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Migrating to z/OS 2.2: Part 1 of 2

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Abstract:

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 2.2 from either z/OS 2.1 or 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 2.2 migration. She will overview the changed content of z/OS 2.2. 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 planned for z/OS V2.2 is September 30, 2015.

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

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- **Content of z/OS V2R2**
  - Added, Changed, and Withdrawn Elements and Features
- **z/OS Ordering and Deliverables**
  - Products Related to z/OS
- **z/OS Policies**
  - z/OS End of Service dates
  - z/OS Coexistence-Migration-Fallback
- **Planning for z/OS V2R2:**
  - Ensuring System Requirements are Satisfied
    - Driving and Target System Requirements
  - Coexistence System Requirements
  - Some Migration Actions You Can Do NOW
  - Programmatic Verification of Migration Actions for z/OS V2R2
  - Using z/OSMF Workflow for z/OS migration
  - Some Installation Enhancements in SMP/E and ServerPac

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Scope

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

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

  - for zEC12 and zBC12: migration action in *z/OS Migration* "Migrate to an IBM zEnterprise zEC12 or zBC12 server"

  - for z13: migration action in *z/OS V2.1 Migration* (-03 level), *z/OS V2.2 Migration,* or session "z/OS Support for the IBM z13".

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Related Publications:

     *IBM Publications Center zipped PDF publications number: **SK4T-4949***
     z/OS Planning for Installation
     z/OS Migration
     z/OS Introduction and Release Guide
     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
     z/OS MVS Initialization and Tuning Reference
     z/OS UNIX System Services Planning
     ServerPac: Installing Your Order (no order number; custom-built to your order)
     ServerPac: Using the Installation Dialog,

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/ http://www.ibm.com/systems/z/os/zos/library/bkserv/v2r2pdf/index.html	z/OS V2R1 and V2R2 Elements and Features PDF downloads
http://www.elink.ibmlink.ibm.com/public/applications/publications/cgibin/pbi.cgi	IBM Publications Center
http://www.redbooks.ibm.com/redbooks.nsf/pages/IBMIEAV22	IBM Education Assistant for z/OS V2R2 (at GA)
http://www.redbooks.ibm.com/redbooks.nsf/pages/IBMIEAV21	IBM Education Assistant for z/OS V2R1
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	Shopz 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

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 V2R2 Elements (changing in z/OS V2R1 and V2R2) IBM

→ BCP
→ Common Information Model (CIM)
→ Communications Server
→ *Communications Server Security Level 3*
→ Cryptographic Services:
   → ICSF (FMID HCR77B0)
   → PKI Services
   → System SSL
→ DFSMSdfp
→ DFSMSdss
→ DFSMShsm
→ DFSMSrmm
→ DFSMStvs
→ DFSORT
→ Distributed File Service
→ HCD
→ HCM
→ IBM HTTP Server powered by Apache (IHSA) *NEW!*
→ IBM Knowledge Center for z/OS *NEW!*

→ IBM Tivoli Directory Server *NEW!*
→ IBM z/OS Management Facility
→ Infoprint Server
→ Integrated Security Services:
   → Network Authentication Service
→ ISPF
→ JES2
→ JES3
→ Language Environment
→ Library Server
→ Network File System
→ RMF
→ Run-Time Library Extensions

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

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 V2R1, This element changed in z/OS V2R2
All other elements not listed have not changed since z/OS R13.
New in V2R1: z/OS Font Collection, and zEDC.
New in V2R2: IBM HTTP Server powered by Apache, IBM Knowledge Center for z/OS, z/OSMF, and z/OS OpenSSH.

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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 V2R2 since z/OS R13.
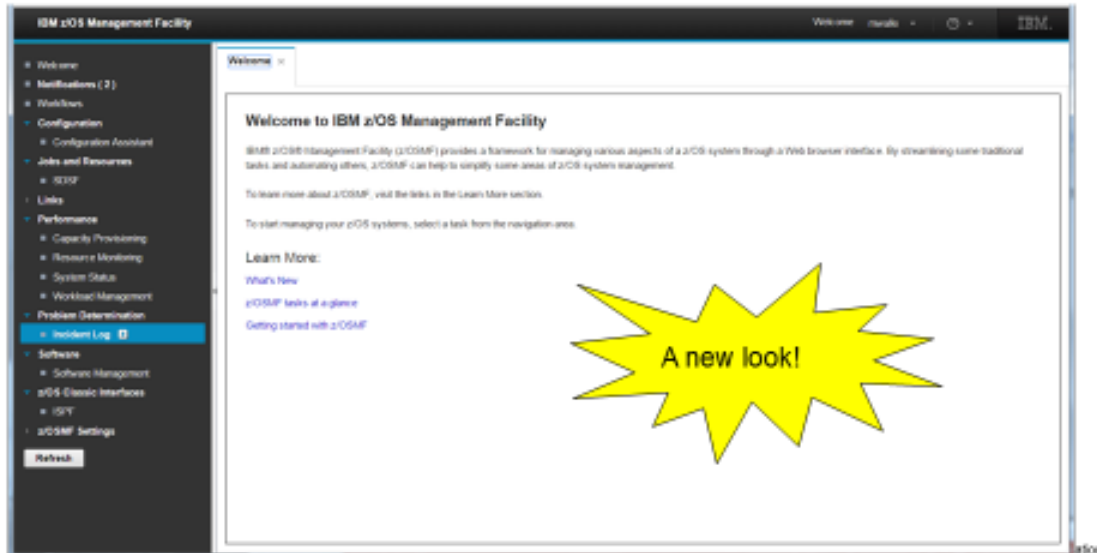
New base element in z/OS V2.2: z/OSMF

IBM z/OS Management Facility:

- Provides a web-based interface that allows you to manage various aspects of your z/OS systems through a browser at any time, from any location.
- Previously, its own program product number (at no cost).
- Use requires IBM SDK **64-bit Java V7.1**, which is not included in z/OS.

A new look!

New base element in z/OS V2.2: z/OS OpenSSH

Overview:

- OpenSSH provides secure encryption for both remote login and file transfer. Some of the utilities that it includes are:
  - **ssh**, a z/OS client program for logging into a z/OS shell. It can also be used to log into other platform's UNIX shells. It is an alternative to **rlogin**.
  - **sftp** for file transfers over an encrypted **ssh** transport. It is an interactive file transfer program similar to **ftp**.

- Level in z/OS V2.2 is OpenSSH 6.4p1.
- This level is also provided in IBM Ported Tools V1.3, base feature.
  - Previously ported level was 5.0p1 in prior releases.
- There are possible migration actions between 5.0p1 and 6.4p1 due to open source changes.

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New base element in z/OS V2.2: IBM Knowledge Center

Overview:

- Knowledge Center for z/OS is a web application that provides IBM product publication content to web browser clients from the z/OS server system.
  - It is a Java web application deployed by the WebSphere® Liberty Profile packaged with the z/OSMF base element.

- Designed to provide enhanced search technology similar to that used for Information Centers.

- Designed to enable you to create your own local repositories and tailor the content presented from them.

- z/OS V2.2 ServerPac will to help you complete the necessary setup tasks .

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New base element in z/OS V2.2: IHSA

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IBM HTTP Server Powered by Apache Overview:

- Replaces the IBM HTTP Server Powered by Domino

- z/OS V2.2 level is 9.0.0.0. A base exclusive element.

- IBM Ported Tools V1.2 and V1.3 HTTP Server feature are at level 8.5.5, and will run on z/OS V1.12, V1.13, and V2.1.
    - And now with a migration accommodation: z/OS V2.2!
    - It is recommended to use this migration accommodation if you need both IHSA 8.5.5 and 9.0 on z/OS V2.2.
        - If you use this migration accommodation, it is expected that you will move from IHSA 8.5.5 to 9.0 (and therefore only be using IHSA 9.0) on z/OS V2.2 before the End of Service for z/OS V2.1 (planned to be September 2018).
        - Thus, you will have approx. 3 years of "dual" IHSA 8.5.5 and 9.0 support on z/OS V2.2.
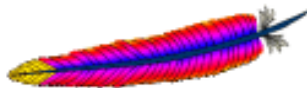
Apache

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Some thoughts about IBM HTTP Server

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A strongly suggested migration path if you are using IBM HTTP Server powered by Domino.

1. **Are you affected?** Use the "as is" health check from http://www-03.ibm.com/systems/z/os/zos/installation/HTTP_Health_Checker.html
    - This check will simply tell you if you are using IBM HTTP Server powered by Domino.
2. **While on z/OS V1.13 or z/OS V2.1:**
    - Install IBM Ported Tools V1.3 HTTP Server (level 8.5.5, Apache level 2.2).
    - Migrate from IBM HTTP Server powered by Domino to the HTTP Server 8.5.5.
        - Use Redbook: **IBM HTTP Server on z/OS: Migrating from Domino-powered to Apache-powered** (REDP-4987)
        - Use z/OS UNIX Tools and Toys **ihsCMT** (http://www-03.ibm.com/systems/z/os/zos/features/unix/bpxa1ty2.html). This tool generates an approximation of an equivalent httpd configuration file for IHSA.
        - You can run the Domino and Apache servers side by side on z/OS V1.13 or V2.1.
            - z/OS Infoprint Server still needs the Domino server prior to z/OS V2.2!
3. **When installing z/OS V2.2:**
    - Migrate to IBM HTTP Server 9.0 (in the z/OS V2.2 base, Apache level 2.4).
        - Use "**Upgrading to 2.4 from 2.2**" http://publib.boulder.ibm.com/httpserv/manual24/upgrading.html .
        - Refer to http://www-01.ibm.com/support/knowledgecenter/SSEQTJ_8.5.5/com.ibm.websphere.ihs.doc/ihs/cihs_upgrading2.html for the general process on how to move from 8.5.5 to 9.0 (although the documentation does not yet discuss z/OS or 9.0).
    - Configure z/OS Infoprint Server (Infoprint Central) with APAR OA48654, PKI, and Library Server to use the new z/OS V2.2 HTTP Server.
    - Take advantage of the migration accommodation for "dual" IHSA (8.5.5 and 9.0), if necessary. Refer to WSC TechDoc (FLASH10857) for important usage details.

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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 later:
  - 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
  - Support for the BSAM and QSAM access methods (APAR OA42195 in 1Q2014)
  - DFSMSdss exploits 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 z/OS V2.1 PTF UA72749 which was available on March 13, 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 UA72250, the IBM Encryption Facility for z/OS (5655-P97) 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.

DFSMSdss exploits zEDCs, in 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**.

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   IBM

- **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)
            - Existing references to SYS1.FONTOLN should point to this data set now.
        - SYS1.SFONDLIB (previously existing, new to z/OS)
            - These data sets use approx. 2000 cylinders
        - /usr/lpp/fonts/worldtype/IBM/

    - Some fonts will use a new separately provided file system:
        - Mounted at /usr/lpp/fonts
        - Approx. allocation size of a font file system:
            - zFS: 2048 3390 cylinders
13   - HFS: 2028 3390 cylinders   © 2015 IBM Corporation

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.

If you have any existing references to the SYS1.FONTOLN data set, you should change them to reference the SYS1.SFNTILIB data set.

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 V2.1
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 V2.1
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

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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 R13 to z/OS V2.2. The removal of these functions may have migration actions which you can perform now, in preparation for z/OS V2.2.

- 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.
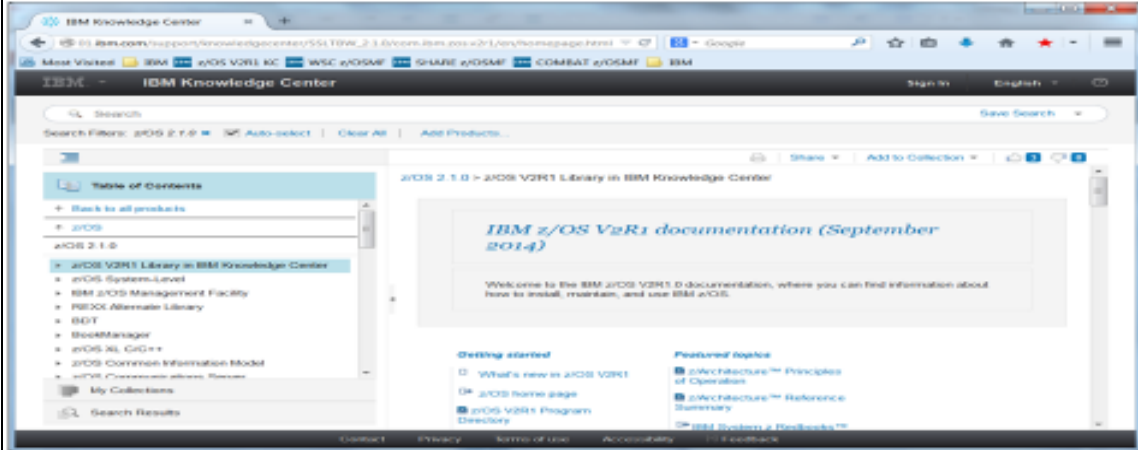
- z/OS R13 is the last release to provide the z/OS Capacity Provisioning support that utilizes the System z API for communication with the Support Element (SE) or Hardware Management Console (HMC). This protocol is based on IP network connection using SNMP. IBM recommends configuring the Capacity Provisioning 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 in z/OS V2R1 (last delivered in z/OS R13)

As of z/OS V2.1, product documentation has "gone 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 Knowledge Center delivery of the z/OS product documentation and discontinue the use of BookManager® format.

For users who do not need the entire product library, IBM plans to continue to provide PDFs for individual documentation download. You can download all the z/OS PDFs from a zipped file found in the IBM Publications Center at http://www-05.ibm.com/e-business/linkweb/publications/servlet/pbi.wss?CTY=US . Search for "SK4T-4949" to easily find the latest z/OS collection.

Element and Functions Withdrawn from z/OS V2R2

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.	z/OS V2.2
BookManager Build	Optional Feature.	z/OS V2.2
Simple Network Management Protocol (SNMP) subagent	Optional Feature – Infoprint Server. As an alternative to using a network management system to monitor PSF-controlled printers, you can use Infoprint Central	z/OS V2.2
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.	z/OS V2.2
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.	z/OS V2.2
JES2 z2 checkpoint level	Base Element support – migrate to z11 checkpoint level (in R11)	z/OS V2.2
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.*	z/OS V2.2

Withdrawn in z/OS V2R2 (last delivered in z/OS V2R1)

This section lists items that were withdrawn in z/OS V2R2. You should take this into account if you are migrating from z/OS R13 or V2.1 to z/OS V2.2. The removal of these functions may have migration actions which you can perform now, in preparation for z/OS V2.2.

- z/OS V2.1 Communications Server was 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 was 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 JSR 48-compliant implementation, is included in z/OS V1.13 and is included in z/OS V2.1. IBM recommends that users of SBLIM Version 1 convert to Version 2.
- z/OS V2.1 was the last release to include the **Simple Network Management Protocol (SNMP) subagent provided with Infoprint Server**, so you must take steps to stop using it. The SNMP subagent lets network management systems (such as Ricoh Network Printer Manager for the web) communicate with PSF-controlled printers that do not have internal SNMP agents. However, because most newer printers contain internal SNMP agents, network management systems can communicate directly with these printers. As an alternative to using a network management system to monitor PSF-controlled printers, you can use Infoprint Central, a web-based print management system. Infoprint Central can display the status of all your PSF-controlled printers. In addition, Infoprint Central lets you stop and start the printers, change printer work-selection criteria, and turn TCP/IP-connected printers online and offline.
  - You are using the SNMP subagent if the `start-daemons={snmpd}` attribute is specified in the Infoprint Server configuration file. The configuration file's default location is /etc/Printsrv/aopd.conf. However, you might have specified a different location in environment variable AOPCONF in the `aopstart` EXEC.
- z/OS V2.1 was 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. 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 was the last release to support the **z/OS BookManager Build** optional feature.

- z/OS V2.1 was 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 was 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.

Functions Planned to be Withdrawn
in the releases after z/OS V2R2...

|		
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 the release after z/OS V2.2
DFSMSdfp TSO/E-based System Data Mover (SDM) related commands, except for the query commands.	Base Element support :IBM recommends you use the REXX version of these commands instead. The query commands (CQUERY, FCQUERY, XQUERY, XSTATUS), and the XSET command will remain.	In the release after z/OS V2.2

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Planned for removal in the releases following z/OS V2R2

This section lists items that IBM has announced it intends to remove in the releases after z/OS V2R2. 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 V2.2 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 V2.2 is planned to be the last release to provide support in the Common Information Model (CIM) component for the Java Managed Provider Interface (JMPI).

- z/OS V2.2 is planned to be the last release to support the DFSMSrmm CIM Provider.

- z/OS V2.2 is planned to be the last release to include a number of TSO/E-based System Data Mover (SDM) related commands. Except for the query commands (CQUERY, FCQUERY, XQUERY, XSTATUS), and the XSET command, which will remain, IBM recommends you use the REXX version of these commands instead. For more information about using the REXX commands, see *z/OS DFSMS Advanced Copy Services.*
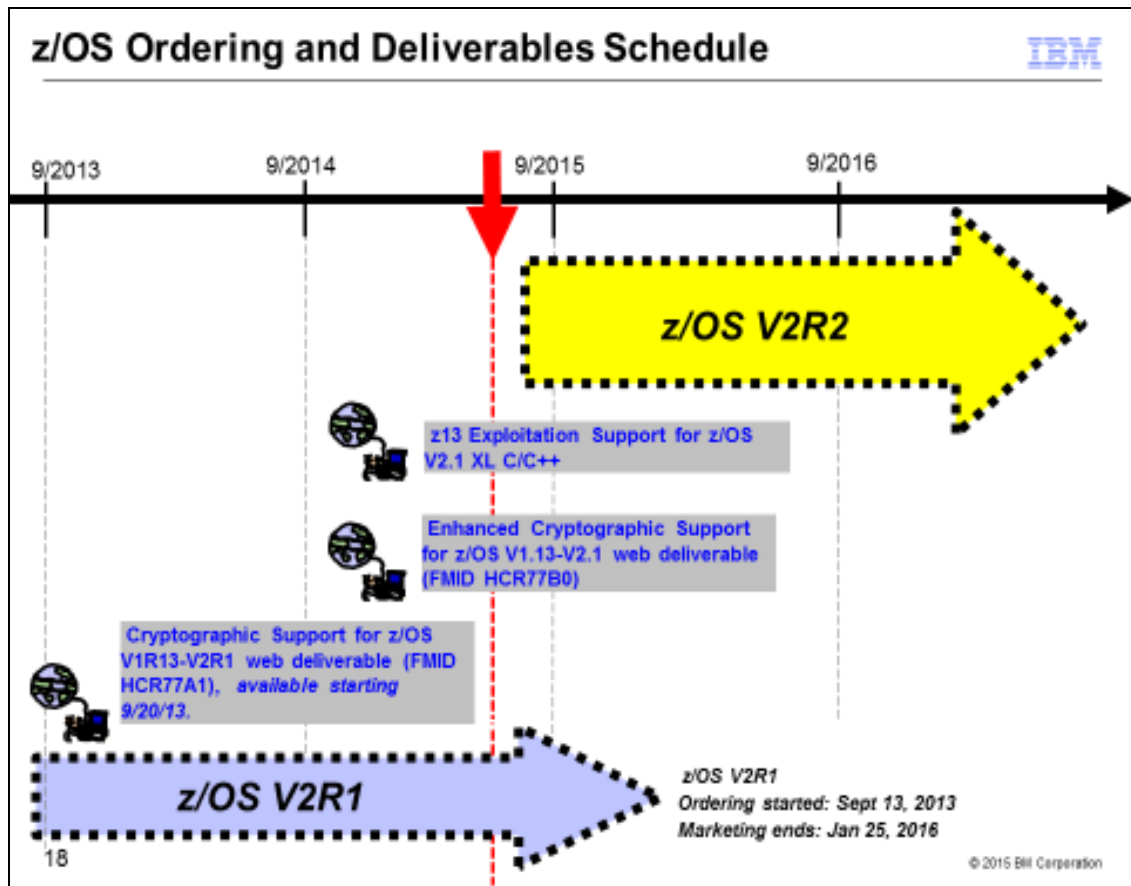
z/OS Ordering and Deliverable Key Dates

Key Dates for recent z/OS releases and functions:

- **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.
- **September 30, 2015:** GA planned availability
- **January 17, 2016**: Recommended last date for ordering z/OS V2R1.
- **January 31, 2016**: Last date for processing orders for z/OS V2R1 via ServerPac and CBPDO.
-

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 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.

Enhanced Cryptographic Support for z/OS V1.13-V2.1 Web deliverable (ICSF FMID HCR77B0, and incorporated into z/OS V2.2). This web deliverable supports z/OS V1.13 and z/OS V2.1. Two of the many enhancements found in this level of ICSF are:
- Exploitation of Crypto Express5S for the z13. This exploitation requires the Enhanced Cryptographic Support for z/OS V1.13 and z/OS V2.1 web deliverable.
- Sharing cryptographic coprocessors across a maximum of 85 domains for the z13. This support requires minimum MCL levels for Crypto Express4S and Crypto Express5S coprocessors and is also planned to be available for Cryptographic Support for z/OS V1R10 - z/OS V1R12 web deliverable and later with the PTFs for APAR OA44910.

z13 Exploitation Support for z/OS V2.1 XL C/C++ Web deliverable
z/OS V2.2 XL C/C++ supports the z13 processor, with ARCH(11) and TUNE(11) parameters designed to take advantage of the new instructions to better optimize your generated code. XL C/C++ will also be designed to support the single instruction, multiple data (SIMD) instructions provided with the z13 vector extension facility and corresponding vector programming language extensions, and the IBM MASS (Mathematical Accelerator Subsystem) and ATLAS (Automatically Tuned Linear Algebra Software) libraries.

The MASS library is intended for accelerated execution of elementary mathematical functions that serves as a higher-performance alternative to the standard math library that is part of the z/OS XL C/C++ Runtime. The ATLAS library is designed to provide linear algebra function support for BLAS (Basic Linear Algebra Subprograms) and LAPACK (Linear Algebra PACKage) functions routinely used in Business Analytics and Optimization solutions. These two libraries provide a powerful framework for development of new Business Analytics workloads, porting math-intensive workloads from other platforms, and accelerating Business Analytics workloads on z13.

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
z/OS V2R2	ICSF FMID HCR77B0 is incorporated.
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. •Enhanced Cryptographic Support for z/OS V1.13-V2.1 Web deliverable (FMID HCR77B0). 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. •Enhanced Cryptographic Support for z/OS V1.13-V2.1 Web deliverable (FMID HCR77B0). Does NOT 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 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
Enhanced Cryptographic Support for z/OS V1.13–V2.1 (FMID HCR77B0)	February 2015	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
Enhanced Cryptographic Support for z/OS V1.13–V2.1 (FMID HCR77B0)	February 2015	Web deliverable
z/OS V2R2, FMID HCR77B0 Incorporated	September 30, 2015	New release of products

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. (z/OS V2.2 itself requires an IBM z10 EC or z10 BC or later.)

Some popular (no-charge!) products for z/OS (5650-ZOS)

- **IBM Ported Tools for z/OS V1 R3 (5655-M23, 5655-M29)**
  - The base product includes OpenSSH and Xvfb. It is updated with newer version of the associated open source code for Open SSH: specifically 6.4p1.
  - The *IBM HTTP Server Feature* is at the V8.5.5 level.
  - http://www.rocketsoftware.com/portedtools/ has a port of bzip2, cURL, Perl, sudo, and PHP.

- **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)*
- *IBM 64-bit SDK for z/OS, Java 2 Technology Edition, V7.1 (5655-W44 , 5655-I48)* **
- *IBM 31-bit SDK for z/OS, Java 2 Technology Edition, V7.1 (5655-W43, 5655-I48)*
- *IBM 64-bit SDK for z/OS, Java 2 Technology Edition, V8 (5655-DGH , 5655-I48)*
- *IBM 31-bit SDK for z/OS, Java 2 Technology Edition, V8 (5655-DGG, 5655-I48)*

** *prereq for z/OS V2.2 z/OSMF*

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IBM Ported Tools for z/OS Version 1 Release 3 (5655-M23, 5655-M29), available February 20, 2015

IBM Ported Tools for z/OS is a program product available at no cost to you (for the product or for the feature). 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 OpenSSH and Xvfb in the base. The IBM HTTP Server 8.5.5 is a separate feature. See note below about withdrawal from marketing on April 30, 2014 for certain features.

For Version 1 Release 3 of the IBM Ported Tools for z/OS product, the base is updated to include a more current OpenSSH: 6.4p1.

Xvfb support is provided through FMID HVFB111, which is supplied when ordering the base product. This level is the same as what was in IBM Ported Tool for z/OS V1.2.

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 UNIX 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.   The IBM HTTP Server feature for IBM Ported Tools V1.3 is at the same level as for IBM Ported Tools V1.2. Note that there is a higher IBM HTTP Server planned to be provided in z/OS V2.2.

Features withdrawn from marketing on April 30, 2014

Some features of the IBM Ported Tools for z/OS have been withdrawn from marketing. They are:

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

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

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

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

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

IBM 31-bit SDK for z/OS, Java 2 Technology Edition, V7.0 (5655-W33, 5655-I48)
The 31-bit SDK for z/OS, Java Technology Edition Version 7 Release 0 has been enhanced to:
- Use the Java SE 7 APIs
- Enable your Java applications to exploit the zEC12 instruction set
- Exploit the capabilities available with z/OS V2.1, zEC12, and zBC12
- Improve application throughput without changes to application code
- Improve support for processing native data records and types directly from Java code

- Utilize enhanced monitoring and diagnostics
- 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, V7.0 (5655-W44, 5655-I48)

The 64-bit SDK for z/OS, Java Technology Edition Version 7 Release 0 has been enhanced to:
- Use the Java SE 7 APIs
- Enable your Java applications to exploit the zEC12 instruction set
- Exploit the capabilities available with z/OS V2.1, zEC12, and zBC12
- Improve application throughput without changes to application code
- Improve support for processing native data records and types directly from Java code
- Utilize enhanced monitoring and diagnostics
- Use enhanced z/OS Java unique security and JZOS functionality
- Have Java exploit added z196 instructions

IBM 31-bit SDK for z/OS, Java 2 Technology Edition, V7.1 (5655-W33, 5655-I48)

The 31-bit SDK for z/OS, Java Technology Edition Version 7 Release 1 has been enhanced to exploit the capabilities available with z/OS V2.1, zEC12, and zBC12, such as:
- Java exploitation of Transactional Execution
- Support of 2 GB pages
- zEnterprise Data Compression (zEDC)
- Shared Memory Communications over Remote Direct Memory Access (SMC-R)

IBM 64-bit SDK for z/OS, Java 2 Technology Edition, V7.1 (5655-W44, 5655-I48)

The 64-bit SDK for z/OS, Java Technology Edition Version 7 Release 1 has been enhanced to exploit the capabilities available with z/OS V2.1, zEC12, and zBC12, such as:
- Java exploitation of Transactional Execution
- Support of 2 GB pages
- zEnterprise Data Compression (zEDC)
- Shared Memory Communications over Remote Direct Memory Access (SMC-R)

IBM 31-bit SDK for z/OS, Java 2 Technology Edition, V8 (5655-DFH, 5655-I48) available March 6, 2015

The 31-bit SDK for z/OS, Java Technology Edition Version8 has been enhanced to:
- Deliver a comprehensive Java SDK at the SE level 8 for the IBM(R) z/OS platform
- Include the enhancements to z/OS Java unique security and JZOS functionality
- Exploit new capabilities available with z/OS V2.1 and V2.2, as announced in Software Announcement 215-006, dated January 14, 2015,and IBM z Systems z13, as announced in Hardware Announcement 115-001, dated January 14, 2015.
- Provide improved performance using the Data Access Accelerator API for processing native data records and types directly from Java code
- Provide enhanced monitoring and diagnostics
- Contain the JZOS and z/OS unique security enhancements of previous z/OS Java SDK products.

IBM 64-bit SDK for z/OS, Java 2 Technology Edition, V8 (5655-DGG, 5655-I48) available March 3, 2015

The 64-bit SDK for z/OS, JavaTechnology Edition, Version 8 has been enhanced to (similar to the 31-bit SDK V8):
- Deliver a comprehensive Java SDK at the SE 8 level for the IBM(R) z/OS platform
- Include the enhancements to z/OS Java unique security and JZOS functionality
- Exploit new capabilities available with z/OS V21. and V2.2, as announced in Software Announcement 215-006, dated January 14, 2015,and IBM z Systems z13, as announced in Hardware Announcement 115-001, dated January 14, 2015.
- Provide improved performance using the Data Access Accelerator API for processing native data records and types directly from Java code
- Provide enhanced monitoring and diagnostics
- Contain the JZOS and z/OS unique security enhancements of previous z/OS Java SDK products.

End of Service Dates for Older IBM XML and Java 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 Service Policy

IBM

- **Priced service extensions available for older releases:**
  - R12: IBM Software Support Services from 1 Oct 2014 through 30 Sept 2017
- With the V2 release cycle, 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 V1R12	24 Sept 2010	Occurred on 30 Sept 2014 **IBM Software Support Services until 30 Sept 2017**
z/OS V1R13	30 Sept 2011	Announced to be Sept 2016
z/OS V2R1	30 Sept 2013	Planned to be Sept 2018 (5 years!)
z/OS V2R2	Planned for Sept 2015	Planned to be Sept 2020 (5 years!)

LOOK!

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Service Policy

With the two-year z/OS release frequency, the z/OS support policy is five years of z/OS support, with three years of optional extended service (5+3).

Beginning with z/OS V1.12, IBM Software Support Services replaces the IBM Lifecycle Extension for z/OS offering with a service extension for extended support coverage, IBM Software Support Services. (The z/OS Lifecycle Extension had been offered, which would allow you to purchase up to two additional years of correction service.) Going forward, when support for a z/OS release is withdrawn, IBM Software Support Services intends to provide service extension support for the given z/OS release for up to three years. The intention is to provide an accommodation where additional time is needed to migrate to a newer z/OS release within the service support period. This does not alter the z/OS coexistence, migration, fallback, or service policy.

z/OS 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. This extension allows for some time (12 months) to migrate from z/OS V1R13 to V2R2.

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 RSM Enablement Offering for z/OS R13 which was provided for z/OS R13.

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. If you require support for defects for z/OS V1R7 beyond September 2010, contact an IBM representative for a special bid.
z/OS V1R8	29 September 2006	Occurred 30 September 2009 * *The "z/OS V1.8 Lifecycle Extended Service" offering expired on 30 September 2011. If you require support for defects for z/OS V1R8 beyond September 2011, contact an IBM representative for a special bid.
z/OS V1R9	28 September 2007	Occurred 30 September 2010 * *The "z/OS V1.9 Lifecycle Extended Service" offering expired on 30 September 2012. If you require support for defects for z/OS V1R9 beyond September 2012, contact an IBM representative for a special bid.
z/OS V1R10	26 September 2008	Occurred 30 September 2011 * *The "z/OS V1.10 Lifecycle Extended Service" offering expired on 30 September 2013. If you require support for defects for z/OS V1R10 beyond September 2013, contact an IBM representative for a special bid.
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. *See "IBM Software Support Services for z/OS V1.11" below for a fee-based accommodation, through 30 September 2016.
z/OS V1R12	24 September 2010	Occurred 30 September 2014 *See "IBM Software Support Services for z/OS V1.12" below for a fee-based accommodation, through 30 September 2017
z/OS V1R13	30 September 2011	Extended from September 2014 to September 2016 (announced)
z/OS V2R1	30 September 2013	Planned for September 2018
z/OS V2R2	Planned for September 2015	Planned for September 2020

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.

IBM Software Support Services for z/OS V1.11 – October 1, 2014 through September 30, 2016
IBM Software Support Services replaces the IBM Lifecycle Extension for z/OS offering with a corrective service extension for extended support coverage. The IBM Software Support Services for z/OS V1.11 is provided for up to two years, beginning October 1, 2014 and available through September 30, 2016.

This service extension support for V1.11 requires a minimum three month purchase and offers flexibility in support of your individual migration plans, either for single machines or for machines configured within a Parallel Sysplex. When purchased, the service extension must be ordered for all machines running z/OS V1.11 at a given physical location, either for individual IBM z/Architecture machines or for one or more IBM z/Architecture machines within a qualified Parallel Sysplex.

IBM Software Support Services for z/OS V1.12 - through September 30, 2017
Starting October 1, 2014, IBM will offer a fee-based, corrective service extension for up to a three-year period following the z/OS V1.12 discontinuance of program services (September 30, 2014).

Service extension support for V1.12 requires a minimum three month purchase and offers flexibility in support of your individual migration plans, either for single machines or for machines configured within a Parallel Sysplex. When purchased, the service extension must be ordered for all machines running V1.12 at a given physical location, either for individual IBM z/Architecture machines or for one or more IBM z/Architecture machines within a qualified Parallel Sysplex.

z/OS V2R2 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 V2R2 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 V2R2 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 V2R2 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 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. While z/OSMF is a separate program product, 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 V2R2 is coexistence, fallback, and migration supported with the following two z/OS releases: V1R13 and V2R1**. This means that:

- Coexistence of a V2R2 system with a V1R13 or V2R1 system is supported.

- Fallback *from* V2R2 *to* V1R13 or V2R1 is supported.

- Migration *to* V2R2 *from* V1R13 or V2R1 is supported.

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.
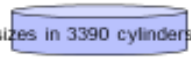
Releases that are coexistence, fallback, and migration supported as of z/OS R10

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 was September 30, 2013. R12 is the oldest release that is service supported at that time and therefore the oldest release that is coexistence, fallback, and migration supported with V2R1.
V2R2	V2R2, V2R1, R13	General availability for V2R2 is planned for September 2015. R13 is the oldest release that is service supported at that time and therefore the oldest release that is coexistence, fallback, and migration supported with V2R2.

Positioning for z/OS V2.2

- **Read Documentation and PSP buckets**
  - *z/OS V2.2 Migration* and *z/OS V2.1 Planning for Installation*
  - Software PSP buckets: ZOSV2R2: ZOSGEN, SERVERPAC, ...
  - Must use FIXCATs for coexistence verification.
  - Remember: V2.2 publications are in KnowledgeCenter and PDFs

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

sizes in 3390 cylinders	z/OS R13	z/OS V2R1	z/OS V2R2
Target libraries (PDS and PDSE)	5,868	11,051	11,169
DLIB	8,941	17,960	16,746
Root file system	3,293 (HFS) 3,309 (zFS)	3,300 (HFS) 3,319 (zFS)	5,200 (HFS) 5,219 (zFS)
Font file system	-	2,048 (HFS or zFS)	2,048 (HFS or zFS)

The 3390-9 capacity is 10,017 cylinders.

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Positioning for z/OS V2.2

- **Ensuring System Requirements Are Satisfied**
  - *Driving System Requirements*
    - Requirements to install z/OS V2.2
    - No change there:
      - A coexisting system level suffices: z/OS R13 or higher
  - **Position for secure electronic delivery!**

  - *Target System Requirements*
    - Product requirements for running on z/OS V2.2
    - Hardware and Software

  - *Coexistence System Requirements*
    - Allows z/OS V2.2 to coexist with other z/OS systems

- **Migration Actions You Can Do NOW**

- **Using Programmatic Assistance – Health Checks and Workflow**

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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 V2R2 Migration*
* *z/OS V2R2 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 R2 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 V2.2 PSP bucket is ZOSV2R2. 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 ZOSV2R2 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:
* 2964DEVICE for the z13 server.
  * The FIXCAT names are IBM.Device.Server.z13-2964.RequiredService, IBM.Device.Server.z13-2964.Exploitation, and IBM.Device.Server.z13-2964.RecommendedService.
* 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.
  - o 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.
  - o The FIXCAT name is IBM.Device.Server.zBX-2458.
- 2097DEVICE for the z10 EC server.
  - o The FIXCAT name is IBM.Device.Server.z10-EC-2097.
- 2098DEVICE for the z10 BC server
  - o The FIXCAT name is IBM.Device.Server.z10-BC-2098.
- 2094DEVICE for the z9 EC server
  - o The FIXCAT name is IBM.Device.Server.z9-EC-2094.
- 2096DEVICE for the z9 BC server
  - o 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 estimated total storage required for z/OS V2.2 data sets is provided below.

For z/OS V2R2:

- The total storage required for all the target data sets is approximately 11,169 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 V2R2.**

- The total storage required for all the distribution data sets is approximately 16,746 cylinders on a 3390 device.

- The total root file system storage is approximately at 5,200 cylinders on a 3390 device when it is an HFS and 5,219 when it is a 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.

- For configuration and execution, additional file system space is needed:

  - 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 94 cylinders primary, 10 cylinders secondary (either HFS or zFS).

  - For Predictive Failure analysis, a separate file system, either HFS or zFS, is created and mounted at mountpoint the /var/pfa. The total space required for zFS or HFS is 300 cylinders primary; 50 cylinders secondary.

- For z/OSMF additional file system space is needed. Refer to your ServerPac installation or sample jobs provided.

- 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 V2R2 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.

As of z/OS V2R2, the Customized Offerings Driver Installation Guide is no longer shipped in hardcopy format. Instead, this publication is shipped in PDF format on a separate DVD.

The Customized Offerings Driver includes a zFS file system 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 V2R2

Driving system requirements for installing z/OS V2R2 by way of ServerPac or dump-by-data-set SystemPac are:

- *An operating system:* Use either of the following:
  - A supported z/OS release (V1R13 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.
  - Note that ServerPac supports extended format and extended addressability for zFS data sets. For any zFS data sets that exceed the 4 GB size limit, you must define an SMS Data Class with extended format and extended addressability. Doing so will require that you specify an SMS Data Class name (defined with extended format and extended addressability) in the CustomPac Installation dialog. For information about providing the Data Class information, see *ServerPac: Using the Installation Dialog*.

- *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 V2R2 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*.

If you intend to receive your order using Standard FTP (FTP):
- SMP/E V3R6 or higher
- ICSF configured and active or IBM 31-bit SDK for z/OS, Java Technology Edition V6.0 (5655-R31), or IBM 64-bit SDK for z/OS, Java Technology Edition V6.0 (5655-R32), or higher, installed which enables SMP/E to calculate SHA-1 hash values to verify the integrity of data being transmitted. If ICSF is not configured and active, SMP/E will use its Java application class instead for calculating the SHA-1 hash values. 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*).
- 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 through a local firewall, you must identify these commands for later use in the CustomPac Installation Dialog, which manages the download of your order.

If you intend to receive your order using Secure FTP (FTPS):
- SMP/E V3R6 or higher
- ICSF configured and active or IBM 31-bit SDK for z/OS, Java Technology Edition V6.0 (5655-R31), or IBM 64-bit SDK for z/OS, Java Technology Edition V6.0 (5655-R32), or higher installed, which enables SMP/E to calculate SHA-1 hash values to verify the integrity of data being transmitted. If ICSF is not configured and active, SMP/E will use its Java application class instead for calculating the SHA-1 hash values. 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*).
- 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 through a local firewall, you must identify these commands for later use in the CustomPac Installation Dialog, which manages the download of your order.
- Ensure that the Root 2 - GeoTrust Global CA Certificate is connected to your security manager keyring and trusted on your system, and that the user ID that executes SMP/E is authorized to use the keyring.
- Ensure that your FTP.DATA data set statements used in the RECEIVE job are set appropriately for your environment. For example, an FTPKEEPALIVE statement with a value of 0 (the default) can cause an FTP control connection to time out in some environments. Also, the security manager keyring file specified by the KEYRING statement in the FTP.DATA file might require certificates to be added. For details about specifying FTP.DATA statements, see *z/OS Network File System Guide and Reference*.

If you intend to download your order using HTTP Secure (HTTPS):
- SMP/E V3R6 with PTFs UO01693 (Base), UO01695 (Japanese), and UO01741 (Base) or higher
  - SMP/E uses the services of IBM 31-bit SDK for z/OS Java Technology Edition V6.0 (5655-R31), or IBM 64-bit SDK for z/OS Java Technology Edition V6.0 (5655-R32) or higher.
- 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.
- Proper level of CustomPac Installation Dialog to support HTTPS downloads. The CustomPac Installation Dialog must be at a level of 26.20.00 or higher. For further details see "Updating Your Dialogs" and "required migration step" in *ServerPac: Using the Installation Dialog*.
- HTTP or SOCKS Proxy Server configuration. If your enterprise requires specific commands to allow the download of your order through an HTTP or SOCKS Proxy Server, you must identify these commands for later use in the CustomPac Installation Dialog, which manages the download of your order.
- Ensure that the Root 2 - GeoTrust Global CA Certificate is connected to your security manager keyring or stored in your default Java keystore file and trusted on your system, and that the user ID that executes SMP/E is authorized to use the keyring or default Java keystore file.

- For instructions on how to set up and verify that your system can connect to the IBM download servers, see the Connectivity Test for SW Download Readiness web site.
- For more information about how to set up FTPS or HTTPS, see *SMP/E for z/OS User's Guide.*

If you intend to receive your 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 V2R2 (and Installing CBPDO)

After installing via ServerPac, you will eventually want to install service on your z/OS V2R2 system. The driving system to install service on your z/OS V2R2 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 V2R2 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 V2R2 Wave 0:

- z/OS R13 or later.

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

z/OS V2R2 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 R13, except that the **program binder**, **HLASM**, and **SMP/E** must be at the current (V2R2) 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 V2R2 program binder and z/OS V2R2 SMP/E (V3R6) in the Wave 0 target system's SYS1.MIGLIB data set. You should STEPLIB to z/OS V2R2 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 V2R2 CBPDO: Driving System Wave 2

In Wave 2 you install the z/OS V2R2 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 for Secure z/OS Software Delivery

IBM has added HTTPS (HTTP using Secure Sockets Layer) support for secure software and service delivery on October 19, 2014.

To use HTTPS direct-to-host downloads, you need to:
- have SMP/E V3.6 with PTFs UO01693 (Base) and UO01695 (Japanese) or higher
- have CustomPac Installation Dialog level 26.20.00 or higher
- set up a keyring and enable the CA (Certificate Authority) certificate that is used by the IBM download server or use the Java keystore file
- provide the appropriate HTTPS proxy or SOCKS proxy options if required for your environment.

IBM plans to remove support for unsecured FTP connections used for z/OS software and service delivery 1Q2016. At that time, it is planned that new z/OS software (products and service) direct-to-host downloads will require the use of FTPS (File Transfer Protocol, supporting the Transport Layer Security (TLS) and Secure Sockets Layer (SSL) cryptographic protocols) or HTTPS (Hypertext Transfer Protocol Secure, supporting the TLS and SSL cryptographic protocols).

If you plan to use FTPS or HTTPS, IBM recommends that you visit the Connectivity Test website to verify your system setup well in advance. No change is required to use Download Director with encryption to download packages to a workstation and transfer them to z/OS later; 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?lang=en_US&source=cbct

If you are not already using FTPS for software and service delivery, IBM recommends that you implement support in your network environment for either FTPS or HTTPS for direct-to-host connections as soon as possible to assure a smooth transition. Download Director with encryption, an alternative download method you can use to download packages to a workstation and transfer them to z/OS later, is not affected by this change and is planned to remain available.

Download instructions can be found in the Internet Delivery Installation Checklist file for your order type in the Shopz Help and on the Shopz download page for your order. Additional information can be found in the "Download to Host Install Instructions" README file on the Shopz download page for your ServerPac or SystemPac order. In addition to existing support for magnetic tape and DVD, the CustomPac installation dialog used for ServerPac or SystemPac installation will allow you to specify which download method to use, prompt for the appropriate information, and create the RECEIVE job accordingly

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 V2R2 supports these System z server models:

- IBM z13
- IBM zEnterprise zBC12 and zEC12
- IBM zEnterprise 196 (z196) and IBM zEnterprise 114 (z114)
- IBM System z10 EC and System z10 BC

The following IBM System z servers, and earlier servers, are not supported with z/OS V2R2 and later releases:

- IBM System z9 EC and System z9 BC
- 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 V2R2 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

(As of V2.1, z/OS 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/systems/z/advantages/pso/cftable.html

If you are moving your coupling facilities and the coupling facility structures will be on higher CFCC levels than they were previously, run the Coupling Facility Structure Sizer (CFSIZER) tool to find out if you have to increase coupling facility structure sizes. Prepare to make the necessary changes to the CFCC level as indicated by the tool.
You can download the CFSIZER tool at Coupling Facility sizer (http://www.ibm.com/systems/support/z/cfsizer/).

Note: After you make a coupling facility available on the new hardware, you can run the Sizer utility, an authorized z/OS program, to evaluate structure size changes. The Sizer utility is distinct from CFSizer, and should be run after the new hardware (CFLEVEL) is installed, but before any CF LPAR on the new hardware is populated with structures. You can download the Sizer utility at http://www.ibm.com/systems/support/z/cfsizer/altsize.html.

- IBM z13 servers ship with CFCC level 20.
- IBM zEnterprise zEC12 servers initially shipped with CFCC level 18. After Sept 2013, the zEC12 and zBC12 ship at CFCC level 19.
- z114 and z196 servers ship with CFCC level 17.

As it has been since CFCC Level 17, ensure that the CF LPAR has at least 512MB of storage. Also, if you have not installed the preconditioning and exploitation PTFs necessary for your new CFCC level, note that those PTFs are required to be installed throughout your sysplex before you can implement that CFCC Level. (Use the FIXCAT for the appropriate level of server hardware to identify the coexistence CFCC PTFs.)

Software Requirements for z/OS V2R2
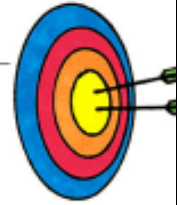
- **Software Requirements:**
  - **Coexistence** Software (on other z/OS systems)

  - **Target** Software (correct levels of IBM non-z/OS and non-IBM products on the z/OS system)
    - Generally, you may use the product levels on z/OS V2R2 from your prior system, as long as those product levels are still service-supported.

    - Note, however, that if you are using any of the functions in *z/OS V2R2 Planning for Installation*, Appendix B, **verify that those functional requirements are satisfied.**

    - z/OS V2R2 has an overall dependency on IBM 64-bit SDK for z/OS, Java Technology Edition, V7.1 (5655-W44) and IBM 31-bit SDK for z/OS, Java Technology Edition, V7.1 (5655-W43). For the specific Java dependencies for each element, see *z/OS V2R2 Planning for Installation*, Appendix B.

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

For a list of independent software vendors (ISVs) that support z/OS, a link is intended to be provided from this website after z/OS V2.2 is GA: http://www.ibm.com/systems/z/os/zos/features/software/isv220.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*

Selected z/OS V2R2 SW Functional Requirements
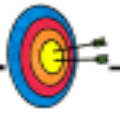
Function	Minimum functional dependency
z/OSMF	IBM 64-bit SDK for z/OS, Java Technology Edition, V7.1 (SR3) (5655-W44)
BCP Predictive Failure Analysis (PFA)	IBM 31-bit SDK for z/OS, Java 2 Technology Edition, V7.1 or later
IP Services: SNMP NetView client support	Tivoli NetView for z/OS V5 (5697-ENV) R3 or later.
DFSMSdfp: full support in exploiting PDSE member generations with ISPF	IBM Data Set Commander V8.1 (5635-ISP) is beneficial
DFSMSdss: IMS backup-while-open support	Database Manager feature of IMS V12 (5635-A03) or later
HCD: migrate from the active switch configuration or to activate a switch configuration. And to perform the verification/priming function of the active I/O configuration	Tivoli System Automation for z/OS (5698-SA3)
Knowledge Center for z/OS	IBM 64-bit SDK for z/OS, Java Technology Edition, V7.1 (5655-W44)
Infoprint Server: Infoprint Central	One of the following: – IBM 31-bit SDK for z/OS, Java Technology Edition, V7.1 (5655-W43) – IBM 64-bit SDK for z/OS, Java Technology Edition, V7.1 (5655-W43)

→ Use FIXCAT `IBM.TargetSystem-RequiredService.z/OS.V2R1`
→ Website http://www-306.ibm.com/software/support/lifecycle/ can be helpful.
→ Use z/OSMF's Software Management report to help identify installed products that are approaching or are at EOS.

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

You must determine the minimum product release levels and release levels for functional requirements. IBM middleware and application products require a specific level (version, release, or PTF) so that the products will run on z/OS V2R2. You cannot use the FIXCAT support to determine these release levels. Instead, you can refer to *z/OS V2.2 Planning for Installation,* Appendix B, for the functions of z/OS that require specific z/OS optional features, IBM middleware products, or IBM application products.

If you are upgrading from z/OS V1R13 or z/OS V2R1, you may use the product levels on z/OS V2R2 that you used on your prior z/OS release, as long as the product levels are still service-supported. Note, however, that if you are using any of the functions in *z/OS V2.2 Planning for Installation,* Appendix B, and those functions have dependencies on IBM middleware or application products, you must use the product levels shown (or later).

Many of these products can be ordered as part of your z/OS ServerPac order. Note that there may be differences between what is minimally service supported, what is minimally supported with z/OS V2R2, and what is currently orderable.

If you're migrating to z/OS V2R2, you can find out which products have new levels by using ShopzS 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.

Finding End of Service Dates for IBM 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 V2R2

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 <u>minimum or functional level</u> for z/OS V2R2.**

```
++HOLD(HKM5530) FIXCAT FMID(HKM5530) REASON(AA48261)
RESOLVER(UA77930) CATEGORY(IBM.TargetSystem-
RequiredService.z/OS.V2R2) DATE(15188).
```

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

```
SET BDY(GLOBAL).      /* Your Omegamon z/OS V5.3 global */

REPORT MISSINGFIX ZONES(OMEGTGT)

FIXCAT(IBM.TargetSystem-RequiredService.z/OS.V2R2).
```

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Programmatic Help with Target System PTF Verification for z/OS V2.2
The PTFs needed to support z/OS V2.2 are identified with a FIXCAT called **IBM.TargetSystem-RequiredService.z/OS.V2R2,** in Enhanced HOLDDATA. You must 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 V2R2.

Using FIXCAT for coexistence PTFs for z/OS V2R2

For coexistence verification for z/OS V2R2, the fix category of interest is **IBM.Coexistence.z/OS.V2R2**. 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/OS V2R1 as well as z/OS V2R2 on your z/OS R13 system, your command could be:
```
REPORT MISSINGFIX ZONES(ZOSR13T) FIXCAT(IBM.Coexistence.z/OS.V2R*,
                                        IBM.Function.HealthChecker).
```

Some Migration Tasks You Can Do NOW

1. **Transition off of removed functions and elements:**
   - <u>In V2.1:</u> BPX.DEFAULT.USER, zFS multi-fs, Windows-based CPCC and
   - <u>In V2.2:</u> IBM HTTP Server Domino->Apache, JES2 z2, …
   - <u>Beyond V2.2:</u> Consoles shared mode
2. **Review documentation and PSP buckets, when available.**
3. **Prepare Driving and Target Systems:**
   - Driving systems – note regular ftp delivery removal in 1Q2016
   - Target systems -
     - On the hardware server level?
     - DASD storage for z/OS V2R2 – much more space!
     - IBM product level research: FIXCAT IBM.TargetSystem-RequiredService.z/OS.V2R2
     - ISV research for z/OS V2R2
   - Coexisting systems - FIXCAT IBM.Coexistence.z/OS.V2R2 (and others!)
4. **Use IBM Health Checker for z/OS** FIXCAT IBM.Function.HealthChecker
   - Activate the Migration Health Checks (they are shipped INACTIVE).
5. **If you have z/OSMF V2.1, use the z/OS V2.2 Migration Workflow**
6. **Perform z/OS V2R2 migration actions you can do NOW.**

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Prepare for your migration to z/OS V2.2!
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 V2R2 migration smooth. Listed above are a recap of 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

1. ZOSMIGREC_ROOT_FS_SIZE
2. XCF_SYSPLEX_CDS_CAPACITY
3. RSM_MEMLIMIT
4. IOS_FABRIC_MONITOR
5. SUP_HiperDispatchCPUConfig
6. CNZ_CONSOLE_OPERATING_MODE
7. ZOSMIGV2R1_CS_LEGACYDEVICE
8. ZOSMIGV2R1_CS_GATEWAY
9. ZOSMIGV2R2_Next_CS_SENDMAILDAEMN
10. ZOSMIGV2R2_Next_CS_SENDMAILCLIEN
11. ZOSMIGV2R2_Next_CS_SENDMAILMTA
12. ZOSMIGV2R2_Next_CS_SENDMAILMSA
13. ZOSMIGV2R2_Next_CS_SMTPDDAEMON
14. ZOSMIGV2R2_Next_CS_SMTPDMTA
15. ZOSMIGV2R1_DEFAULT_UNIX_ID
16. ZOSMIGREC_ZFS_RM_MULTIFS
17. ZOSMIGV1R11_CS_DNSBIND9
18. DMO_REFUCB
19. JES2_Z11_Upgrade_CK_JES2
20. JES3_DATASET_INTEGRITY
21. SUP_SYSTEM_SYMBOL_TABLE_SIZE
22. CEE_USING_LE_PARMLIB
23. SDSF_ISFPARMS_IN_USE
24. USS_HFS_DETECTED
25. ZFS_VERIFY_ CACHESIZE
26. VSM_CSA_CHANGE
27. ICSFMIG77A1_CCA_COPROCESSOR_ACTIVE
28. ICSFMIG77A1_TKDS_OBJECT
29. ZOSMIG_HTTP_SERVER_DOMINO

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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.

For z/OS, the convention is **ZOSMIGVvvRrr**_*component_program_name* The names of migration checks begin with the characters **ZOSMIG**. Following this prefix is a value to help you plan the timing of the migration action, as follows:

- **ZOSMIGVvRr_Next :** Migration action is recommended, but will become a required migration action in the release after V*v*R*r*.
- **ZOSMIGVvRr_Next2 :** Migration action is recommended, but will become a required migration action two releases after V*v*R*r*.
- **ZOSMIGVvRr :** Migration action is required in the release indicated by V*v*R*r*.
- **ZOSMIGREC :** Migration action is recommended for the foreseeable future. The migration action might never be required.
- **ZOSMIGREQ :** Migration action that is recommended now, but will be required in a future release.

For the ICSF element, the convention is **ICSFMIGnnnn**_*component_program_name*).

Migration checks have 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!*

For description of the health checks above, which release they run on, and their severity refer to the *Health Checker User's Guide.*

Using z/OSMF V2.1 for z/OS V2.2 migration!

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z/OS Downloads site (As-Is Downloads) contain z/OSMF workflow
files which are derived from the z/OS V2.2 Migration book.

- **If you use z/OSMF V2.1, use the V2.2 migration workflow right away!**
  - Can use the workflow from the beginning of your z/OS V2.1 migration planning activities, *instead of the book*.
  - Read the text accompanying the download to understand the benefits, and known observations.

- New features in the z/OS V2.2 Migration Workflow!
  - Invocation of health checks to determine migration applicability.
    - A health check exception will mark the workflow step as failed, until re-run as successful.
  - Ability to optionally provide feedback on your migration experience.
    - Provide feedback on every migration action, and on the migration as a whole, if you desire.
    - You can still complete each step without providing any feedback.

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z/OS V2.2 Migration Workflow

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Health checks on several migration actions:

Mini-wizard to submit a job to run the health check, and analyze the output.

Introducing another advancement in z/OS migration assistance!

We have copied the z/OS V2.2 Migration book into two z/OS Management Facility (z/OSMF) z/OS Migration Workflows. (One for the V2R1 to V2.2 path, one for the V1.13 to V2.2. path.) Using the z/OSMF workflow, you can go through a z/OS V2.2 migration as an interactive, step-by-step process. Depending on your z/OS V2.2 migration path, you select the files you will need. If you do not download all necessary files, your workflow cannot be created.

The Workflow XML documents are identical to the z/OS Migration book (GA32-0889), meaning the book contains identical information to the Workflow XML documents. However, in z/OS V2.2 the z/OS V2.2 Migration Workflow now has the capability to invoke IBM Health Checker for z/OS health checks directly from the step, and also provides the optional capability to give feedback on your migration experience. As the z/OS V2.2 Migration book is updated, the corresponding z/OSMF Workflow files are planned to be updated. Check the level of the Workflow document to see what the corresponding level of the book is.

This tool is not supported by the IBM Service organization but rather by the tool owner on a best-can-do basis. Please report any problems, suggestions, or comments to zosmig@us.ibm.com.
If you would like to see a short demo on using the z/OS V2.1 migration workflow, visit IBM® z/OSMF V2.1 Migration Workflow Demo on YouTube.

Current z/OS V2.2 Migration Workflow level: 01 (July 28, 2015), which corresponds to the z/OS V2.2 Migration book (GA32-0889-05). You can easily see which book level your workflow corresponds to by selecting the highest level step 1 through step 3 in the workflow. On the General tab in the Description of those major tasks, you will see the following: This z/OSMF Workflow was derived from the *Migration from z/OS V2R1 and z/OS V1R13 to z/OS V2R2*, GA32-0889-05. . On the "Migration: Introduction" General tab, you will see the Summary of Changes, which lists the changes between this workflow and any prior levels of the workflow.

Migration Workflow Tips
1. To be consistent with the book, the workflows include some migration actions shown as "None" for components that do not have any migration action. "None." still counts as a workflow sub-task to

complete, even though there is no migration action to perform. To complete the sub-task, mark the migration action sub-tasks with an "Override-complete" to have them designated as complete.

2. The URL links to the documentation in the workflow cannot go to an anchor in the web page. The URLs will just bring you to the web page, not content that may be further down in the page. You may have to scroll down on the web page to find the information that you need.

3. Some migration actions have associated health checks. For those steps, the health check will be invoked to determine if the migration action is applicable to your system. Read the instructions carefully on the Perform tab before running the health check, as important information is provided for each check.

4. For each migration action and for the entire migration, you can optionally provide your feedback to IBM. Just follow the instructions you see in z/OSMF. You do not need to provide feedback to complete each step of the workflow.

5. At this point, you cannot copy an existing workflow into a new or existing workflow. Take this into consideration if you wish to upgrade a workflow to a higher level when one is provided. This means that you should use the latest level of the workflow for your z/OS V2.2 migration. If subsequent levels of the workflow are released after you've already started, you can refer to those levels of the z/OS V2.2 Migration book and see (from the Summary of Changes) those migration actions that are not accounted for in your existing workflow. We recognize the need to "update" a migration workflow.

For those migrating from z/OS V2.1 to V2.2, download each of these three files as <u>binary</u> from the website, and store them in the same directory. The files you'll need are:

From z/OS V2.1 to V2.2 Migration Workflow for z/OSMF XML file zosV2.1tov2.2_migration_workflow01.xml (1.6 MB)	2015-07-28
Feedback template for the z/OS V2.1 to V2.2 Migration Workflow file migration_feedback_gather_zos_v2r1.txt (229 KB)	2015-07-28
Text file used for invoking health checks in the workflow HC_rexx.txt (21 KB)	2015-07-28

ServerPac Migration Action – Already done?

- 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 for FTPS downloads, and 26.20.00 for HTTPS downloads.
  - 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.

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 must update the CustomPac Installation Dialog to level 26.20.00 or higher in order to support Secure HTTP (HTTP using Secure Sockets Layer or HTTPS). 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.

Updating your ServerPac dialogs 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 is no 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

Newer ServerPac Install Enhancements

- **ServerPac in z/OS V2R2:**
  - Provide updated jobs, documentation to aid in the installation of V2R2 z/OSMF core function
  - Provide new dialog variables and a new job to customize z/OSMF environment variable file.
    - You can use this optional job in case you do not want to use default values shipped with Environment file.
  - Provide support to specify if SMF Logstream or SMF Dataset is to be used in Full System Replacement install path.
  - Supports extended format and extended addressability for zFS data sets.
    - For any zFS data set that exceeds 4GB size, you must define an SMS data class with extended format and extended addressability.
  - Provide Support to set up Knowledge Center for z/OS.

- **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.

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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 nw 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.

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

- **Changing content of z/OS V2R2**
  - New z/OS V2.2 content: z/OSMF, IBM HTTP Server Apache, OpenSSH, KC.
  - New z/OS V2.1 content: zEDC and z/OS Font Collection
  - Prepare now for removed V2.2 content: **IBM HTTP Server (Domino),** ...
- **Timeline of z/OS ordering and deliverables:** associated products to consider
- **z/OS Policies**
  - z/OS V2R2 Coexistence-Migration-Fallback from z/OS V2.1 or z/OS R13.
- **Ensuring System Requirements are Satisfied**
  - Driving, Target SW, Target HW, and Coexisting System Requirements
    - Bigger z/OS root file system
    - z/OS V2.2 requires z10 or higher.
    - Target system requirements: general Java SDK V7.1 functional requirement.
    - Software delivery – HTTPS avail, regular FTP planned to be removed 1Q2016.
    - Use FIXCATs `IBM.TargetSystem-RequiredService.z/OS.V2R2`,
      `IBM.Coexistence.z/OS.V2R2, IBM.Function.HealthChecker,`...
- **Use IBM Health Checker for Migration Actions:** Install and activate checks
- **Use z/OSMF Workflow for z/OS V2.2 migration:** Goodbye, book!
- **Migration action on ServerPac dialog:** required if not already done
- **ServerPac enhancements:** SMF to logstream, z/OSMF set up, KC set up, >4GB zFS

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