM products on the z/OS system)
    - If the IBM products are still service-supported, they may be used on z/OS V2R1, **with some exceptions** which will be found in *z/OS V2R1 Planning for Installation*, Appendix B**.**

  - **Functional Requirements**
    - As always, some functions may need specific SW or HW levels for exploitation.
    - *Reminder:* Consult the appropriate exploitation documentation to understand the limitations on fallback.

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

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

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

The minimum level IBM software products that run with z/OS, and is documented in *z/OS V2R1 Planning for Installation* Appendix B. Carefully review what is documented. Only the IBM software products levels **above the minimum service-supported level, or which need specific APARs or PTFs are documented.** Other IBM software products not documented in this Appendix, if they are still service-supported, are supported with z/OS V2R1.

Many of these products can be ordered as part of your z/OS ServerPac order, z/OS SystemPac order, separate CBPDO order, or separate ProductPac order. Note that there may be differences between what is minimally service supported, what is minimally supported with z/OS V2R1, and what is currently orderable.

If you're migrating to z/OS V2R1, 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, a link is provided from this website,
http://www.ibm.com/systems/z/os/zos/features/software/isv210.html.

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

Some z/OS V2R1 SW Target System Req's

Product name	Minimum supported level
z/OSMF	V2R1 *(which in turn requires IBM SDK 64bit Java Tech Ed V7 + PTFs)*
CICS TS	V3 R1 + PTFs UK29210, UK29407, and UK40130 (V3 R1 and V3 R2 will be end of service on 12/31/15)
DB2	V9 R1 (V9.1 will be end of service on 6/27/14; V8.1 was end of service: 4/30/12)
IMS	V11 R1 (V11 R1 will be end of service on 10/30/14; V10 R1 was end of service: 11/12/12)
WebSphere Application Server	V7.0 (V6.1 was end of service on 9/30/13, V6.0.1 was end of service: 9/30/10; V5.0 was end of service: 9/30/08)
Tivoli OMEGAMON XE	V4.2 + PTFs described in XE Technotes (V4.1 was end of service on 9/28/13)
Tivoli System Automation	V3.3 + PTFs (V3.2 was end of service on 4/30/13, V3.1 was end of service 9/30/10)
IBM SDK Java Technology Edition (31-bit or 64-bit)	V6 R0 *(notice that this is too low for z/OSMF V2R1)* (V5R0 was end of service on 9/30/13, V1R4 was end of service: 9/30/11.)
Tivoli Netview	V5 R3 with PTFs UA42146 and UA46833 (V5R2 was end of service: 3/31/12; V5R1 was end of service: 3/31/12)

➔Use FIXCAT `IBM.TargetSystem-RequiredService.z/OS.V2R1`

➔Website http://www-306.ibm.com/software/support/lifecycle/ can be helpful.

26 ➔Use z/OSMF's Software Management report to help identify installed products that are approaching or are at EOS.

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Selected IBM products that run on z/OS V2R1

For the list of the IBM software products that run on z/OS V2R1 (above minimum service-supported levels, or those with specific PTF requirements), refer to Appendix B of *z/OS V2R1 Planning for Installation* and PSP buckets, when available. This appendix also lists functions of z/OS that require specific z/OS optional features, IBM middleware products, or IBM application products.

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

An especially useful way of identifying if any of the products you are approaching or have met end of service is to use the z/OSMF Software Management application, and look at the End of Service report!
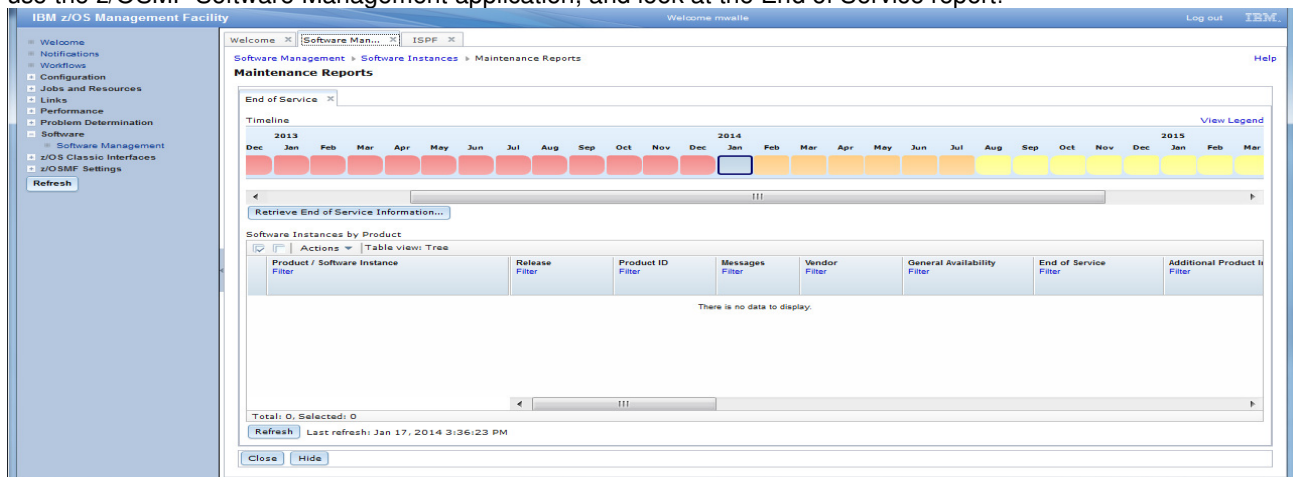
Target System PTF Verification for z/OS V2R1

1. **RECEIVE the latest HOLDDATA. (If you pull HOLDDATA from the ftp website, make sure you use FULL!)**
   - **HOLDDATA is produced to associate a particular PTF with a minimum or functional level for z/OS V2R1.**

```
++HOLD(HKN3510) FIXCAT FMID(HKN3510) REASON(AA42000)
RESOLVER(UA69308) CATEGORY(IBM.TargetSystem-
RequiredService.z/OS.V2R1) DATE(13179).
```

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

```
SET BDY(GLOBAL).     /* Your IBM Tivoli Omegamon XE V5.1 for
Mainframe Networks global */
REPORT MISSINGFIX ZONES(TIVTGT)
FIXCAT(IBM.TargetSystem-RequiredService.z/OS.V2R1).
```

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Programmatic Help with Target System PTF Verification for z/OS V2.1

z/OS V2R1 Planning for Installation Appendix B documents the PTFs that are required for minimum support on z/OS V2R1 and PTFs that are required to use specific functions. These PTFs (for both minimum and functional support) also will be identified with a FIXCAT called **IBM.TargetSystem-RequiredService.z/OS.V2R1,** in Enhanced HOLDDATA. You can use the SMP/E REPORT MISSINGFIX command to help identify those PTFs on your current system which would be needed for your upgrade to z/OS V2R1.

Note: Appendix B also documents minimum product release levels and release levels for functional requirements. This FIXCAT support is only for PTFs (not release levels) that are documented in this Appendix.
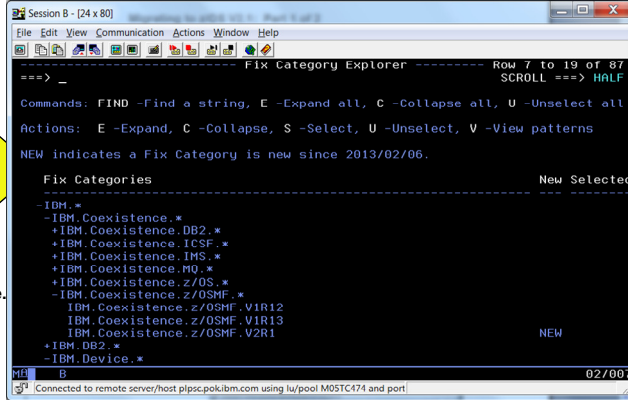
Coexistence System PTF Verification for z/OS V2R1   IBM

- *Must* use FIXCATs to verify coexistence PTFs are installed.
- Other related coexistence FIXCATs you may want to use:
  - `IBM.Coexistence.z/OS.V2R1`
  - `IBM.Coexistence.z/OSMF.V2R1`
  - …and there may be others!

Use the FIXCAT Explorer*
to find new FIXCATs!

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

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```
Session B - [24 x 80]                                             Migrating to z/OS V2.1 - Part 1 of 2      [ - □ x ]
File  Edit  View  Communication  Actions  Window  Help
🗔 🗔🗔 🗔🗔 🗔🗔 🗔 🗔 🗔🗔 🗔🗔 🗔 ● ✏
--------------------------- Fix Category Explorer --------- Row 7 to 19 of 87
===> _                                                   SCROLL ===> HALF

Commands: FIND -Find a string, E -Expand all, C -Collapse all, U -Unselect all

Actions:  E -Expand, C -Collapse, S -Select, U -Unselect, V -View patterns

NEW indicates a Fix Category is new since 2013/02/06.

    Fix Categories                                              New Selected
    -----------                                                --- --------
  -IBM.*
   -IBM.Coexistence.*
    +IBM.Coexistence.DB2.*
    +IBM.Coexistence.ICSF.*
    +IBM.Coexistence.IMS.*
    +IBM.Coexistence.MQ.*
    +IBM.Coexistence.z/OS.*
    -IBM.Coexistence.z/OSMF.*
     IBM.Coexistence.z/OSMF.V1R12
     IBM.Coexistence.z/OSMF.V1R13
     IBM.Coexistence.z/OSMF.V2R1                                NEW
   +IBM.DB2.*
   -IBM.Device.*
MA     B                                                            02/007
🖉 Connected to remote server/host plpsc.pok.ibm.com using lu/pool M05TC474 and port
```

Coexistence Service Requirements for z/OS V2R1

As of z/OS R12, you must use SMP/E FIXCATs to identify the z/OS coexistence PTFs. The coexistence PTFs for z/OS V2R1 are not documented in *z/OS V2R1 Migration,* are not included in PSP buckets, and are not included in any handouts for conferences.

SMP/E FIXCATs allow you to have the most up to date and correct information about z/OS coexistence, and is the easiest way to quickly determine if you have all the necessary coexistence PTFs installed. Take into consideration other products that you may be migrating with z/OS V2R1 – for instance z/OSMF V2R1 – and use SMP/E FIXCATs to verify their coexistence requirements as well.

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

Coexistence System PTF Verification for z/OS V2R1

1. **RECEIVE the latest HOLDDATA. (If you pull HOLDDATA from the ftp website, make sure you use FULL!)**

    - **HOLDDATA is produced to associate a particular PTF as coexistence between z/OS R12 or z/OS R13, with z/OS V2R1.**

```
++HOLD(HDZ1D10) FIXCAT FMID(HDZ1D10) REASON(AA36293)
RESOLVER(UA61386) CATEGORY(IBM.Coexistence.z/OS.V2R1)
DATE(12123).
```

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

```
SET BDY(GLOBAL).      /* Your z/OS R13 global */

REPORT MISSINGFIX ZONES(ZOSR13T)

FIXCAT(IBM.Coexistence.z/OS.V2R1,

       IBM.Function.HealthChecker).
```

For the migration health checks ☺!

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Using FIXCAT for coexistence PTFs for z/OS V2R1

For coexistence verification for z/OS V2R1, the fix category of interest is **IBM.Coexistence.z/OS.V2R1**. You can use the FIXCAT of ++HOLD statement to identify APARs, their fix categories, and the PTF that resolves the APAR. Another fix category that is helpful when doing the coexistence verification is **IBM.Function.HealthChecker**, for verifying that you've got the latest migration IBM Health Checks for z/OS installed on your coexisting system.

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

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

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

Note that you can use wildcards in the FIXCAT name in the REPORT MISSINGFIX command. For example, if you wanted to verify coexistence for z/OSMF V2R1 as well as z/OS V2R1 on your z/OS R13 system, your command could be:
```
REPORT MISSINGFIX ZONES(ZOSR13T) FIXCAT(IBM.Coexistence.z/OS*.V2R1,
                                        IBM.Function.HealthChecker).
```

Some Migration Tasks You Can Do NOW

1. **Transition off of removed functions and elements:**
   - In R13: DCE removals, DCE Security Server, ...
   - In V2.1: BPX.DEFAULT.USER, zFS multi-fs, Windows-based CPCC and CA, …
   - Beyond V2.1: JES2 z2, consoles shared mode, IBM HTTP Server (Domino)...
2. **Review documentation and PSP buckets, when available.**
3. **Prepare Driving and Target Systems:**
   - Driving systems – note new eletronic delivery consideration.
   - Target systems -
     - On the right server level?
     - DASD storage for z/OS V2R1 – much more space! Another file system!
     - IBM product level research: FIXCAT **IBM.TargetSystem-RequiredService.z/OS.V2R1**
     - ISV research for z/OS V2R1
   - Coexisting systems - FIXCAT **IBM.Coexistence.z/OS.V2R1** (and others!)
4. **Use IBM Health Checker for z/OS!** FIXCAT **IBM.Function.HealthChecker**
   - Activate the Migration Health Checks (they are shipped INACTIVE).
5. **Perform z/OS V2R1 migration actions you can do NOW.**

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Prepare for your migration to z/OS V2R1!
In this presentation you've seen many things can you can do right now, on your current z/OS release to help make your z/OS V2R1 migration smooth. Listed above are the things that were shown in this presentation, but make sure you review Part 2 of this presentation (and look at the *z/OS Migration* book) so that you know a more complete migration picture.

IBM Health Checker for z/OS Checks for Migration   IBM

1. **ZOSMIGREC_ROOT_FS_SIZE**
2. **XCF_SYSPLEX_CDS_CAPACITY**
3. **RSM_MEMLIMIT**
4. **ZOSMIGREC_SUP_TIMER_INUSE**
5. **SUP_HiperDispatchCPUConfig**
6. **ZOSMIGV1R13_CNZ_CONS_OPER_MODE**
7. **SUP_HiperDispatch**
8. **CNZ_SYSCONS_ALLOWCMD**
9. **GRS_AUTHQLVL_SETTING**
10. **CATALOG_IMBED_REPLICATE**
11. **ZOSMIGV1R11_ZFS_RM_MULTIFS** / **ZOSMIGREC_ZFS_RM_MULTIFS**
12. **ZOSMIGV1R13_ZFS_FILESYS** 🔥

13. **ZOSMIGREC_SMB_RPC**
14. **INFOPRINT_PRINTWAY_MODE**
15. **JES2_Z11_Upgrade_CK_JES2**
16. **CEE_USING_LE_PARMLIB**
17. **SDSF_ISFPARMS_IN_USE**
18. **USS_HFS_DETECTED**
19. **ZOSMIGV1R13_RO_SYMLINKS**
20. **ZOSMIGV2R1_DEFAULT_UNIX_ID**
21. **ZOSMIGV2R1_ZFS_VERIFY_ CACHESIZE**
22. **ICSFMIG77A1_CCA_COPROCESSOR _ACTIVE**
23. **ICSFMIG77A1_UNSUPPORTED_HW**
24. **ICSFMIG77A1_TKDS_OBJECT**
25. **TCP/IP legacy device check – 2Q14**

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Using IBM Health Checker for z/OS for migration purposes

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

Details on how to run the Migration Health Checks are provided in beginning of the *z/OS Migration* book.

System REXX health check considerations

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

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

Migration Health Checks and Best Practice Health Checks

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

- • the name of the check follows a convention. For z/OS, the convention is:
   ZOSMIGVvvRrr_*component_program_name* (and for the ICSF element, the convention is
   ICSFMIGnnnn_*component_program_name*). Notice the "MIG" characters, followed immediately by the release identifier. This tells you that the check helps with migration, and the migration action was introduced in the release specified in the name. If the version and release where the change is occurring

isn't announced yet, you may see **ZOSMIGREC**_component_program_name (where **REC** indicates it is RECommended, and is not a requirement yet).
- the check has a status of **INACTIVE** by default. Because you may not want to know about migration actions during non-migration periods, Migration Health Checks will not automatically be active.

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

This table shows all the IBM Health Checks for z/OS referenced in the *z/OS V2R1 Migration* book. You can see the related migration action, the check name, where the check ships, the severity, and if it active (background in yellow) or inactive (background in white).

BCP**: warns that the number of CPUs is approaching the requirement to use HiperDispatch**	**SUP_HiperDispatchCPUConfig (OA30476)**	ACTIVE LOW	For z/OS R10 and beyond.
BCP: **verify expected HiperDispatch state matches what is actually in use**	**SUP_HIPERDISPATCH (OA36150)**	ACTIVE MED	For z/OS R13 and beyond
BCP: **verify ALLOWCMD setting with desired value**	**CNZ_SYSCONS_ALLOWCMD**	ACTIVE LOW	For z/OS R12 and beyond
BCP: **verify if console operating mode is explicitly specified.**	ZOSMIGV1R13_CNZ_CONS_OPER_MODE (OA32930)	INACTIVE LOW	For z/OS R11, and R12
z/OS UNIX: **Migrate from HFS file systems to zFS file systems**	**USS_HFS_DETECTED (OA29947)**	ACTIVE LOW	For z/OS R11 and beyond.
BCP: **Migrate from a Sysplex Timer to STP**	ZOSMIGREC_SUP_TIMER_INUSE (no APAR)	INACTIVE LOW	For z/OS R11 and beyond
BCP: **Determine if system is using the recommended AUTHQLVL setting**	**GRS_AUTHQLVL_SETTING**	ACTIVE LOW	For z/OS R13 and beyond
DFSMSdfp: **Redefine catalogs with IMBED, REPLICATE, and KEYRANGE attributes**	**CATALOG_IMBED_REPLICATE (no APAR)**	ACTIVE LOW	For z/OS R11 and beyond.
JES2: **Verify z11 checkpoint level**	**JES2_Z11_UPGRADE_CK_JES2 (no APAR)**	ACTIVE LOW	For z/OS R11 and beyond
zFS: **Discontinue use of multi-file system aggregates**	ZOSMIGV1R11_ZFS_RM_MULTIFS (when sysplex) or ZOSMIGREC_ZFS_RM_MULTIFS (when not sysplex) (OA27198)	INACTIVE LOW	For z/OS R9 and beyond.
zFS: **Verify if the sysplex is running sysplex=filesys**	ZOSMIGV1R13_ZFS_FILESYS (OA35465)	INACTIVE LOW	For z/OS R11 and R12
SMB: **Determine if SMB is running with the Distributed Computing Environment (DCE) and DCE/DFS File Server**	ZOSMIGREC_SMB_RPC (OA30117)	INACTIVE MEDIUM	For z/OS R11 and beyond.
BCP: **Enough XCF groups in your CDS.**	**XCF_SYSPLEX_CDS_CAPACITY (no APAR)**	ACTIVE MEDIUM	For z/OS R4 and beyond.

General: **Version root has enough room on DASD**	**ZOSMIGREC_ROOT_FS_SIZE** **(OA28684 and OA28631)**	INACTIVE LOW	For z/OS R9 and beyond.
Infoprint Server: **Migrate from IP PrintWay basic to extended mode**	**INFOPRINT_PRINTWAY_MODE** **(OA26583)**	ACTIVE LOW	For z/OS R8 and beyond.
SDSF: **ISFPRMxx detection**	**SDSF_ISFPARMS_IN_USE** **(PK59629)**	ACTIVE LOW	For z/OS R8 and beyond.
LE: **CEEPRMxx detection**	**CEE_USING_LE_PARMLIB** **(PK62487)**	ACTIVE LOW	For z/OS R8 and beyond.
BCP: **Verify that virtual storage limits are set properly**	**RSM_MEMLIMIT** **(no APAR)**	ACTIVE LOW	For z/OS R4 and beyond.
BCP: **Determine if z/OS R13 symlinks will impact current system.**	**ZOSMIGV1R13_RO_SYMLINKS** **(OA35605 and OA35636)**	INACTIVE LOW	For z/OS R11 and R12.
RACF: **Use the BPX.UNIQUE.USER profile instead of BPX.DEFAULT.USER**	**ZOSMIGV2R1_DEFAULT_UNIX_ID** **(OA37164)**	INACTIVE LOW	For z/OS R12 and R13.
zFS: **Determine whether to accept the new default values for certain zFS variables in the zFS IOEFSPRM configuration file**	**ZOSMIGV2R1_ZFS_VERIFY_CACHESIZE** **(OA41630)** **ZFS_VERIFY_CACHESIZE**	INACTIVE LOW ACTIVE LOW	For z/OS R12 and R13 For z/OS V2R1 and beyond
ICSF HCR77A1 (web deliverable): **Detect any coprocessor that that will not become active when HCR77A1 is started.**	**ICSFMIG77A1_CCA_COPROCESSOR_ACTIVE** **(OA42011)**	INACTIVE LOW	For all supported prior ICSF levels
ICSF HCR77A1 (web deliverable): **Run HCR77A1 on a supported server**	**ICSFMIG77A1_UNSUPPORTED_HW** **(OA42011)**	INACTIVE LOW	For all supported prior ICSF levels
ICSF HCR77A1 (web deliverable): **Detect TKDS objects that are too large for the new record format in HCR77A1**	**ICSFMIG77A1_TKDS_OBJECT** **(OA42011)**	INACTIVE LOW	For all supported prior ICSF levels.
Communications Server: **Detect usage of legacy device drivers.**	**TBD** **(OA44669 / PI12977 and OA44671 / PI12981)**	INACTIVE LOW	For z/OS R12 and R13

SMP/E V3R6 Non-z/OSMF Enhancements

- **Enhancements not related to z/OSMF** (in PTFs for IO18093 and IO19179):
  - Cross Global Zone Reporting on REPORT CROSSZONE and REPORT SYSMODS commands.   You can use different GLOBALs!
  - A new report, SYSMOD Comparison HOLDDATA, on REPORT SYSMODS command to list HOLDDATA that must be resolved.
  - **Ability to use SMP/E dialogs in ISPF split screen! However, only one logical screen per CSI data set is allowed for update (many for read!)**

Before:

```
Session C - [24 x 80]
File  Edit  View  Communication  Actions  Window  Help

                         CSI QUERY - DDDEF ENTRY              Row 1 to 1 of 1
===> _                                                    SCROLL ===> PAGE

  To return to the previous panel, enter END .

  Primary Command: FIND
. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
                        SMP/E INITIALIZATION ERROR
===>

********************************************************************************
*                                                                              *
* The following error was detected while attempting to                        *
* initialize the SMP/E dialogs. The initialization of                         *
* these dialogs has not completed.                                            *
*                                                                              *
*                                                                              *
*                                                                              *
* The message has been logged in your ISPF log.  You may                      *
* wish t                                                                       *
* progra   Split-screen mode is not allowed for the SMP/E dialogs             *
*                                                                              *
* To return to ISPF, enter END .                                              *
MA    C                                                                  02/007
128  Connected through TLS1.0 to secure remote server/host mvs1.centers.ihost.com usi
```

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SMP/E V3R6 Non-z/OSMF Enhancements

- **SMP/E Split Screen:**
  After…it just works as we want it to!

```
Session B - [24 x 80]
File  Edit  View  Communication  Actions  Window  Help

                         CSI QUERY - DDDEF ENTRY              Row 1 to 1 of 1
===>                                                      SCROLL ===> HALF

  To return to the previous panel, enter END .

  Primary Command: FIND

  Entry Type:  DDDEF                        Zone Name: TGT113
  Entry Name:  LINKLIB                      Zone Type: TARGET

  DSNAME: SYS1.LINKLIB
                         CSI QUERY - DDDEF ENTRY              Row 1 to 1 of 1
===> _                                                    SCROLL ===> HALF

  To return to the previous panel, enter END .

  Primary Command: FIND

  Entry Type:  DDDEF                        Zone Name: TGT112
  Entry Name:  LINKLIB                      Zone Type: TARGET

  DSNAME: SYS1.LINKLIB
MA    B                                                                  14/007
Connected to remote server/host plpsc.pok.ibm.com using lu/pool M05TC488 and port
```

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SMP/E V3R6 (as of z/OS R13 SMP/E) Non-z/OSMF Enhancements

Cross Global Zone Reporting
The REPORT CROSSZONE and REPORT SYSMODS commands have been modified to allow zones to be specified that are defined in different global zones.

For the REPORT CROSSZONE command, the new ZONES operand can be used in place of the ZONESET operand to specify a list of zones and/or ZONESETs. With each value, a CSI data set name can optionally be provided when the zone or ZONESET is defined in a different global zone than the current set-to global zone.

For the REPORT SYSMODS command, the COMPAREDTO operand has been modified to allow a CSI data set name to be specified with a zone name. The CSI data set name is optional and can be specified when the comparison zone is defined in a different global zone than the current set-to global zone.

SYSMOD Comparison HOLDDATA Reporting
The REPORT SYSMODS command compares the SYSMOD content of two target or dlib zones. A SYSMOD Comparison report is generated identifying the SYSMODs that exist in the input zone, but are not found in the comparison zone.

A new report is now being generated by the REPORT SYSMODs command to list the SYSTEM and USER HOLDDATA which must be resolved in order to install the SYSMODs identified in the SYSMOD Comparison Report.

In order for this new report to be complete, HOLDDATA must be retained in the global zone even when the associated SYSMODs are removed. Therefore, HOLDDATA will no longer be deleted during ACCEPT processing when the NOPURGE indicator is off in the active options entry, and during RESTORE processing when the NOREJECT indicator is off in the active OPTIONS entry. Additionally, HOLDDATA may no longer be deleted using the Purge mode or Mass mode paths of REJECT processing.
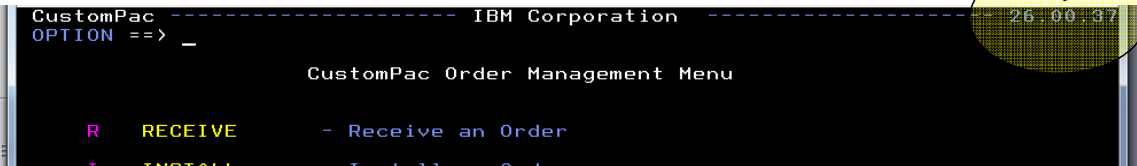
SMP/E Dialog Split Screen
With PTFs on SMPE V3R6 (for APARs IO18093 and IO19179), SMP/E will allow you to use the SMP/E dialog with multiple ISPF logical screens at a time. This provides support for any number of logical screens for reading CSI data sets and zones concurrently, and for using one logical screen per CSI data set for update. This improves the usability of the SMP/E ISPF dialog.

ServerPac Migration Action

- Applicable to any ServerPac order created as of October 1, 2013. Applicable to any z/OS V2.1 ServerPac order.
- You must have the CustomPac dialog level at least 26.00.00.
  - The upper right corner of the primary panel will tell you the level.

```
CustomPac ------------------- IBM Corporation -------------------  26.00.37
OPTION ==> _

                    CustomPac Order Management Menu


    R    RECEIVE        - Receive an Order

    I    INSTALL        - Install an Order
```

- Refer to *ServerPac: Using the Installation Dialog* for instructions. For electronic orders:
  1. Copy the EUPDATES job from the FTP server as instructed within Shopz, to your system.
  2. Customize the job to indicate what the hlq name of your master CustomPac dialog data sets are.
  3. Run the EUPDATES job.
- You cannot perform this migration action until you receive your ServerPac order.

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ServerPac Migration Action:
Ensure your CustomPac Installation Dialog is updated
This migration action not tied to a specific release. The change is introduced with z/OS V2R1 as of October 1, 2013; however, it also applies to z/OS V1R13 as long as that release remains orderable

ServerPac has made changes that require you to use an updated RECEIVE job. You must update the CustomPac Installation Dialog to level 26.00.00 or higher in order to support Secure FTP (FTP using Secure Sockets Layer or FTPS) and removal of the BookManager format of the IYO. You can determine the level of the CustomPac Installation Dialog you are using by checking the upper right hand corner of the primary panel CPPPPOLI.

If you plan to use FTPS, IBM recommends that you visit the Connectivity Test website to verify your system setup well in advance. No change is required for Download Director with encryption; however, you can also verify Download Director with the Connectivity Test. The Connectivity Test can be found at the following web site: https://www14.software.ibm.com/webapp/iwm/web/preLogin.do?lang=en_US&source=cbct

Updating your ServerPac dialgos ensures that the RECEIVE job JCL is generated and no longer references the Bookmanager file of the Installing Your Order (IYO) document, since that document isno longer available in BookManager format.

Migration Action: see the topic "Updating your dialogs" in *ServerPac: Using the Installation Dialog*. You will need to refer to the section for your order's delivery media (that is, tape, DVD, or internet delivery) to determine the steps to take. The electronic steps are outlined in the slide above. Because the dialog is included in your ServerPac order, you will not be able to perform this migration action until your ServerPac order has been completed.

Did you know about Product ServerPac?

- Started October 15, 2012 in Shopz (and enhanced in z/OS V2R1)
- You can order many z/OS, DB2, IMS*, NCP*, or CICS* program products withOUT also ordering z/OS, DB2, IMS*, NCP*, or CICS*.
  - If a product requires a base product for <u>installation</u>, then you still need to have that product in your order, however.
  - Other requisites will be shown, and bypassable, if you already have them installed on your system.
  - Eligible products will have a **triangle icon** in the product catalog.
    * Enhancements concurrent with z/OS V2.1 GA
- As of z/OS V2R1, Product ServerPac is designed to allow you to use an existing GLOBAL zone for installation. Still, however, it will not merge the shipped SMP/E zones (or data sets) with your existing target or dlib zones (or data sets).
  - *Therefore, order products in a Product ServerPac that you would install and migrate together in a <u>"product set".</u>*
  - The value is for installing a product set that you would otherwise build up product by product.
- No cross-SREL product support for Product ServerPac.

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Product ServerPac in Shopz

Triangle: eligible for Product ServerPac
Circle: License status on system
Diamond: Internet deliverability

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Product ServerPac
As of October 15, 2012, using Shopz, you are able to order eligible products in a Product ServerPac in the same manner as for regular ServerPac. Shopz has a new triangle icon to indicate which products in the ServerPac catalog are eligible for a Product ServerPac. Because this is a ServerPac, Shopz product requisite checking will enforce requisites required for installation, but similar to CBPDO, Shopz will also display requisites that can be bypassed if you already have them installed on your system.

A Product ServerPac has the same characteristics as a regular ServerPac. IBM installs the product or product set when manufacturing your order and delivers the target and distribution libraries with service integrated (applied and accepted) to the latest RSU level and with HIPER and PRP service applied, and the SMP/E environment with a single GLOBAL zone and the minimum number of TARGET and DLIB zones required. By default, for the z/OS SREL, IBM delivers WebSphere products in their own zone pair, IBM Installation Manager installed products in their own zone pair, and the rest of the products in a separate zone pair. The intent is for you to manage the products you ordered as a product set in the delivered SMP/E environment.

Concurrent with z/OS V2.1 availability, Product ServerPac will be designed to support orders for certain products from all ServerPac subsystems without a base product such as IMS, NCP, or CICS. The triangle icon in the Shopz catalog can help you identify which products are eligible for Product ServerPac. In addition, Product ServerPac will be designed to allow you to use an existing GLOBAL zone for installation.

Newer ServerPac Install Enhancements

- **ServerPac in z/OS V2R1:**
  - Provide a comparison between saved jobs to define RACF profiles for a prior order and the jobs generated for the current order.
  - Orders that include RACF feature will provide a RACF database you can use for initial IPL when you do not have an existing security environment.

- **ServerPac in z/OS R13:**
  - Improved handling for user-supplied installation jobs by preserving their placement in the list of jobs generated by the CustomPac Installation Dialog.
  - You can now merge IBM data sets into target user-defined data sets.
  - **Data Set Origin** (IBM or User-Defined) is a new attribute off of Modify System Layout "View and change data sets by selected attributes".
  - Program Directories and *ServerPac: Installing Your Order* in Adobe PDF format on DVD for orders on tape, so they can be read immediately from an optical drive on a workstation without the need to download them from z/OS data sets after the RECEIVE job has been run.

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z/OS V2R1 Installation Enhancements in ServerPac
Starting with z/OS V2.1 orders, ServerPac will support a comparison between saved jobs to define RACF profiles for a prior order and the jobs generated for the current order. This function is designed to help you identify new security definitions that are required for the new products, or levels of products, in new orders.

In addition, ServerPac orders that include z/OS with the Security Server RACF feature will provide a RACF database you can use for initial IPL when you do not have an existing security environment.

z/OS R13 Installation Enhancements in ServerPac
Program directories for the products in your order are no longer provided in hard copy format. They are now provided in soft copy format only on the media delivered with your order. For tape orders, program directories will be provided as PDF files on the DVD shipped with the order. For DVD orders, program directories will be provided as PDF files on the first DVD shipped for the order. For electronic orders, link to program directories will be available on Shopz download page. To view the program directories in PDF format, use Adobe© Acrobat© Reader© 6.0 or higher.

z/OS R12 Installation Enhancements in ServerPac
You may have missed it, but these enhancements were in z/OS R12 ServerPac:
- Concurrently with z/OS V1.12 availability, ServerPac and CBPDO will be orderable on DVD. DVD support can be used by installations that cannot use Internet delivery or require physical media. Installing software using DVD requires a workstation with a DVD drive that can read discs in DVD-5 (single-sided, single layer) format and a network connection to your z/OS system.
- The ServerPac installation dialog now allows SDSF and JES SMP/E zones to be merged, without having to merge either into the z/OS BCP zone.
- The Zones option in the dialog has been enhanced to propagate the zone names into the middle level qualifier (if found) of the SMP/E CSI data set names in Modify System Layout.
- A number of jobs, which are no longer needed, are removed.
- A file system mounted at /var/wbem is now created and delivered in ServerPac.

- Several z/OSMF setup improvements have been made, including new tasks for z/OSMF applications new in z/OSMF V1.12.

z/OS R11 Installation Enhancements in ServerPac
As of z/OS R11, these user-friendly enhancements are available for ServerPac, but you may not have noticed them:
- The Modify System Layout dialog has been redesigned to make it easier for you to maintain ServerPac configurations after installation. This is intended to make them easier to reuse for later installations.
    - Specifically, the Modify System Layout (MSL) dialog has been changed to allow you to enter MSL if the ALLOCDS job has been run and the ServerPac order has been set to STARTED without triggering the volume overflow condition process. You may save your changes in MSL, however a new message will be issued to indicate that you have to re-run the Install jobs if you want your changes to be used for that order. The new message is: CPP0605097W: - Your order is already started. To use the changes you made, rerun the installation jobs.
- Effective 4Q2009, Tivoli OMEGAMON and other Tivoli monitoring products can be ordered in ServerPac without having z/OS in the same order. When you order with ShopzSeries, you can locate these products in a display group called "IBM Tivoli Monitoring Products." You must select "IBM Tivoli Management Services on z/OS (5698-A79)" as the base product for a Tivoli ServerPac order.

Just a comment about z/OS V2.1 Language Environment

Something to expect … not a migration action!

- **OS/VS COBOL programs running under z/OS V2.1 LE are supported*:**
  - If you encounter a problem, open a PMR.
  - There are no current plans to remove the OS/VS COBOL program support from z/OS LE.
  - OS/VS COBOL programs cannot:
    - run in CICS, since CICS V3 (2004),
    - be run as DB2 stored procedures,
    - be pre-loaded by IMS, and
    - call or be called by COBOL V5 programs (June 2013)

  > Attend COBOL V5 sessions on Wed 11am and 1:30pm, and Thurs 11am !!

  - For OS/VS COBOL programs running on z/OS V2.1 LE, you will receive a warning messages to help identify programs that are executed:
    - For main programs (like EXEC PGM= in JCL): `IGZ0268W An invocation was made of OS/VS COBOL program "program-name"`
    - When an OS/VS COBOL program is called as a subroutine of another program: `IGZ0269W "program-lang" version "program-version" program "program-name" made a call to OS/VS COBOL program "program-name"`
    - You can suppress these warning messages, or cause the program to abend by using exit CEEWUCHA.
    - These warning messages lets you know which programs are being called vs. exist in data sets (which the Load Module Analyzer helped with).

38 *OS/VS COBOL programs running under the old runtime library **are not** supported. The OS/VS COBOL compiler and runtime were end of service in June 1994.   © 2014 IBM Corporation

z/OS V2.1 Language Environment and OS/VS COBOL Programs

You may have OS/VS COBOL programs running in your applications without knowing it. You would like to be able to identify those programs since they will not be able to interoperate with Enterprise COBOL V5 programs and since IBM may remove support for OS/VS COBOL programs from LE in the future.   (There are no current plans to remove this support from LE, however.)

In z/OS V2.1 the LE COBOL run-time library has been enhanced to diagnose the use of OS/VS COBOL programs with a warning-level message which will be written to the CEEMSG data set. The message can be suppressed or converted to an abend by using an LE user condition handler which is also being supplied as an example. The following condition handler sample programs are supplied in the SCEESAMP data set:

- IGZWUXOI - to ignore the condition
- IGZWUXOA - to convert the condition to an immediate abend

To enable the condition handler, you can use the Language Environment run-time option USRHDLR(IGZWUXOI) to ignore the condition or USRHDLR(IGZWUXOA) to cause an immediate abend.

Using z/OSMF V2.1 for z/OS V2.1 migration!

z/OS Downloads site (As-Is Downloads) contain z/OSMF workflow files
which are a port of the z/OS V2.1 Migration book.

- **After you have z/OSMF V2.1 up and running**
  - Can use the workflow to help continue on with your z/OS V2.1 migration planning activities.
  - Read the text accompanying the download to understand the benefits, and known observations.
- View a YouTube demo (z/OS V2R1 Migration Workflow Video) for quick instructions on how to use the download.
- Feedback is welcome to zosmig@us.ibm.com !

Migrating to z/OS V2.1: Part 1 of 2 Summary

- **Changing content of z/OS V2R1**
  - New priced feature - zEDC, associated with new hardware
  - New base element - z/OS Font Collection, with a new font file system!
  - Prepare now for removed content: BookManager books, BPX.DEFAULT.USER, zFS multi-fs aggrs, IBM HTTP Server (Domino), ...
- **Timeline of z/OS ordering and deliverables:** associated products to consider
- **z/OS Policies**
  - z/OS V2R1 Coexistence-Migration-Fallback from z/OS R13 or z/OS R12.
  - Two year release cycle, starting with z/OS V2R1.
- **Ensuring System Requirements are Satisfied**
  - Driving, Target SW, Target HW, and Coexisting System Requirements
    - z/OS V2.1 requires z9 or higher, and appropriate storage control units.
    - Software delivery – extension of FTP, preventive removals
    - Use FIXCATs `IBM.TargetSystem-RequiredService.z/OS.V2R1,` `IBM.Coexistence.z/OS.V2R1, IBM.Function.HealthChecker,` and others.
- **Use IBM Health Checker for Migration Actions:** Install and activate
- **Migration action on ServerPac dialog:** required to upgrade dialog
- **Review some installation enhancements:** split screen support, (others in backup material of handout), and z/OS V2.1 LE identification of OS/VS COBOL pgms, z/OSMF workflow for z/OS V2.1 migration

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