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IBM Advanced Technical Support – Washington Systems Center

# Software for the 2094: z/OS, z/VM, VSE, TPF, Linux on System z9





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## Topics

- **z/OS**
  - Software levels
  - Service
  - HCD
  - Sysplex
  - Crypto
  - OSA-Express2
  - Ordering
- **z/VM**
- **Linux on System z9**
- **VSE and TPF**

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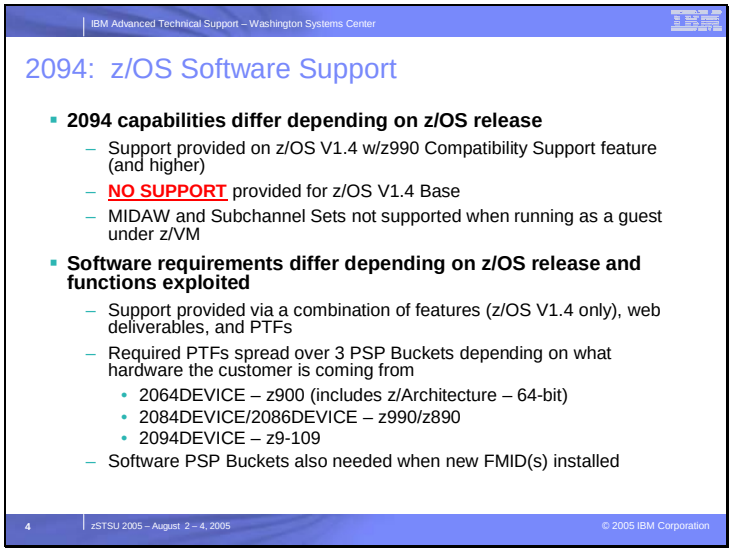


The z/OS capabilities that you have on the z9-109 server depend on the level of z/OS that you execute on the z9-109. More z/OS capabilities exist on the higher z/OS releases than on the lower z/OS releases.

The lowest support z/OS release for the z9-109 is z/OS V1R4 with the z990 Compatibility feature. The z990 Compatibility feature is no longer orderable, and has been replaced with the z990 Exploitation feature. The z990 Exploitation feature remains orderable until December 2006. All z/OS V1R4 orders placed after 24 February 2004 automatically included the z990 Exploitation feature.

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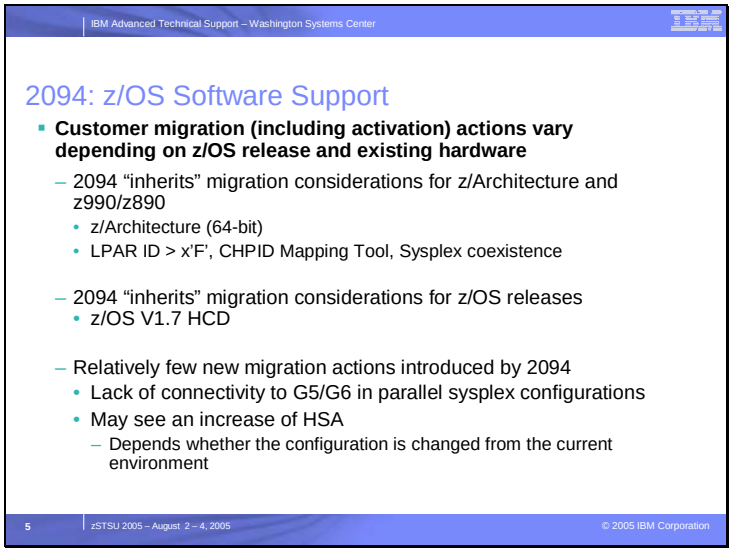


**z990 and z890 basis:** Migration to z9-109 has as its basis, the migration to z990 and z890, which in turn had as its basis a migration to z900 and z800. If you are migrating to a z9-109 from z990 or z890 (and have performed the migration actions associated with z990 or z890), then you have fewer migration actions than those that are coming from servers older than z990 or z890 and have not yet performed the migration actions associated with z990 or z890.
It is important to note that you can migrate directly to a z9-109 without going through to intermediate servers, but you still do need to ensure that any migration considerations are satisfied for those servers that you "skipped".

The support (excluding the cryptographic support) for the z9-109 is delivered entirely via service, unlike the support that was required for the z890 and z990. The z890 and z990 support was delivered with service **and** FMIDs (Web deliverables and features). The crypotographic support for the z9-109, as well as for the z890 and z990, continues to be FMIDs many of which are available in Web deliverables.

**z990 "Inherited" Migration Considerations**

**Migration Actions To Be Documented in**

- *z/OS and z/OS.e Planning for Installation*
- *z/OS Migration*

**Update CFRM Policies**

If Coupling Facility image resides on z990, then LPAR ID (from HMC Image Profile) is used in CFRM policy
In order to use an LPAR ID > 15 (X'F'), z990 Compatibility (or Exploitation) code is required on all systems in the sysplex
Use SETXCF START,POLICY,TYPE=CFRM command to make the updated policy active

**Update Automation for new and changed messages**

Several messages and command output updated for 2 digit LPAR IDs

**Notify those affected by changed command output**

**Update PARMLIB Members**

- IPCS Support - new ICSF member, CSFIPCSP

- With Exploitation, IEASYSxx - the CMB= parameter is now ignored
- May affect user and vendor programs
- IEAOPTxx ECMB=NO NOT supported in z/OS V1.7 and higher
- With Exploitation, IEASYSxx - you may need to increase (by 1) the value of MAXCAD.
- With Exploitation, SMFPRMxx - the description of the serial number in the SID parameter changed when running on a z990.

**Perform Miscellaneous Migration actions**

- Rebuild Standalone Dump
- OSA/SF new GUI requires Java 1.1.2 help files and Java 1.4 run-time library loaded on the workstation

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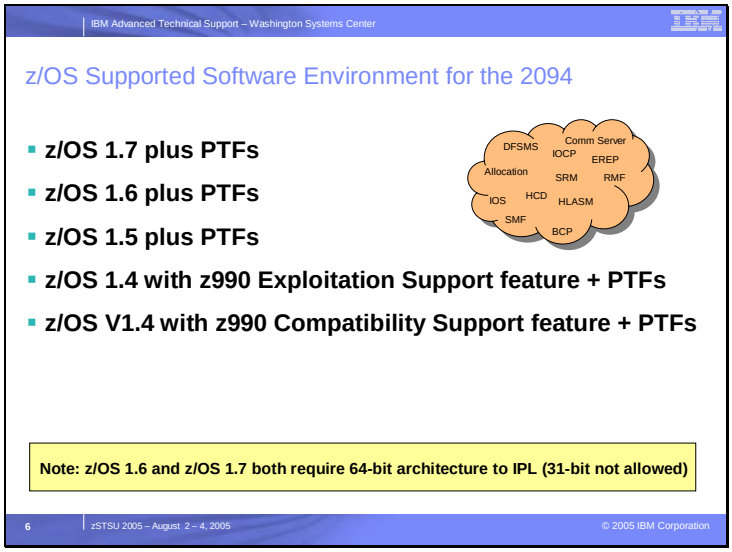


These are the supported z/OS levels which can run on a 2094 (z9-109). It does not imply all 2094 functions are available in all z/OS supported releases. The next several charts will identify what functions each release is limited to.

Bimodal Migration Accommodation is not available for z/OS 1.5, therefore z/OS 1.5 can only run in 64-bit mode on a z9-109, z990 and z890.

z/OS 1.4 z990 Compatibility Support feature is not longer available. This function is included in the z/OS 1.4 z990 Exploitation Support feature.

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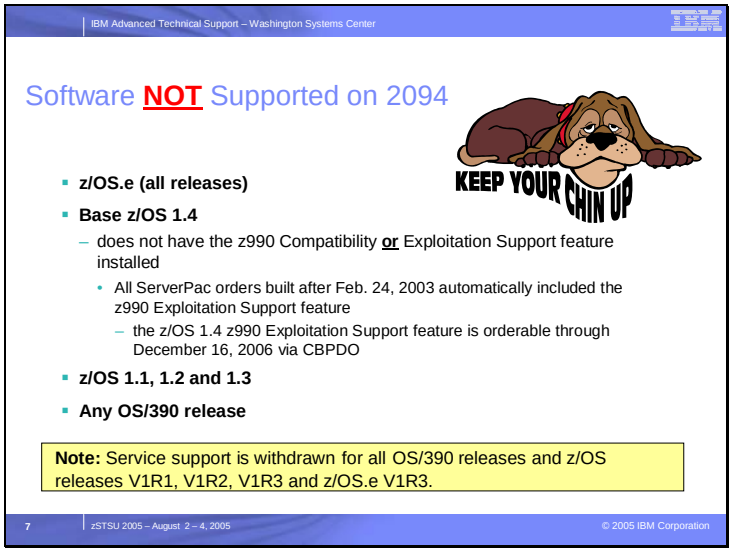


The z990 Compatibility Support is included in the z990 Exploitation Support feature. And, is integrated in all z/OS releases beginning with z/OS 1.5.

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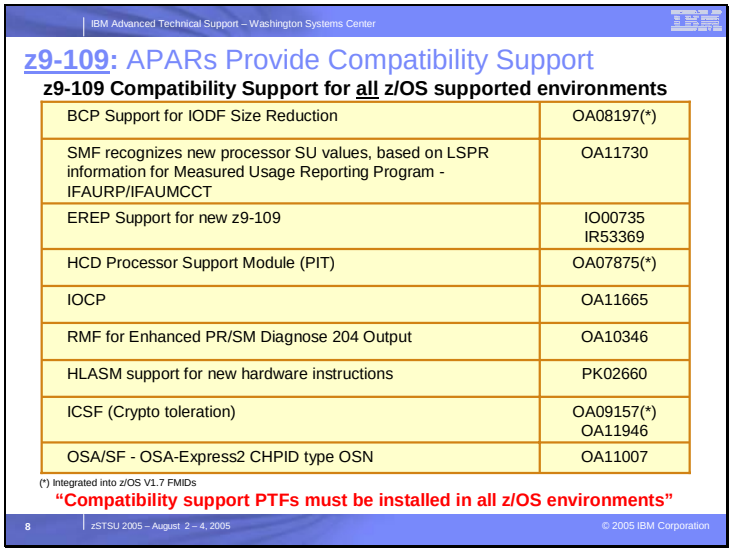


These 2094 compatibility APARs are applicable to all z/OS environments supported on the 2094. These are in addition to any other APARs/PTFs listed for specific function support.

Crypto customers with ICSF base web deliverable *(z990 Cryptographic Support* or *z990/z890 Enhanced Cryptographic Support)* installed require APARS OA09157 and OA11946 to tolerate Crypto Express2 (Coprocessor or Accelerator); exploitation of Crypto Express2 Accelerator is not allowed.

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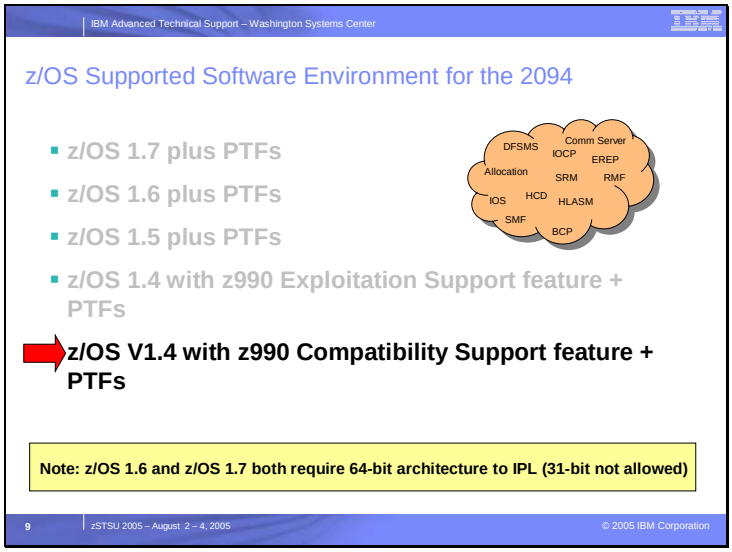


Now we will see what specific functions are provided with each z/OS supported environment beginning with the lowest common denominator – z/OS 1.4 with the z990 Compatibility Support feature installed.

z/OS 1.4 z990 Compatibility Support feature is not longer available. This function is included in the z/OS 1.4 z990 Exploitation Support feature.

Let's take a look at what functions are supported when just this feature is installed on a z/OS 1.4 base; with or without

- Bimodal Migration Accommodation
- Console Enhancement feature

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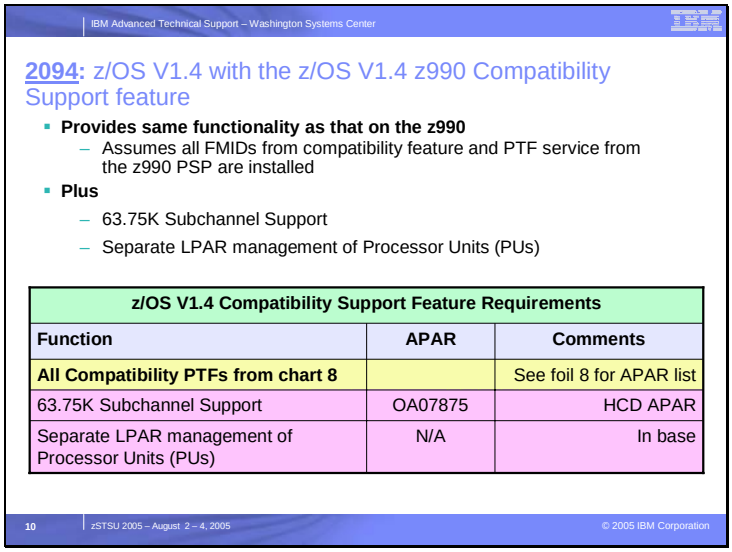


Those functions available on the z990 with just the z/OS 1.4 z990 Compatibility Support feature installed are carried forward to the 2094. The same restrictions apply on the 2094:

- Can only IPL in LCSS0 (unless z/VM)
- LPAR id must be <=x'F'
- <= 15 LPARs

**63.75K subchannels:** zSeries addresses a maximum of 64K subchannels in subchannel set 0 (zero) with 1024 (1K) of these previously reserved for system use. IBM is making available 768 of these 1K reserved subchannels for customer use. The increased addressable storage this represents may be significant. For example, if you are using 3390 volume sizes and have 768 volumes of 54GB/volume, this represents 41 terabytes of increased storage addressability (54GB/volume * 768 volumes = 41 TB). In addition, the IBM TotalStorage DS8000 series can be defined to attach 63.75K unit addresses. Now with 63.75K in the host, there is symmetry between the server and storage subsystems. 63.75K subchannels is exclusive to z9-109, is supported by all channel types, and by z/OS and z/VM.

**Request Node Identification Data (RNID) - designed to assist with the isolation of ESCON and FICON cabling-detected errors**: In a fiber optic environment, with extended distances, resolution of cabling problems can be a challenge. The operating system can request the RNID data for a specified device/control unit for each device/control unit attached to ESCON or native FICON channels and display the RNID data using an operator command.

RNID is exclusive to z9-109, is supported by ESCON, FICON Express2, and FICON Express features when configured as CHPID type FC, and by z/OS.

**Separate PU management - new flexibility for managing Processor Units (PUs)**: PUs defined as Internal Coupling Facility (ICF) processors, Integrated Facility for Linux on System 9 (IFL) processors, or zSeries Application Assist Processors (zAAPs) can now be managed separately. In the past, ICF processors, IFL processors, and zAAPs were grouped together for allocation within and across the LPARs.

The separate management of PU types enhances and simplifies capacity planning and management of the configured LPARs and their associated processor resources.

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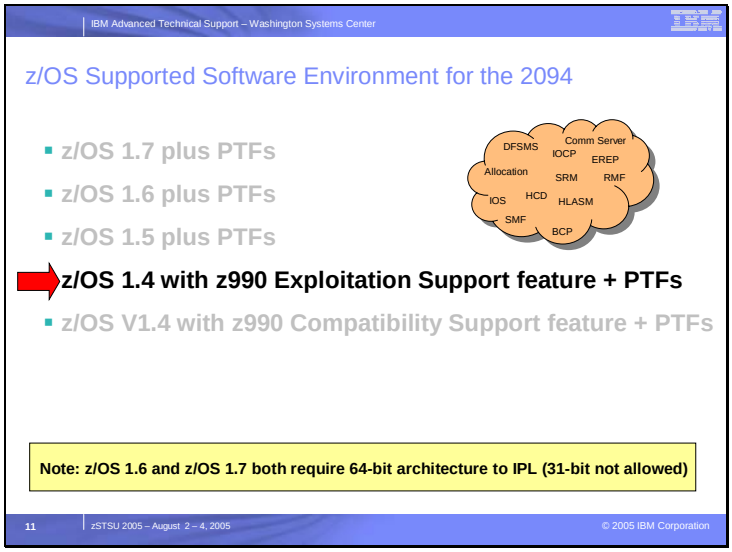


z/OS 1.4 z990 Exploitation Support feature is orderable via CBPDO through December 2006. This feature was automatically included in all ServerPac orders since February 24, 2004.

Let's take a look at what functions are supported when just this feature is installed on a z/OS 1.4 base; with or without

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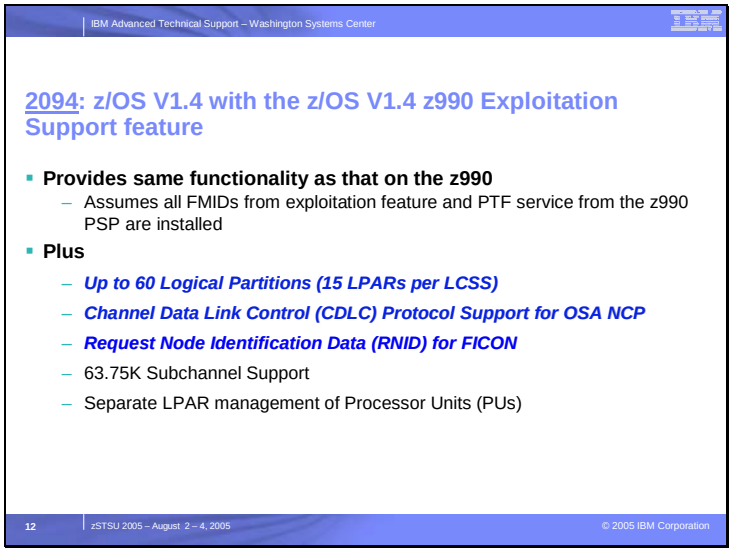


Those functions available on the z990 with just the z/OS 1.4 z990 Exploitation Support feature installed are carried forward to the 2094:

- IPL with any LCSS
- IPL with any LPAR ID
- ECMB (Extended Channel Measurement Block)
- External Spanned Channels

**60 Logical Partitions**

IBM is once again doubling the number of Logical Partitions (LPARs). You now havethe ability to define up to 60 LPARs, the ability to define up to 60 LPARs, 15 LPARs per Logical Channel Subsystem, which may provide you even more flexibility to allocate hardware resources. With Processor Resource/Systems Manager (TM) (PR/SM) (TM) and Multiple Image Facility (MIF) you can share ESCON and FICON channels, ISC-3s, and OSA ports across LPARs. Support for up to 30 LPARs became available October 2003. Support of up to 60 LPARs is exclusive to the z9-109 and is supported by z/OS, z/VM, z/VSE, TPF, z/TPF, and Linux on System z9. Introduction of 60 LPARs satisfies the

Statement of General Direction in Hardware Announcement 103-142, (RFA38035) dated May 13, 2003.

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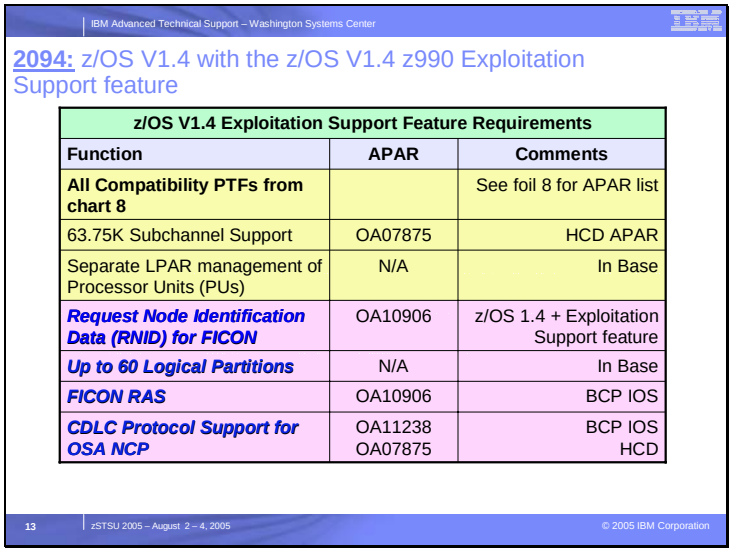


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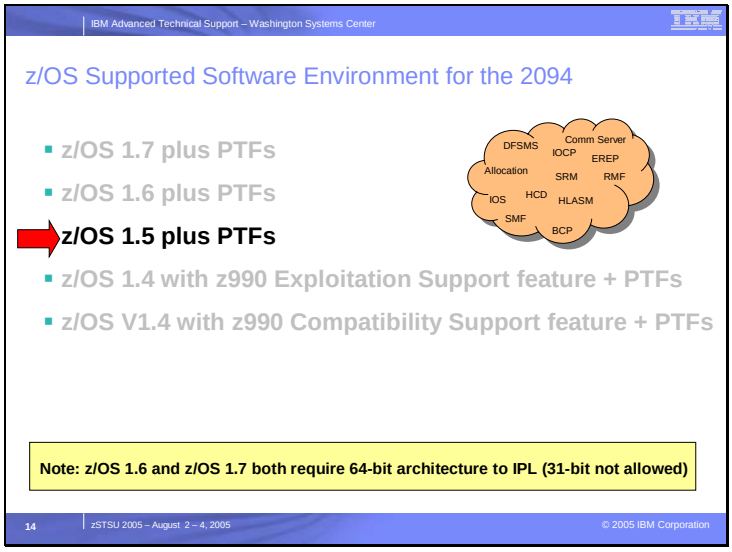


z/OS 1.5 is no longer orderable. z990 Compatibility and Exploitation Support is integrated in the base.

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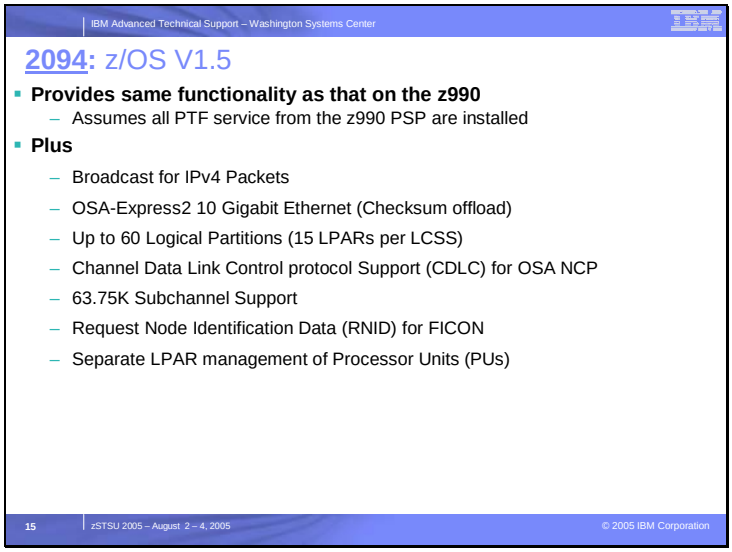


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**OSA-Express2 10 Gigabit Ethernet LR (#3368)** on z9-109 9 requires at a minimum: Supporting CHPID type OSD only for z/OS V1.5 (for Checksum offload). The OSA-Express2 10 Gigabit Ethernet (GbE) long reach (LR) feature has one port per feature and is designed to support attachment to a 10 Gigabits per second (Gbps) Ethernet Local Area Network (LAN) or Ethernet switch capable of 10 Gbps. OSA-Express2 10 GbE LR supports CHPID type OSD exclusively. It can be defined as a spanned channel and can be shared among LPARs within and across LCSSs.

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## 2094: z/OS V1.5

| z/OS V1.5 Requirements | | |
|---|---|---|
| **Function** | **APAR** | **Comments** |
| **All Compatibility PTFs from chart 8** | | See foil 8 for APAR list |
| 63.75K Subchannel Support | OA07875 | HCD APAR |
| Request Node Identification Data (RNID) for FICON | N/A | In Base |
| Separate LPAR management of Processor Units (PUs) | N/A | In Base |
| Up to 60 Logical Partitions | N/A | In Base |
| FICON RAS | OA10906 | BCP IOS |
| CDLC Protocol Support for OSA NCP | OA11238<br>OA07875 | BCP IOS<br>HCD |
| Broadcast for IPv4 Packets | N/A | z/OS 1.5 Base |
| OSA-Express2 10 Gigabit Ethernet (Checksum offload) | N/A | z/OS 1.5 Base |




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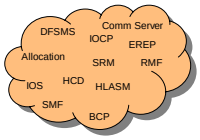
## z/OS Supported Software Environment for the 2094

- z/OS 1.7 plus PTFs
- **z/OS 1.6 plus PTFs**
- z/OS 1.5 plus PTFs
- z/OS 1.4 with z990 Exploitation Support feature + PTFs
- z/OS V1.4 with z990 Compatibility Support feature + PTFs




**Note: z/OS 1.6 and z/OS 1.7 both require 64-bit architecture to IPL (31-bit not allowed)**




z/OS 1.4 z990 Compatibility and Exploitation Support feature are integrated in the z/OS 1.6 base.

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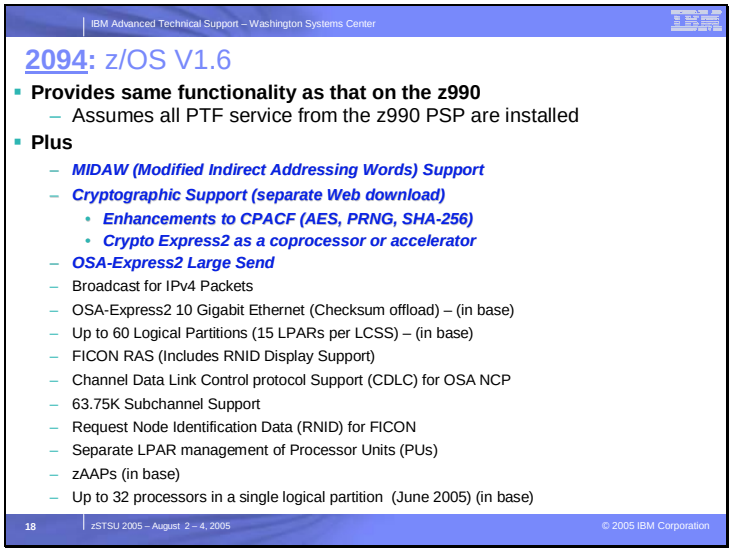


**MIDAW (modified indirect addressing words) support:** Indirect Addressing (IDA) provides virtual storage access for channel programs. z9-109 processors implement a new function for channel programming, modified indirect addressing words (MIDAWs). MIDAWs can be used to move data over FICON channels, which can provide substantially better response time while increasing overall channel bandwidth. MIDAWs exploitation by z/OS is expected to improve performance for some DB2 table scan, DB2 sequential prefetch, BSAM, and extended-format data set operations by reducing system overhead for I/O requests on z9-109 processors, with no application changes.

**Cryptographic support:** Integrated Cryptographic Service Facility (ICSF) supports the cryptographic functional updates provided by 2094 servers, including:
Crypto Express2 fast path operations (the acceleration mode for SSL/TLS operations and digital certificate operations), which were previously done in the PCICA card. This allows customers to migrate from PCICA to the X Crypto Express2.
Support for clear key AES and SHA-256 cryptographic algorithms.
These functions are designed to allow customers to exploit new high-capacity hardware and a more robust development environment, in order to help grow existing applications and deploy new applications.

This support is provided by a new web download – this support is not integrated in z/OS V1.6. The web download is called *Cryptographic Support for z/OS v1.6 and V1.7* and may be obtained

from http://www.ibm.com/eserver/zseries/zos/downloads. It will replace web download *ICSF 64-bit Virtual Support for z/OS V1R6 and z/OS.e V1R6.*

**Support for OSA-Express2 large send:** Communications Server exploits OSA-Express2 large send (also referred to as TCP segmentation offload) for IPv4 traffic. Large send can improve performance by offloading outbound TCP segmentation processing from the host to OSA-Express2 by employing a more efficient memory transfer into OSA-Express2.

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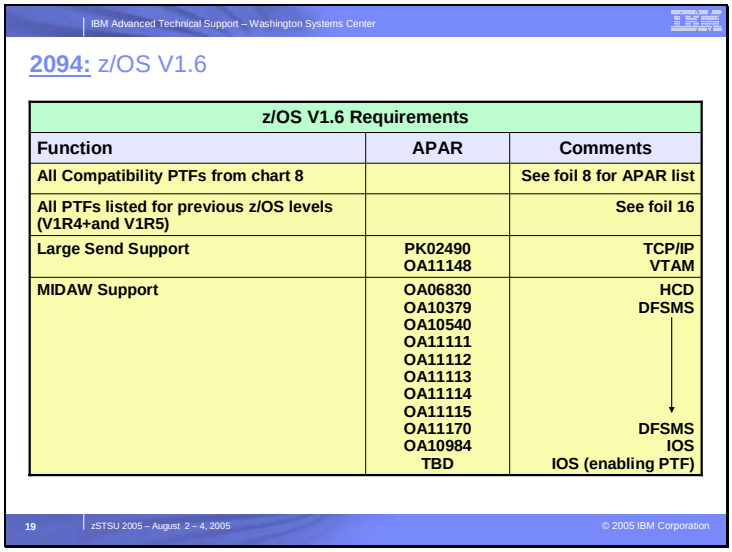


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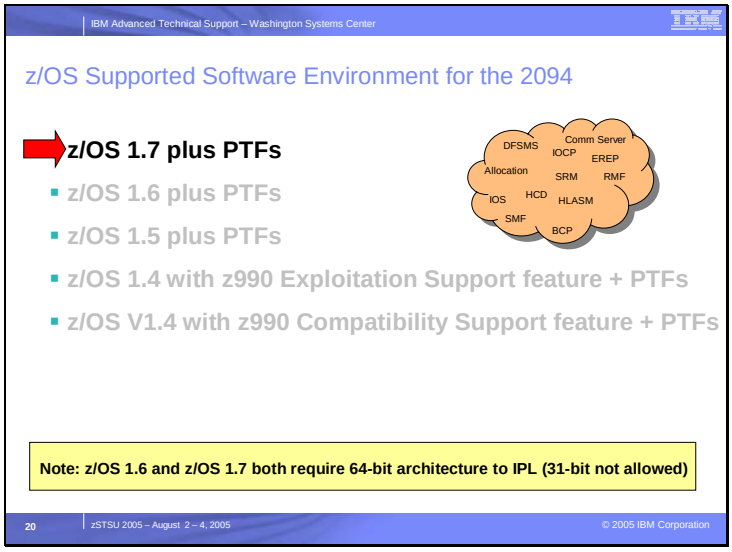


z/OS 1.7 is being announced on July 26, 2005 along with 2094 and z/VM 5.2. Some functions for z/OS 1.7 have been previewed in previous announcement letters, 204-180 (August 10, 2004) and 205-034 (February 15, 2005). This section is only going to focus on those functions delivered with z/OS 1.7 in support of the 2094.

General Availability of z/OS 1.7 is September 30, 2005.

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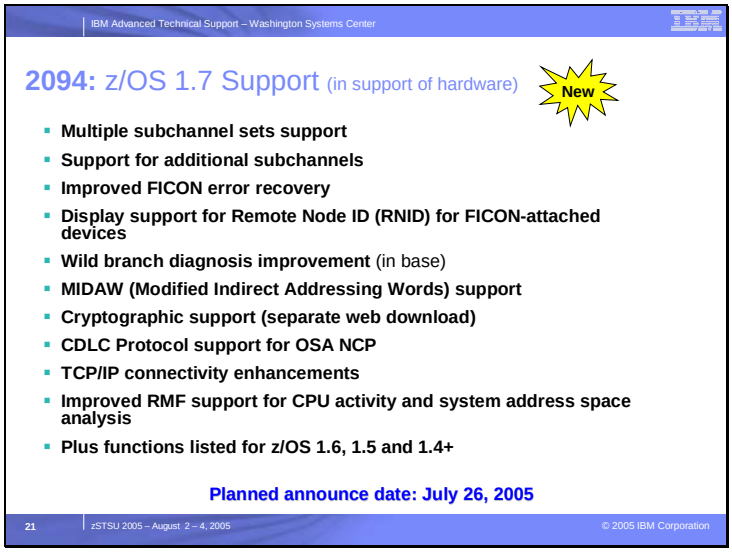


**Multiple subchannel sets support** provides a second set of subchannels for defining Parallel Access Volume (PAV) aliases. This new function can help provide relief from the 64K device limit by allowing multiple paths to a device to be defined without consuming additional device numbers for each alias.

**Support for additional subchannels on 2094 servers: 2094** servers make an additional 768 subchannelsavailable, making it possible to define up to 65,280 devices for each z/OS LPAR.

**Improved FICON error recovery:** Some problems can cause FICON links to fail and recover many times in a short period. This can cause system recovery actions to be repeatedly driven while substantially reducing throughput for those links. New 2094 processor function combined with z/OS V1.7 I/O recovery processing improvements are designed to make it possible for the system to detect these conditions and keep an affected path offline until a repair action can be taken. This is expected to help limit the performance impacts of these failures.

**Display support for Remote Node ID (RNID) display for ESCON-attached and FICON-attached devices:** In a fiber optic environment, the resolution of cabling problems can be a challenge, particularly when devices are located some distance from the processors to which they are attached. In z/OS V1.7, the output of the DISPLAY MATRIX operator command (D M=DEV) includes RNIDs to help make it easier to diagnose these problems by making additional information, such as a device's serial number, available.

**Wild branch diagnosis improvement:** A new hardware function stores the address of the last successful branch instruction on 2094 servers. z/OS V1.7 is designed to include this information in dumps, which can make it easier to find a program that branches to an unexpected location. This can help decrease problem determination time, improve the quality of failure diagnosis, and enhance the probability of first failure fault isolation.

**OSA CDLC support:** OSA CDLC support is provided for z/OS and the IBM Communication Controller for Linux on System 9. This support is designed to allow z/OS to continue to communicate with an external network using channel data link control (CDLC) architecture, providing an alternative to a SNA network.

**RMF support for >16-way processors - Report adaptation:** RMF support for greater than 16 processors in a z/OS image was made available in z/OS V1.6. In z/OS V1.7, improved support is provided for CPU activity and system address space analysis.

**TCP/IP connectivity enhancements:** HiperSocket interfaces now support IPv6. This enhancement allows IPv6 communications between LPARs for z/OS TCP/IP stacks and Linux for zSeries TCP/IP stacks. It also expands IPv6 connectivity options between TCP/IP stacks in a sysplex when DYNAMICXCF is configured.

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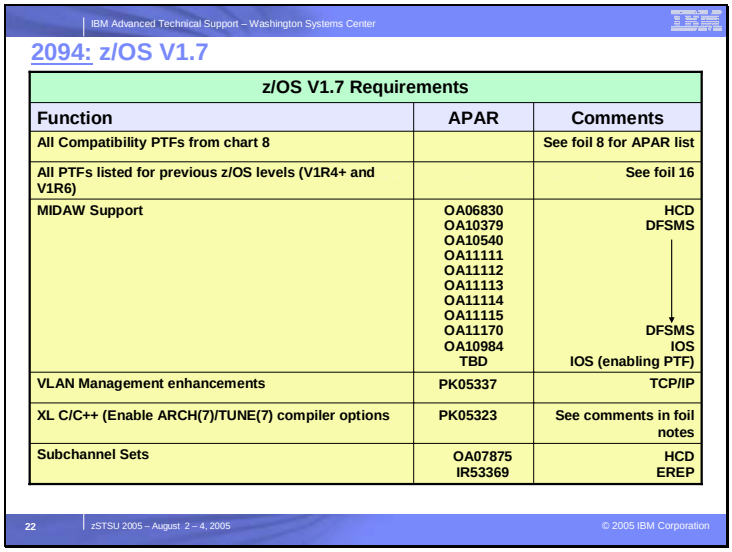


C/C++ customers shouldn't use the ARCH(7)/TUNE(7) parameters until they are sure that the compiled code will only run on a z9-109 (including DR sites).

**XL C/C++:** As of z/OS V1.7, the z/OS C/C++ compiler has been renamed to z/OS XL C/C++. The XL C and XL C++ compilers that are part of the C/C++ without Debug Tool optional priced feature of z/OS allow you to write code that follows the current ISO/IEC International Standards. XL C/C++ offers you the flexibility to compile your code using the language level that meets your needs and is

designed to improve usability and portability of programs across different platforms.

**Note: C/C++ ARCH(7) and TUNE(7) options:** The ARCHITECTURE C/C++ compiler option selects the minimum level of machine architecture on which your program will run. Note that certain features provided by the compiler require a minimum architecture level. ARCH(7) exploits instructions available on z9-109. For more information, refer to the ARCHITECTURE compiler option in *z/OS XL C/C++ User's Guide*.

The TUNE compiler option allows you to optimize your application for a specific machine architecture within the constraints imposed by the ARCHITECTURE option. The TUNE level must not be lower than the setting in the ARCHITECTURE option. For more information, refer to the TUNE compiler option in *z/OS XL C/C++ User's Guide*.

***Exploitation Restriction*:** Once you exploit the C/C++ ARCH(7) or TUNE(7) option, those programs may only run on z9-109 servers, or an operation exception will result. This is a consideration for programs that may run on different level servers, and during fallback or disaster recovery.

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## 2094: OSA-Express2

| 2094 OSA-Express2 Requirements | | |
|---|---|---|
| **Function** | **APAR** | **Operating System** |
| OSA-Express2 Large Send | Yes | z/OS 1.6 and higher |
| OSA-Express2 Gigabit Ethernet LX for CHPID OSD | n/a in base | z/OS 1.4 w/Compatibility and higher |
| CHPID OSN in support of OSA-Express2 OSN | Yes | z/OS 1.4 w/Exploitation and higher |
| OSA-Express2 1000BASE-T Ethernet CHPIDs OSC, OSD, OSE | n/a In base | z/OS 1.4 w/Compatibility and higher |
| CHPID OSN in support of OSA-Express2 OSN | Yes | z/OS 1.4 w/Exploitation and higher |
| FICON Express 2 CHPID FC | n/a In base | z/OS 1.4 w/Compatibility and higher |
| OSA-Express2 10 Gigabit Ethernet LR CHPID OSD | n/a in base | z/OS 1.4 w/Compatibility<br>z/OS V1.5 for Checksum Offload |
| VLAN management enhancements for OSA-Express2 and features for CHPID OSD | n/a In base | z/OS V1.7 |




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## 2094: HCD


- **New HCD FMID (HCS7720) shipped in z/OS 1.7**
  - Required for z/OS 1.7
  - Requires an upgrade to V5 if updates to IODF are needed
    - Size of IODF reduced significantly
    - Once z/OS V1R7 is running, updates are only allowed to an IODF that has been upgraded to the V5 level
- **2094 HCD support for pre-z/OS 1.7 systems**
  - **APAR OA08197** for z/OS 1.4, z/OS 1.5 and z/OS 1.6
    - HBB7707 PTF UA17026
    - HBB7708 PTF UA17027
    - HBB7709 PTF UA17028

    → **BCP IOS**
  - **APAR OA07875** → HCD (applies to z/OS 1.4+, z/OS 1.5 and z/OS 1.6)
    - An IODF generated with HCS7720 (z/OS 1.7) can be used for IPL and dynamic I/O for z/OS 1.4, 1.5 and 1.6
    - Build IOCDS includes both devices in SS-0 and SS-1
    - Devices in SS-1 are ignored for z/OS 1.4+, 1.5 and 1.6.




Note: z/OS 1.4+: either compatibility or exploitation support feature is installed (not z/OS 1.4 base).

Upgrade IODF to V5 is only in z/OS 1.7 HCD FMID HCD7720. It is not in HCD APAR OA0785 for z/OS releases 1.4, 1.4 and 1.6.
IOS APAR OA08197 is required for IPL when sharing an IODF built with the z/OS 1.7 HCD. IPL will fail without this APAR installed.

HCD APAR OA07875 is required to define a 2094 for the following z/OS systems:

z/OS 1.4 w/z990 Exploitation Support feature  (HCD FMID HCS7708)
z/OS 1.5 (HCD FMID HCS7708)
z/OS 1.6 (HCD FMID HCS7708)

The coexistence PTF for APAR OA07875 does not allow you to update the V5 IODF from back-level systems. Once the IODF has been upgraded to V5, the z/OS V1R7 HCD libraries must be used to process updates to it. (A  STEPLIB  or JOBLIB from a back-level system is acceptable.)

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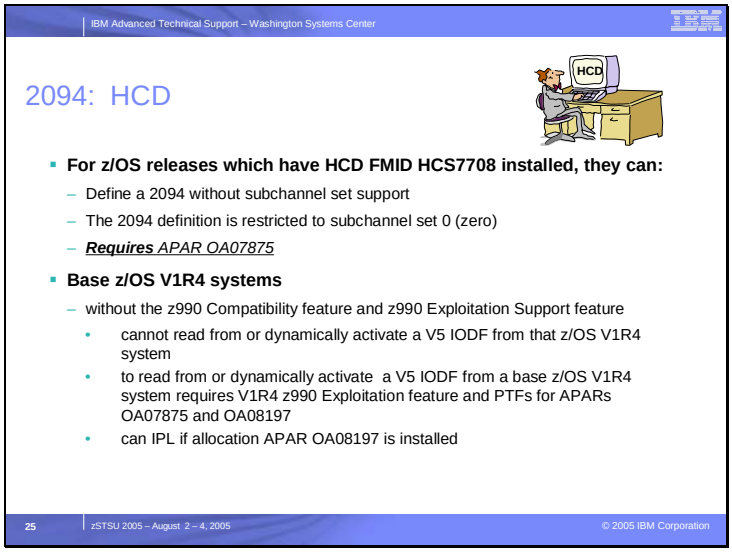


HCD FMID HCS7708 shipped with the:

- z/OS 1.4 z990 Compatibility Support feature, which is no longer available
- z/OS 1.4 z990 Exploitation Support feature, orderable via CBPDO
- z/OS 1.5
- z/OS 1.6

Important note: APAR OA07875 is available for z/OS V1R4 systems that have the z/OS V1R4 z990 Compatibility feature installed (that is, HCD FMID HCS7708). z/OS V1R4 HCD without the z990 Compatibility feature (that is, HCD FMID HCS6091) does not have an applicable coexistence PTF. (Hint: HCD FMID HCS7708 shows up as "z/OS V1.4 HCD" on its primary panel, and is described as "z/OS V1.4 HCD" in the documentation. HCD FMID HCS6091 shows up as "OS/390 Release 9 HCD" on its primary panel.)

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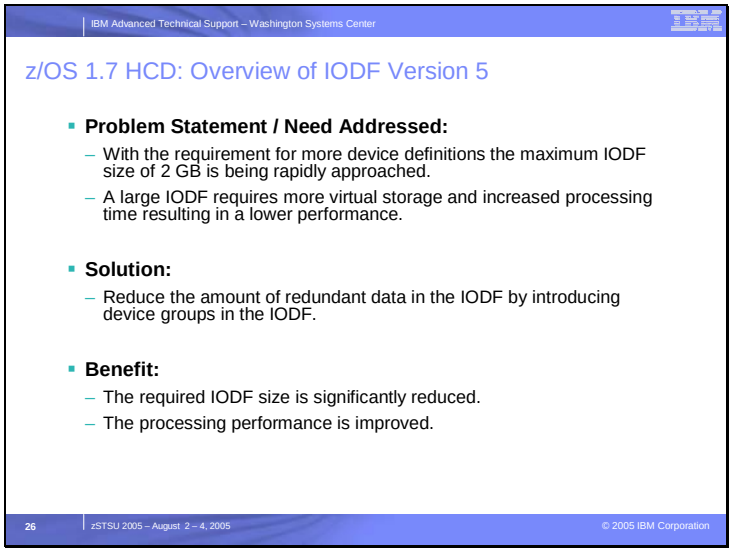
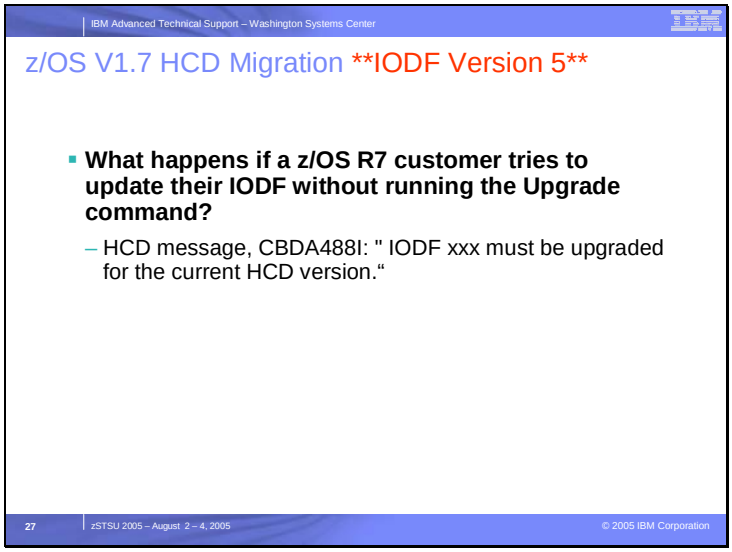



With the requirement for more device definitions (multiple subchannel sets, DS8000 support, sysplex consolidations, etc.) the number of devices is increasing rapidly in the IODF. This causes a strong increase in the size of the IODF, approaching its maximum size which is 2 GB (512 K blocks). A large IODF requires more virtual storage and increased processing time (especially for validation) resulting in a lower performance.

In order to reduce these negative effects of more device definitions, the IODF now contains device groups rather than individual device definitions. This reduces the size of the IODF usually by a factor of greater than 10, and, at the same time, improves the performance of processing large configurations in HCD.

Slide 27




You must first upgrade the IODF before you can make any updates. If you fail to do so, HCD will issue a message indicating this must be done.

The next foil is a screen shot of the HCD panel indicating the selection to upgrade the IODF.

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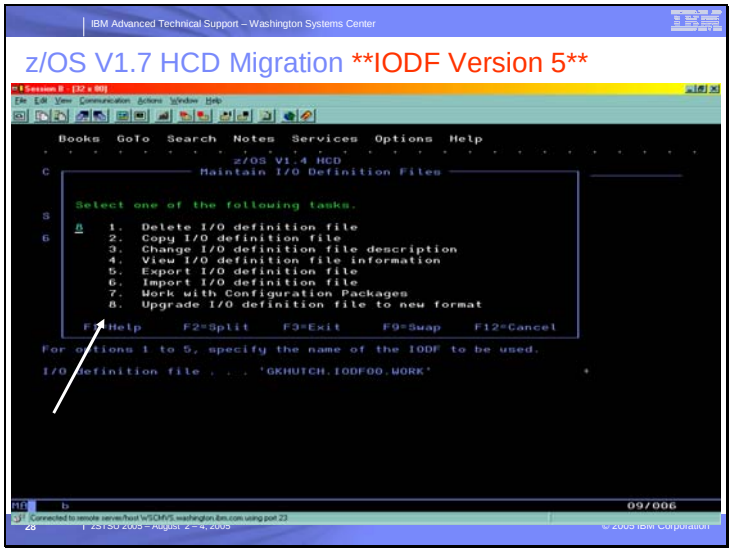


Option 8 from the HCD panel is the selection one must make to perform the upgrade.

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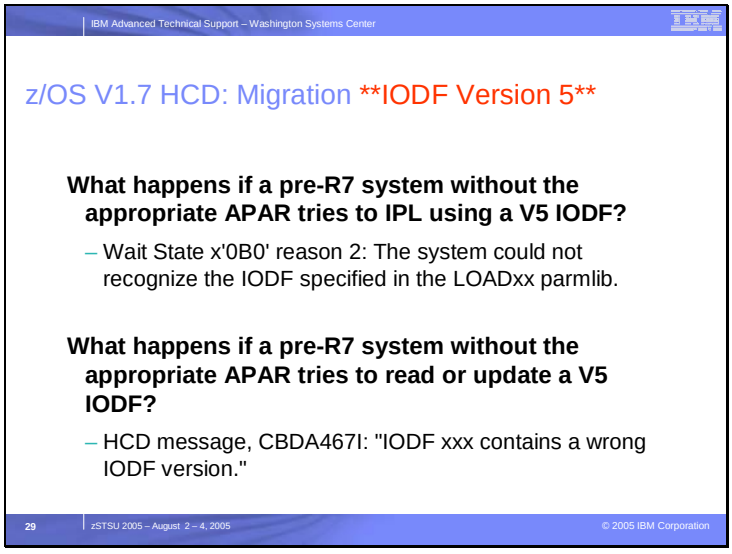
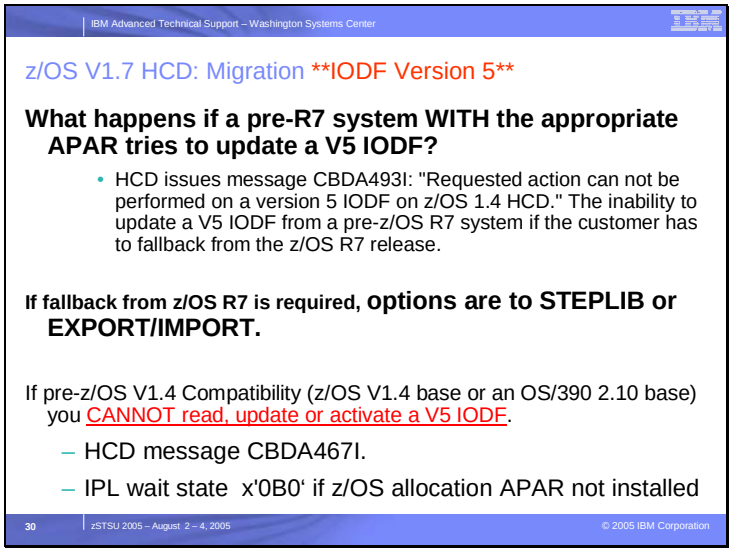


Slide 30




A base z/OS 1.4 system will IPL with the allocation APAR installed using a Version 5 IODF.

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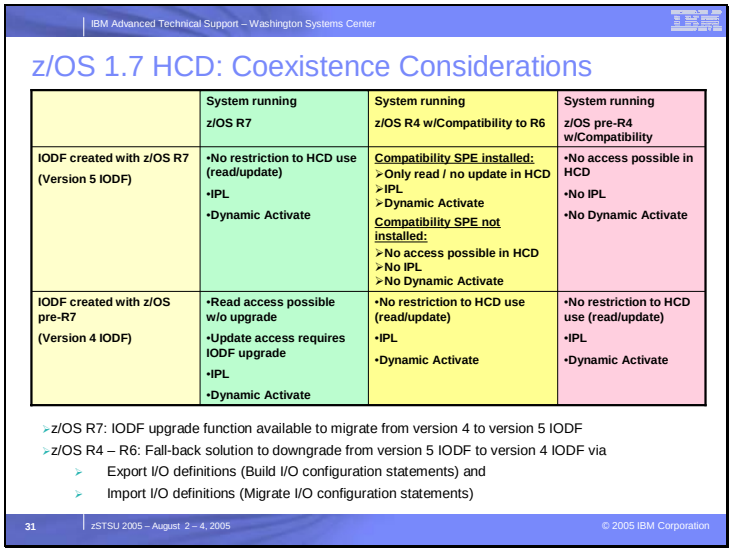


z/OS V1R7 HCD generates an IODF with the new (version 5) format. z/OS V1R4 HCD and OS/390 R9 HCD generate IODFs in the version 4 format.

For z/OS V1R4 HCD, APAR OA07875 is provided allowing read access to a V5 IODF. A V5 IODF can not be downgraded to a V4 IODF, nor can it be updated by z/OS V1R4 HCD. HCD levels prior to z/OS V1R4 HCD can not access a V5 IODF.
The compatibility support is provided such that activation functions can be processed under a back-level release with the new V5 IODF format.
The following dialog actions are supported on a V5 IODF under z/OS V1R4 HCD:
Activate actions (option 2) with the exception of suboption 1 (Build production IODF) and suboption 12 (Build validated work IODF).
Print and compare configuration data (dialog option 3) restricted to the data known under z/OS V1R4 HCD, i.e. without consideration of multiple subchannel set definitions.
Create and view graphical configuration reports (dialog option 4).
Maintain I/O definition files (dialog option 5) with exceptions of suboptions 7 (Update configuration packages; transmit of a package is accepted) and 8 (Upgrade IODF).
Dialog option 1 (Define, modify, or view configuration data) is not supported for a V5 IODF under z/OS V1R4 HCD.

The batch utility functions which only read the V5 IODF, the ACTIVATE system command and search requests via the HCD LDAP Backend are supported for a V5 IODF under z/OS V1R4 HCD.

When a non-supported action is requested on a V5 IODF under z/OS V1R4 HCD, the following error message is shown:
*CBDA493I Requested action can not be performed on version 5 IODF nnnn on z/OS 1.4 HCD.*

When accessing a V5 IODF on HCD releases prior to z/OS V1R4 HCD, the following error message is shown:
*CBDA467I IODF nnnn contains a wrong IODF version.*

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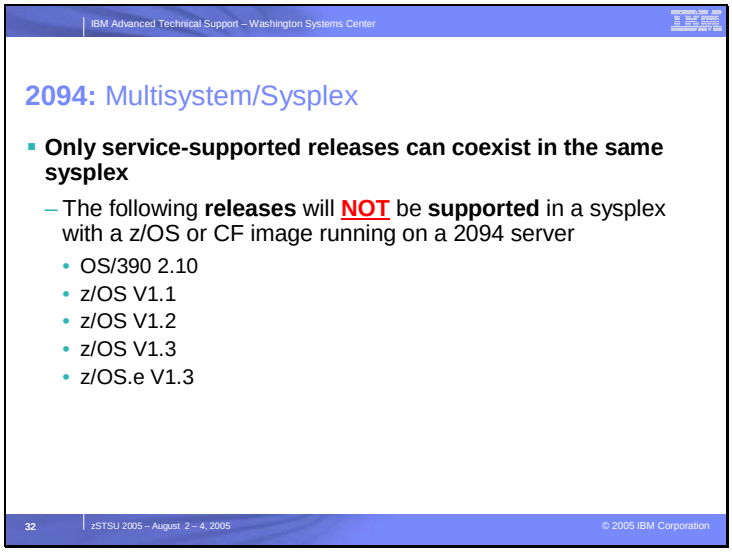


The software levels listed here are no longer within service support – service has been withdrawn and the products are no longer supported.

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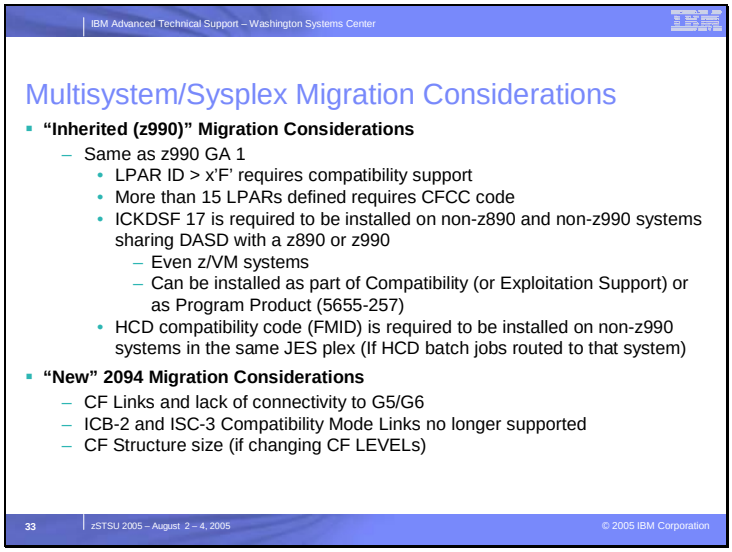


**Previous restrictions:** The same restrictions that are present on your z/OS release level on z990 or z890 are present on the z9-109. For instance, support for LPAR ID of greater than 15 (x'F') requires at least the z/OS V1R4 z990 Exploitation support. The z990 coexistence and migration requirements, including restrictions, are documented in *z/OS Migration*.

New Migration Considerations discussed on next few foils.

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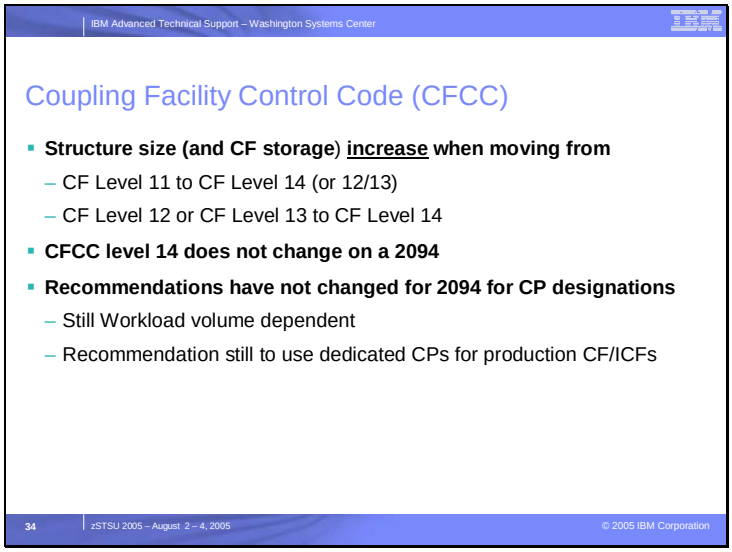


**CF structure sizes:** Generally, when you change Coupling Facility Code Code (CFCC) levels, the Coupling Facility structure sizes may change. z9-109 delivers initially with CFCC Level 14. If you will run with a higher CFCC level on a Coupling Facility on your z9-109, you may have larger structure sizes than you did previously. If your CFCC levels are identical, then there are no expected changes in structure sizes when moving from a previous server to a z9-109.

If you are moving your Coupling Facilities, and the CF structures will be on higher CFCC levels than they were previously, run the CFSIZER tool as it may be necessary to increase CF structure sizes. Prepare to make the necessary changes as indicated by the CFSIZER tool. You can find the CFSIZER tool at http://www.ibm.com/servers/eserver/zseries/cfsizer/.

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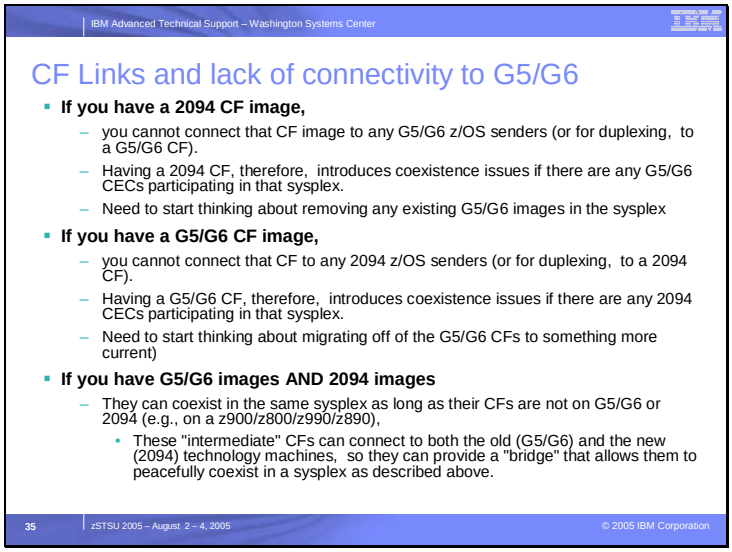


Sender/Receiver mode for coupling links is only mode on G5/G6.

Sender/Receiver mode coupling links are not supported on 2094. Therefore for G5/G6 connection to 2094 for coupling facility links.

**z9-109 sysplex:** Understand these important z9-109 sysplex connection restrictions:
ICB-2 and ISC-3 Compatibility Mode links are not supported on z9-109. If you have ICB-2 or ISC-3 Compatibility Mode links defined, convert them to supported link technologies.
If you have a Coupling Facility (CF) image on z9-109, you cannot connect that CF image to any G5 or G6 z/OS senders (or for duplexing, to a G5 or G6 CF). Having a z9-109 CF, therefore, introduces coexistence issues if there are any G5 or G6 z/OS images or G5 or G6 CFs participating in that sysplex.
If you have a G5 or G6 CF image, you cannot connect that CF to any z9-109 z/OS senders (or for duplexing, to a z9-109 CF). Having a G5 or G6 CF, therefore, introduces coexistence issues if there are any z9-109 z/OS images or z9-109 CFs participating in that sysplex.

If you have G5 or G6 z/OS images **and** z9-109 z/OS images, they can coexist in the same sysplex as long as their CFs are not on G5 or G6 or z9-109 (that is, they are on a z900, z800, z990, or z890). These "intermediate" CFs can connect to both the old (G5 or G6) and the new (z9-109) technology servers, so they can provide a "bridge" that allows them to coexist in a sysplex.

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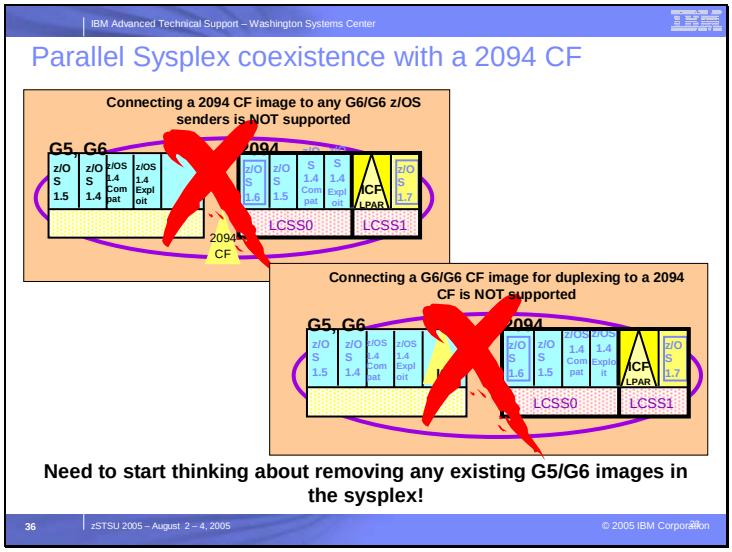
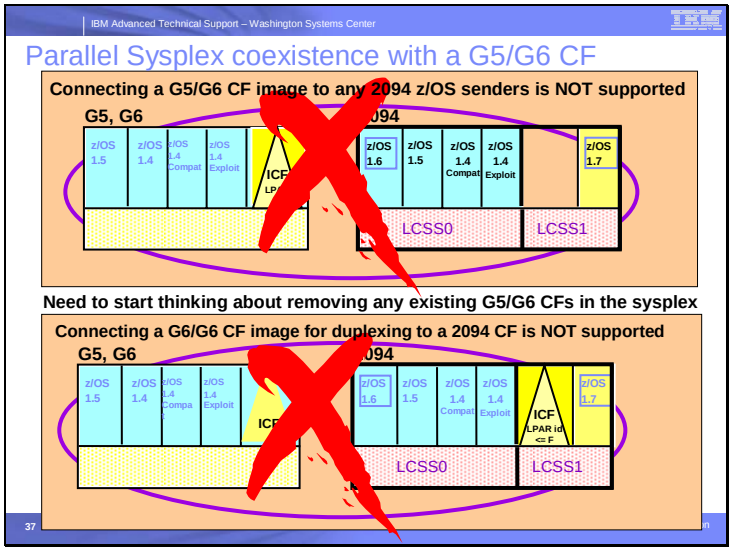



Slide 37



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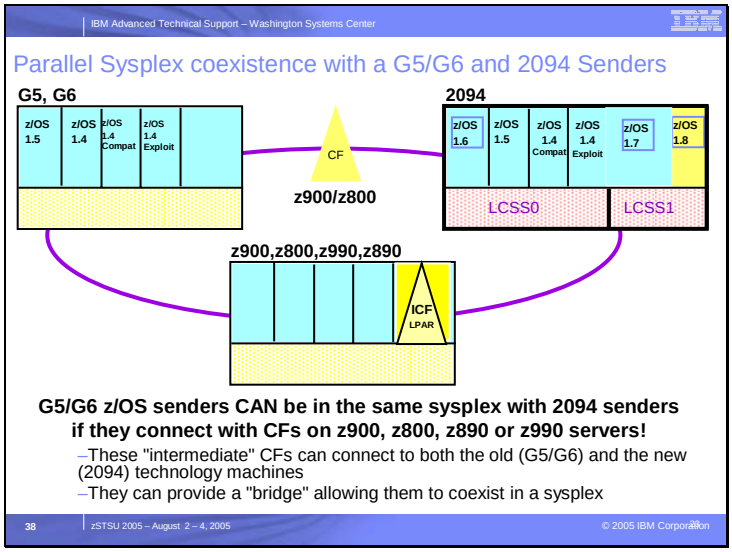
IBM Advanced Technical Support – Washington Systems Center
Parallel Sysplex coexistence with a G5/G6 and 2094 Senders
G5, G6
z/OS 1.5
z/OS 1.4
z/OS 1.4 Compat
z/OS 1.4 Exploit
CF
z900/z800
2094
z/OS 1.6
z/OS 1.5
z/OS 1.4 Compat
z/OS 1.4 Exploit
z/OS 1.7
z/OS 1.8
LCSS0
LCSS1
z900,z800,z990,z890
ICF
LPAR
G5/G6 z/OS senders CAN be in the same sysplex with 2094 senders if they connect with CFs on z900, z800, z890 or z990 servers!
–These "intermediate" CFs can connect to both the old (G5/G6) and the new (2094) technology machines
–They can provide a "bridge" allowing them to coexist in a sysplex
38
zSTSU 2005 – August 2 – 4, 2005
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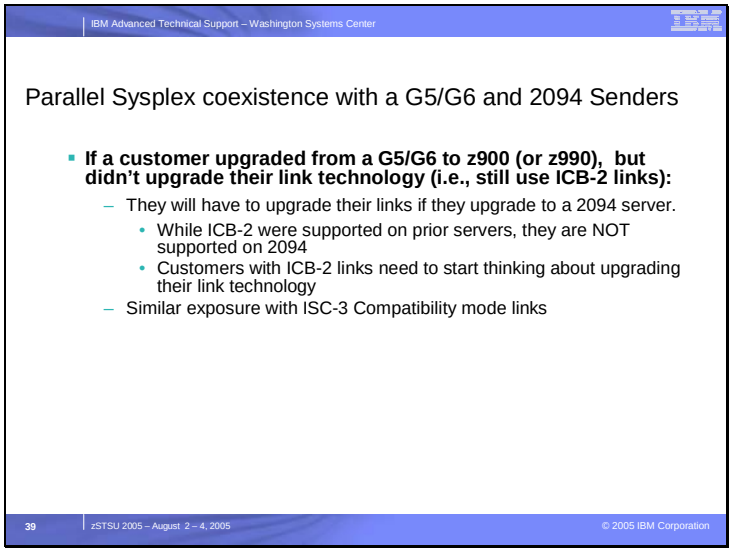


Review your current link technology. If you have any ICB-2 or ISC-3 Compatibility Mode links, convert them to supported link technologies.

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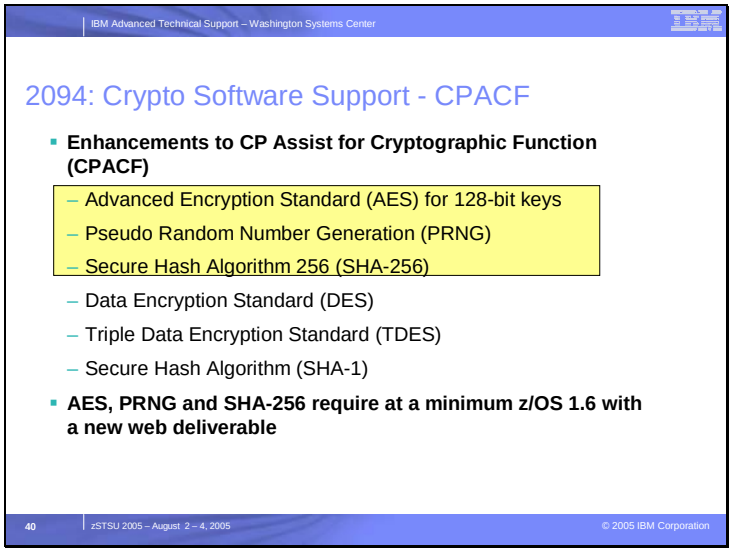


The three items listed in the box are enhancements to CPACF (AES, PRNG and SHA-256) for the z9-109.

**Enhancements to CP Assist for Cryptographic Function (CPACF)**: CPACF, supporting clear key encryption, is activated using a no-charge enablement feature (#3863) and offers the following on every Processor Unit (PU) identified as a Central Processor (CP) or Integrated Facility for Linux (IFL):

Data Encryption Standard (DES)

Triple Data Encryption Standard (TDES)

Secure Hash Algorithm (SHA-1)

CPACF has been enhanced to include support of the following on CPs and IFLs:

• Advanced Encryption Standard (AES) for 128-bit keys

• Pseudo Random Number Generation (PRNG)

• SHA-256

PRNG is a standard function supported on the Crypto Express2 feature. CPACF performance is designed to scale with PU performance improvements. SHA-1 and SHA-256 are shipped enabled on all servers and do not require the enablement feature.

Support for CPACF is also available using the Integrated Cryptographic Service Facility (ICSF). ICSF is a component of z/OS, and is designed to transparently use the available cryptographic functions, whether CPACF or Crypto Express2, to balance the workload and help address the bandwidth requirements of your applications. The enhancements to CPACF are exclusive to the z9-109 and are supported by z/OS, z/VM, and Linux on System z9.

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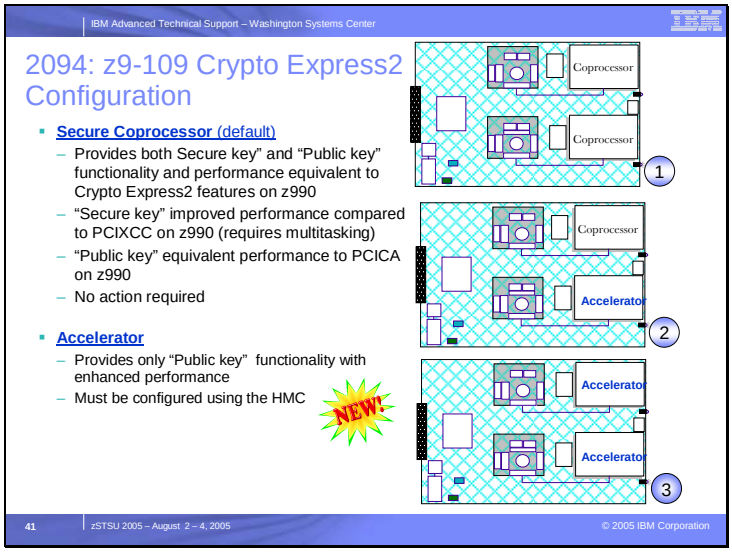


**Configurable Crypto Express2**: The Crypto Express2 feature, with two PCI-X adapters, can be defined as a **Coprocessor** or as an **Accelerator**.

• Crypto Express2 Coprocessor - for secure key encrypted transactions (default)

• Designed to support security-rich cryptographic functions, use of secure encrypted key values, and User Defined Extensions (UDX)

• Designed for Federal Information Processing Standard (FIPS) 140-2 Level 4 certification

• Crypto Express2 Accelerator - for Secure Sockets Layer (SSL) acceleration

• Designed to support clear key RSA operations

• Offloads compute-intensive RSA public-key and private-key cryptographic operations employed in the SSL protocol

The Crypto Express2 feature is designed to provide approximately 6000 (TBD) SSL handshakes per second when both PCI-X adapters are configured as accelerators. This represents a 3X (TBD) performance improvement compared to the PCICA feature and the current Crypto Express2 feature on z990. Since the performance enhancements are implemented in Licensed Internal Code, current Crypto Express2 features carried forward from a z990 to a z9-109 may be able to take advantage of increased SSL performance and the new configuration capability.

The configurable Crypto Express2 feature is exclusive to the z9-109 and is supported by z/OS, z/VM, z/VSE, and Linux on System z9. z/VSE, VSE/ESA, and Linux on System z9 offer support for clear key SSL transactions only. z/VM V5.1, and later, supports clear and secure key operations.

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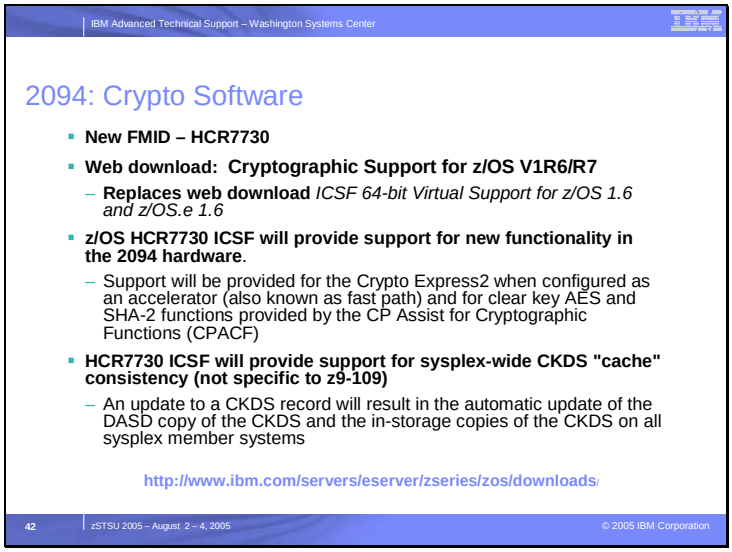


Crypto Express2 Accelerator (CEX2A)

ICSF V1.7 customers with ICSF web deliverable *ICSF 64-bit Virtual Support for z/OS 1.6 and z/OS.e 1.6* can exploit the Crypto Express2 Accelerator and CPACF enhancements (AES, PRNG, SHA-256).

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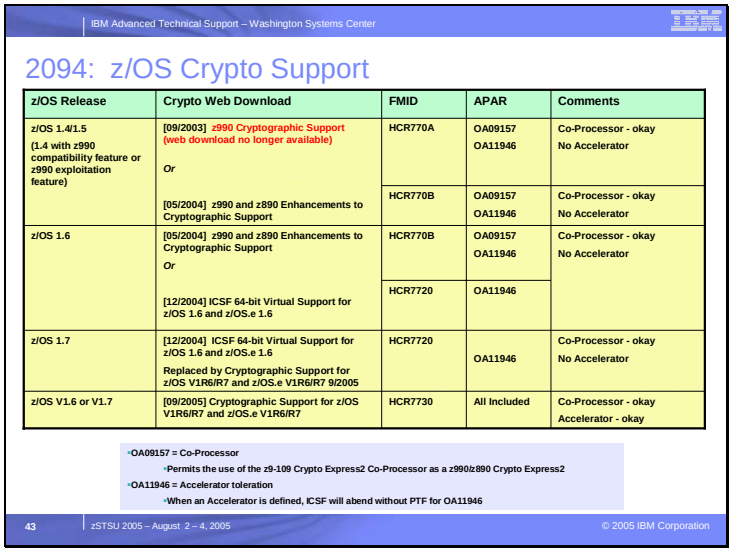


The *ICSF 64-bit Virtual Support for z.OS 1.6 and z/OS.e 1.6* will be removed from the web download site in September 2005 and replaced by the new web download in support of the z9-109, *Cryptographic Support for z/OS V1R6/R7 and z/OS.e V1R6/R7.*

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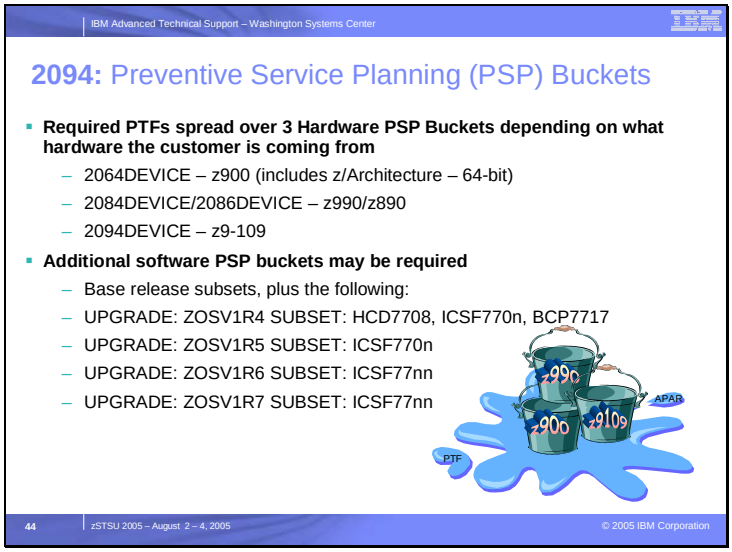


Install the necessary z/OS service, as indicated in the PSP buckets. Which PSP buckets to review for the PTF information depends on where you are coming from. Refer to table below for a list of which PSP buckets to review, based on what z/OS release you will run on z9-109, and what hardware support you already have installed. There may have been additions since you reviewed the PSP buckets, so ensure that any newly identified z/OS service has been installed.

To assist you in determining if you have the Recommended Service installed on your system, which is identified in these PSP buckets, you can use the Enhanced PSP Tool (at http://techsupport.services.ibm.com/390/psp_main.html), or ServiceLink's PSP Service Extraction tool. – (next foil)

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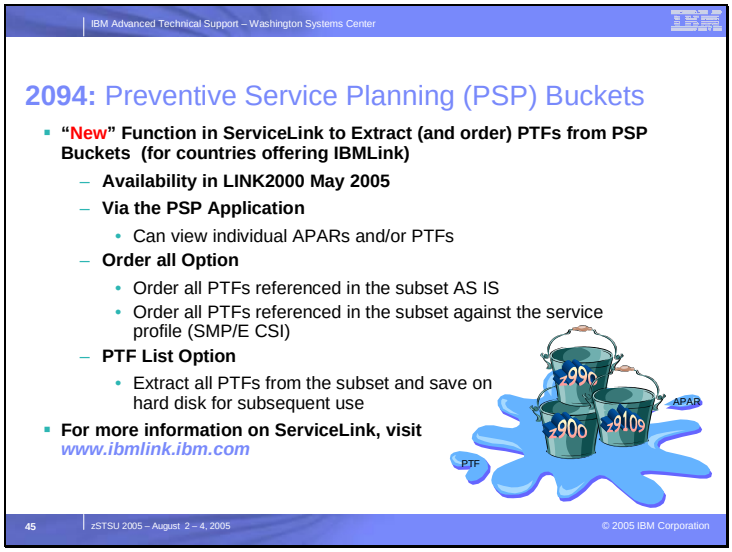


Enhancements to ServiceLink Preventive Service Planning (PSP) and Service Request and Delivery (SRD): By accessing IBMLink and using the PSP application, you can order all the PTFs (including the PTFs of all closed APARs referenced in the subset) AS IS or streamlined, based on your SMP/E Consolidated Software Inventory (CSI profile). APARS referenced in the PE APAR LIST are excluded. Click Order all at the bottom of the View subset page. The extracted PTFs will be transferred to the Submit PTF Order page in SRD, where you can add or delete PTFs before submitting the order. To use a CSI profile, click Upload CSI profile in the SRD Order OS/390 z/OS option to upload your CSI profile to IBM and get the CSI profile name to specify. Plus, you can now download a list of these PTFs to your workstation to see which apply to your system and order them at your convenience. Click PTF list at the bottom of the View subset page to make them available for download via your browser's pop-up download window.

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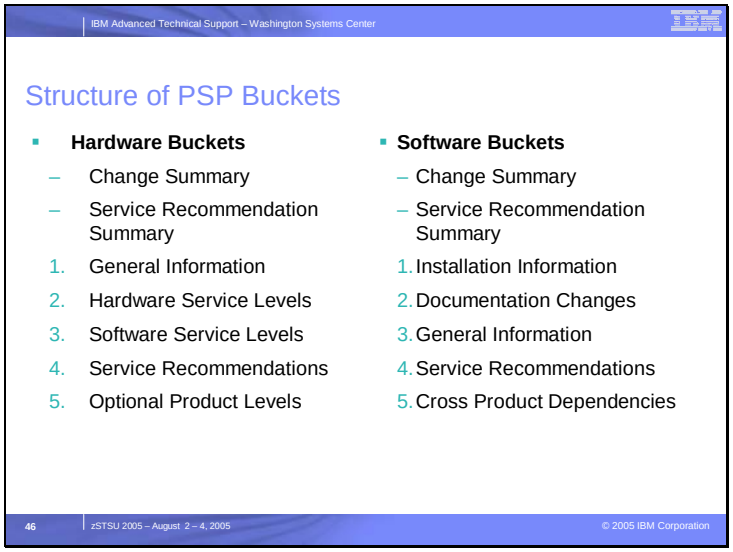


Informational foil.

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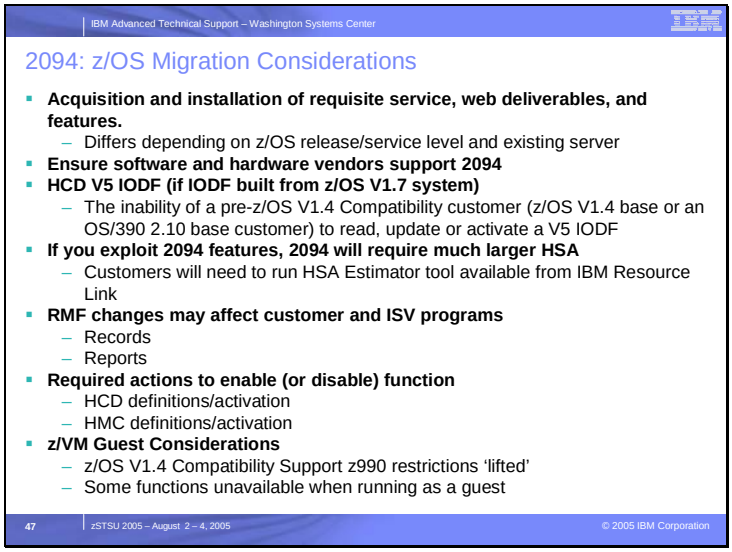


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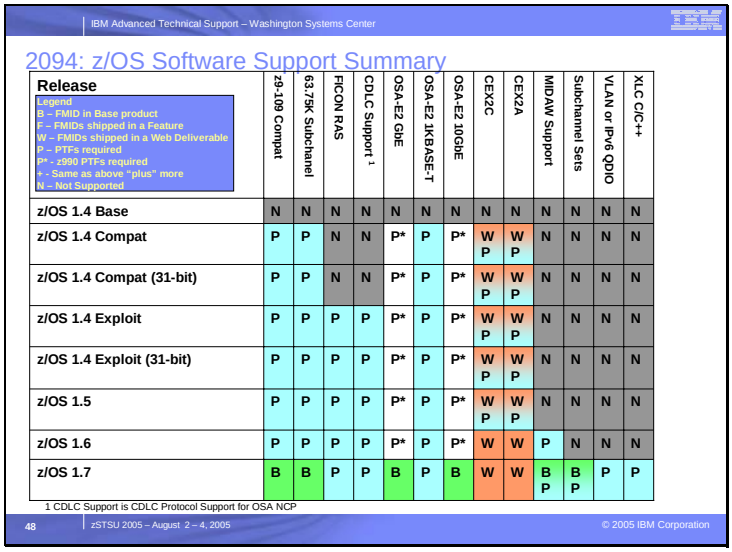


Note: [1] CDLC Support is CDLC Protocol Support for OSA NCP

Legend

B – FMID in Base product

F – FMIDs shipped in a Feature

W – FMIDs shipped in a Web Deliverable

P – PTFs required

P* - z990 PTFs required

+ - Same as above “plus” more

N – Not Supported

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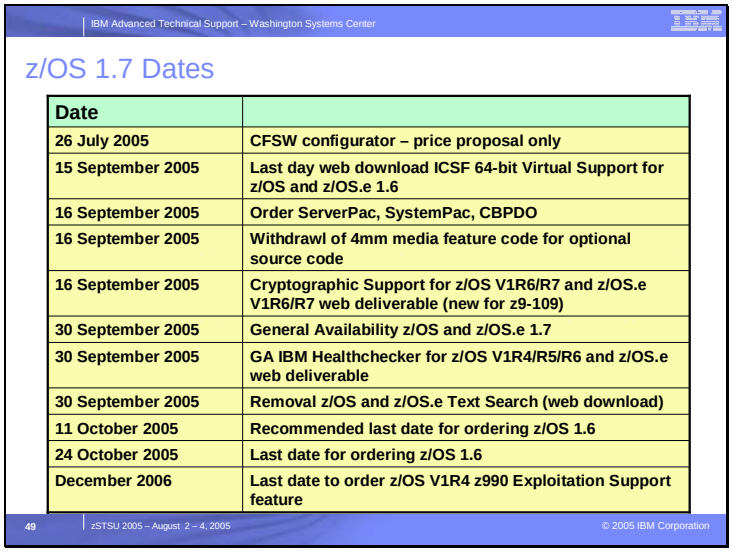


Starting with z/OS V1.7 and z/OS.e V1.7, the Text Search function (FMID HIMN230) previously provided via Web download for use by DB2 Universal Database (TM) (UDB) Text Extender for z/OS, V7 and V8, is no longer available as a z/OS Web deliverable. Instead, the Text Search function is provided by Web download from the DB2 UDB Text Extender Web site: **http://www.ibm.com/software/data/db2/extenders/text/te390/**

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## zSeries z/OS and z/OS.e Support Summary Dates

| | | z800 | z900 | z890 | z990 | 2094 | End of Service | Coexists with z/OS | Ship Date |
|---|---|---|---|---|---|---|---|---|---|
| z/OS & z/OS.e** | 1.4 | x | x | x | x | x | 3/07 | 1.7 | 9/02 |
| | 1.5 | x | x | x | x | x | 3/07* | 1.8* | 3/04 |
| | 1.6 | x | x | x | x | x | 9/07* | 1.8* | 9/04 |
| | 1.7 | x | x | x | x | x | 9/08* | 1.9* | 9/05* |

**z/OS.e - z800 and z890 only
z/OS 1.4 and 1.5 are no longer orderable
z/OS 1.4 exploitation remains orderable until December 2006

* All statements regarding IBM future direction and intent are subject to change or withdrawal without notice, and represents goals and objectives only.




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## z/OS Summary: Support for z9-109

- **z/OS 1.4 (with Compatibility or Exploitation support feature)**
  - 60 Logical Partitions (requires exploitation support)
  - 63.75 Subchannels
  - OSA-Express2 1000BASE-T Ethernet (requires exploitation support)
  - OSA-Express2 OSN Support (requires exploitation support)
- **z/OS 1.6**
  - Modified-Indirect-Addressing Word (MIDAW facility)
  - HiperSockets support of IPv6
  - CPACF Enhancements
  - Crypto Express2
  - Single System Image – up to 32 engines
- **z/OS 1.7**
  - Multiple subchannel sets
  - FICON link incident reporting
- **Statement of direction*:**
  - z/OS 1.7 is planned to support Server Timer Protocol

* All statements regarding IBM future direction and intent are subject to change or withdrawal without notice, and represents goals and objectives only.

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## Additional/Source Information

- **CST Web Site (and Test Report)**
  - http://www.ibm.com/servers/eserver/zseries/zos/servicetst/
- **Enhanced HOLDDATA**
  - http://service.software.ibm.com/holdata/390holddata.html
- **EPSP Tool**
  - http://techsupport.services.ibm.com/390/psp_main.html
- **IBM Resource Link**
  - https://app-06.www.ibm.com/servers/resourcelink/hom03010.nsf
- **ServiceLink (IBMLINK2000)**
  - https://www.ibm.com/ibmlink/link2/
- **zSeries Technical Support Software Services**
  - http://www.ibm.com/services/us/its/pdf/swxcel.pdf
- **ShopzSeries**
  - https://www14.software.ibm.com/webapp/ShopzSeries/ShopzSeries.jsp
- **SMP/E Download**
  - http://www.ibm.com/servers/eserver/zseries/zos/downloads/
- **zSeries IBM TechSupport Portal**
  - http://www.ibm.com/servers/eserver/support/zseries/

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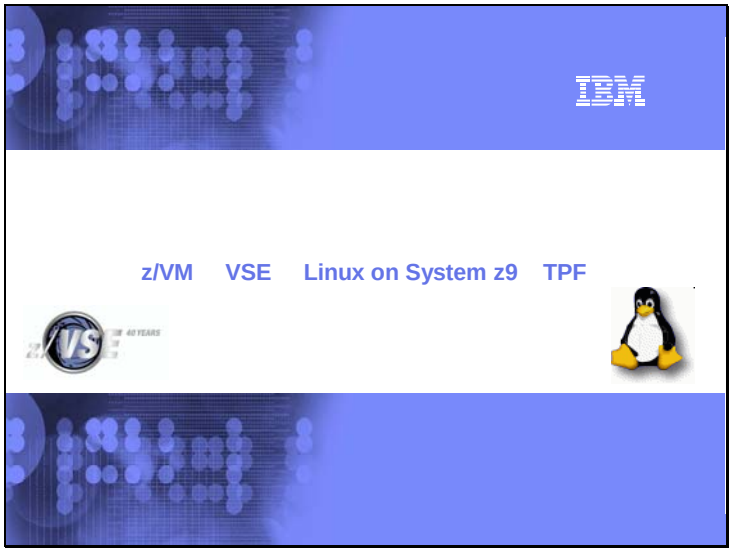


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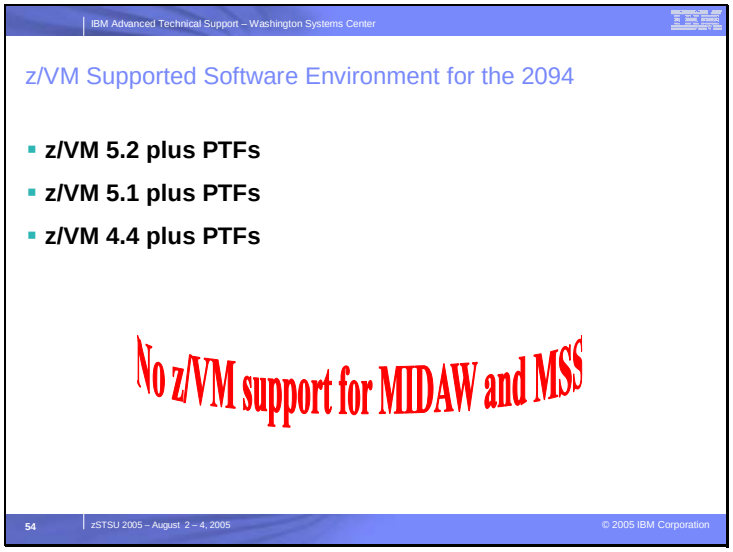

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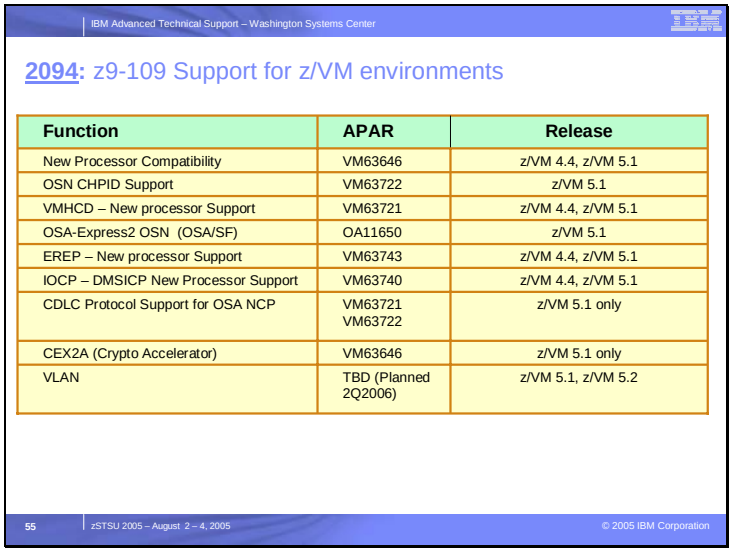


These 2094 compatibility APARs are applicable to all z/OS environments supported on the 2094. These are in addition to any other APARs/PTFs listed for specific function support.

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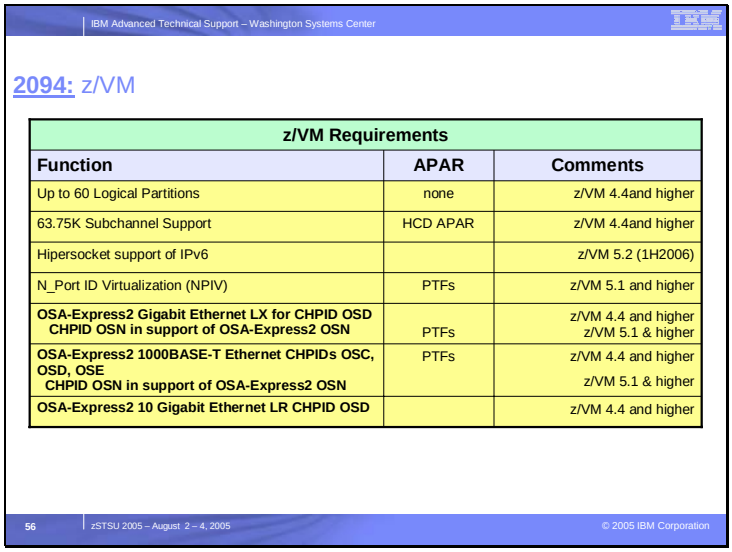

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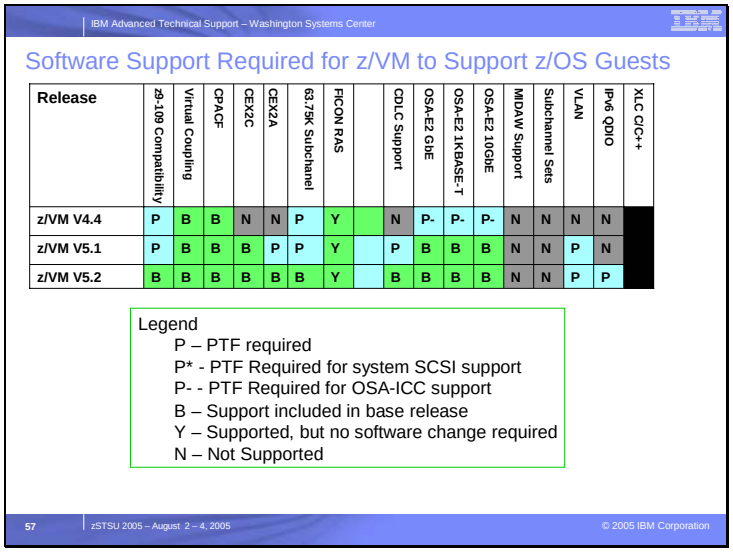


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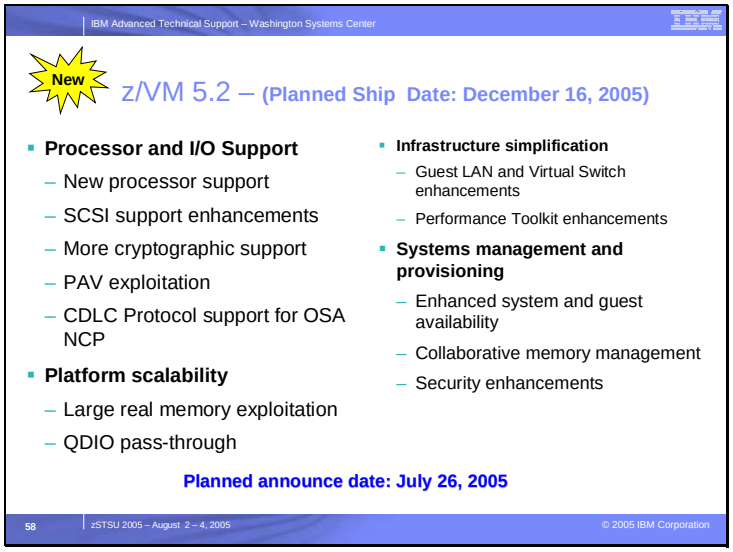

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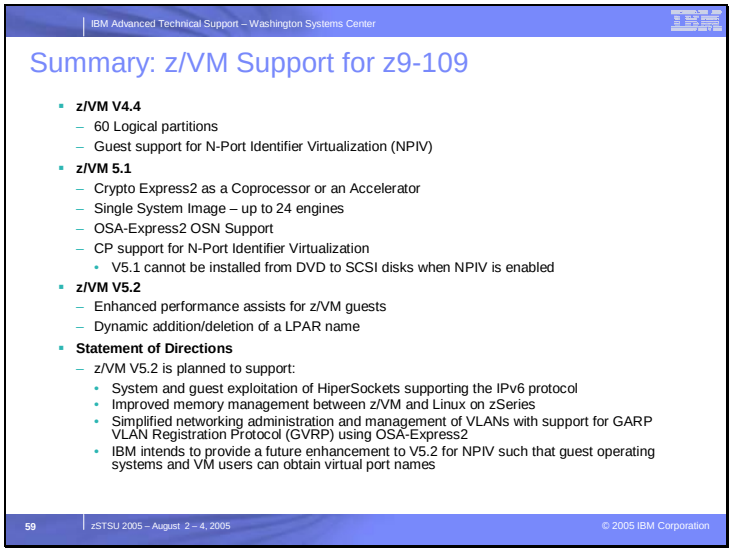


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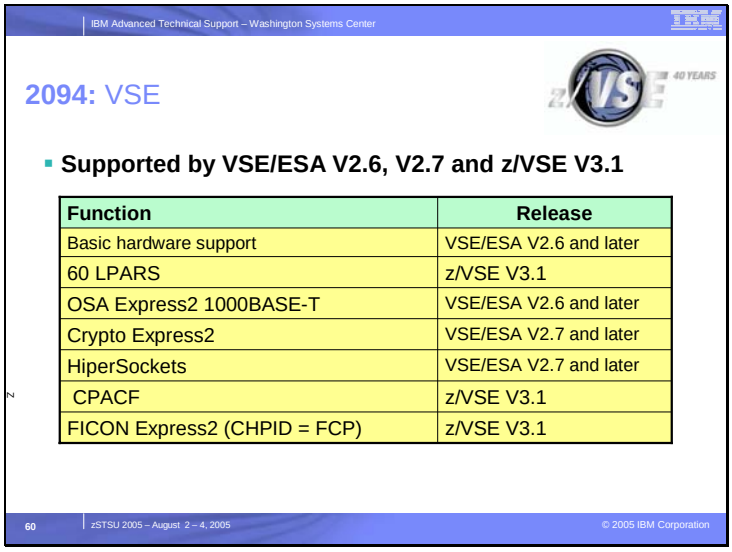


IOCP APARs for VSE:

VSE/ESA DY46271

z/VSE DY46272

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## z/VSE Version 3 Release 1 zSeries Overview


- **Business Resiliency and Security**
  - Basic Security Manager
  - Crypto Express2 (PCICA function)
    - Improved SSL throughput
  - CPACF
- **Workload Management**
  - Up to 60 LPARs
  - FCP-SCSI disk support
    - high I/O rate
    - shared disk storage
- **Business Integration**
  - FICON Express2 (incl CHPID = FC and FCP)
  - OSA Express2, incl GbE, 10 GbE, and 1000BASE-T
  - HiperSockets for fast communications with Linux on zSeries
  - OSA-ICC for simplification and lower TCO

**Plus:**

**Interoperatility -**
VSE connectors
VSE Web services
IBM Middleware

**IBM TotalStorage -**
DS8000 & DS6000 disk
Advanced Copy Support
Virtual Tape Server
3494 Tape Library




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## zSeries z/VM & VSE/ESA Support Summary Dates

| | | z800 | z900 | z890 | z990 | 2094 | End of Market | End of Service | Ship Date |
|---|---|---|---|---|---|---|---|---|---|
| VSE/ESA | 2.6 | x | x | x | x | x | 3/03 | | 12/01 |
| | 2.7* | x | x | x | | x | | | 3/03 |
| z/VSE*** | 3.1* | x | x | x | x | x | | | 1Q05** |
| z/VM | 4.4* | x | x | x | x | x | TBD | 9/06** | 8/03 |
| | 5.1* | x | x | x | x | x | TBD | 9/07** | 9/04 |
| | 5.2 | x | x | x | x | x | TBD | 12/08** | 12/05** |

*Releases currently orderable
**Planned

***z/VSE can execute in 31-bit mode only. It does not implement z/Architecture, and specifically does not implement 64-bit mode capabilities. z/VSE is designed to exploit select features of IBM zSeries hardware.

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## 2094: Linux for System z9

- **Currently available distributions:**
  - SUSE SLES 8
    - Service Level SP4
  - SUSE SLES 9
    - Service Level SP2 (at GA)
  - Red Hat RHEL 3
  - Red Hat RHEL 4
    - Service Level U1




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## 2094: Linux on System z9

| Linux Requirements | |
|---|---|
| **Function** | **Distribution** |
| 63.75K subchannels | SUSE SLES 8<br>Red Hat RHEL 3 |
| Up to 60 Logical Partitions | SUSE SLES 8<br>Red Hat RHEL 3 |
| OSA-Express2 Gigabit Ethernet LX<br>CHPID Type OSD | SUSE SLES 8<br>SUSE SLES 9<br>Red Hat RHEL 3 |
| OSA-Express2 1000BASE-T Ethernet<br>CHPID Type OSD | SUSE SLES 8<br>SUSE SLES 9<br>Red Hat RHEL 3 |
| OSA-Express2 10 Gigabit Ethernet LR<br>CHPID Type OSD | SUSE SLES 8<br>SUSE SLES 9<br>Red Hat RHEL 3 |

***Note***: Other 2094 functions will be made available in future Linux for System 9 distribution releases or service updates

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## 2094: Linux on System z9

- **Other 2094 functions will be made available in future Linux distribution releases or service updates**
  - Program-directed re-IPL
  - Enhancements to CPACF (Linux on zSeries)
  - Crypto Express2 (coprocessor and accelerator) Enhanced performance assists for z/VM Guests MIDAW
  - FCP point-to-point attachments
  - OSA-Express2 Gigabit Ethernet LX for CHPID Type OSN in support of OSA-Express2 OSN
  - OSA-Express2 1000BASE-T Ethernet for CHPID Type OSN in support of OSA-Express2 OSN




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## zSeries TPF Support

| | | z800 | z900 | z890 | z990 | z9-109 | End of Service | Planned Ship Date |
|---|---|---|---|---|---|---|---|---|
| TPF | 4.1 | x | x | x[C] | x[C] | x[C] | TBD | 2/01 |
| z/TPF | 1.1 | x | x | x | x | x | TBD | 9/05 |

**z/TPF Announcement**

IBM has announced plans for the general availability of the z/Transaction Processing Facility Version 1 Release 1 on September 30, 2005.

z/TPF will be designed to help address the challenges of high-speed, high-volume, high-bandwidth computing.

- z/TPF plans to utilize a 64-bit architecture allowing use of large virtual address spaces and programming models common on other platforms. This would enable immediate exploitation of large memory by applications while protecting current investments.
- z/TPF plans to adopt a suite of open tooling for standard application development, focusing on C and C++.
- z/TPF plans to exploit larger memory spaces for optimized price performance of system services and middleware such as Web servers, mail servers and MQSeries®.

These statements represent current intentions of IBM. 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 will not create any liability or obligation for IBM.

x[C] – Supports up to 30 LPARs with PJ29309. Does not support spanned channel sets.

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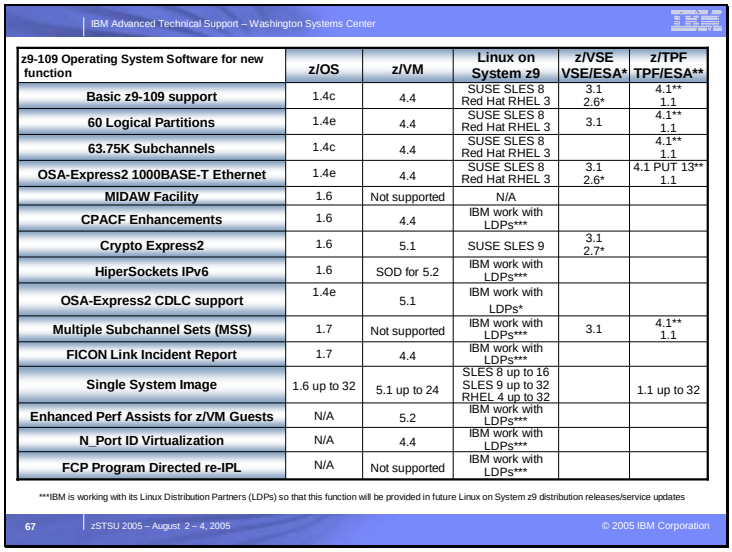


z/OS 1.4c implies z/OS 1.4 z990 Compatibility Support feature

z/OS 1.4e implies z/OS 1.4 z990 Exploitation Support feature

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Time for…….