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# ITSO – z System Hardware Workshop

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## Part 7 – Software and Parallel Sysplex

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# Important information about today's workshop

- The ITSO z hardware team created 7 IBM z13 presentations to be delivered today
  - Part 1 – IBM z13 and zBX Model 004 – Positioning / introduction
  - Part 2 – z13 CPC Details Capacity and Performance
  - Part 3 – z13 I/O Subsystem
  - Part 4 – Native PCIe Adpters – zEDC and RoCE (what's new with z13)
  - Part 5 – HMC, CoD and RAS and zAware
  - Part 6 – Installation Planning
  - **Part 7 – Software, Parallel Sysplex**
- The main references for the presentations today are:.
  - IBM z13 Technical Guide – Redbook – SG24-8251
  - IBM z13 Technical Introduction – Redbook - SG24-8250

- **Part of the available material may not be presented..** ☹
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- **Thank You !**

# IBM z13
# Software Support

Please note: You should always refer to the PSP Device buckets for the latest OS requirements. Any requirements stated in this document might not be current. Certain functions have specific pre-reqs (PTFs/APARs). Its to up to the reader to research these to make sure they have supported software.

# Operating Systems focused on exploiting hardware innovation

## z/OS Version 2.1

- Improved price performance for zIIP workloads with SMT
- Support new analytics workloads with SIMD
- New Crypto capabilities for faster encryption
- Large memory to improve performance and enable new applications

## z/VM Version 6.3

- Improved price performance with support for multi-threading technology
- Support for twice as many processors (z13 only)
- Improved systems management and economics
- Embracing Open Standards and Open Source Interoperability
- Supports more virtual servers than any other platform in a single footprint

## z/VSE Version 5.1

- Reduced risk of access from unauthorized users
- Reduced memory constraints
- Wide portfolio using Linux on z Systems
- Continued system usability enhancements with CICS Explorer
- More efficient communications

## Linux on z System

- Multithreading allows for per core software savings
- Ability to host and manage more workloads efficient and cost-effective
- Automatic identification of unusual messages
- Integrated continuous availability & disaster recovery solution

# Operating System Support for z13

- Currency is key to operating system support and exploitation of future servers
- The following releases of operating systems will be supported on z13 (Please refer to PSP buckets for any required maintenance):

| Operating System | Supported levels |
|---|---|
| **z/OS** | ▪ z/OS V2.1 with PTFs (Exploitation)<br>▪ z/OS V1.13 with PTFs (Limited Exploitation)<br>▪ z/OS V1.12* with PTFs (End of service support 9/30/2014) |
| **Linux on z Systems** | ▪ SUSE SLES 11 (**Later releases:** GA support TBD by SUSE.)<br>▪ Red Hat RHEL 6 and 7 (**Later releases:** GA support TBD by Red Hat.) |
| **z/VM** | ▪ z/VM V6.3 with PTFs – Exploitation support<br>▪ z/VM V6.2 with PTFs – Compatibility plus Crypto Express5S support |
| **z/VSE** | ▪ z/VSE V5.2 with PTFs – Compatibility plus Crypto Express5S (up to 85 LPARs)<br>▪ z/VSE V5.1 with PTFs – Compatibility |
| **z/TPF** | ▪ z/TPF V1.1 – Compatibility |

Note:

- * z/OS V1.12 will run on z13 provided the customer has IBM Software Support Services to get the PTFs
- Beginning with z/OS V1.12, IBM Software Support Services replaces the IBM Lifecycle Extension for z/OS offering for extended support coverage for z/OS. The TSS Service Extension for z/OS is a fee-based Defect support (a fix, bypass, or restriction to a problem) for users who have not completed their migration to a newer z/OS release.
- Service extension support for z/OS V1.12 is provided for up to three years, beginning October 1, 2014 and available through September 30, 2017.
- 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.

# Operating System Support for zBX Model 004

## Software levels for x86 (all are 64 bit only):

Linux
- Red Hat RHEL 5.5 and up
- Red Hat RHEL 6.0 and up
- Red Hat RHEL 7.0 and up
- SUSE Linux Enterprise (SLES) 10 SP4 and up
- SLES 11 SP1 and up
- SLES 12 and up

Windows
- Microsoft Windows Server 2008 R2
- Microsoft Windows Server 2008 SP2
- Microsoft Windows Server 2012
- Microsoft Windows Server 2012 R2

## Software levels for Power blades:

AIX, same as we have today on the mod 3
- AIX 5.3 TL 12 + and up
- AIX 6.1 TL5+ and up
- AIX 7.1 and up

# z/OS Support Summary

| Release | z900/ z800 WdfM | z990/ z890 WdfM | z9 EC z9 BC WdfM | z10 EC z10 BC WdfM | z196 z114 | zEC12 zBC12 | z13 | End of Service | Extended Defect Support[1] |
|---|---|---|---|---|---|---|---|---|---|
| z/OS V1.12 | X | X | X | X | X | X | X | 9/14[1] | 9/17[1] |
| z/OS V1.13 | X | X | X | X | X | X | X | 9/16* | 9/19[1]* |
| z/OS V2.1 | | | X | X | X | X | X | 9/18* | 9/21[1]* |
| z/OS 2.2[2] | | | | X | X | X | X | 9/20* | 9/23[1]* |

**Notes:**

1- 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 defect support

2- Planned: All statements regarding IBM's plans, directions, and intent are subject to change or withdrawal without notice

Legend

| |
|---|
| **Defect support provided with IBM Software Support Services for z/OS** |
| **Generally supported** |

**WdfM** Server has been withdrawn from Marketing

# Supported Releases on z13

- z13 capabilities differ depending on z/OS release
  - Toleration support provided on z/OS V1.12
    - The IBM Software Support Services is required for extended defect support
  - Exploitation support provided on z/OS V1.13 and higher
    - **z/OS V1.13**
      - Exploitation of selected functions
    - **z/OS V2.1**
      - Exploitation of most functions

# z/OS V1.12* Toleration Support for z13

- Provides same functionality as that on the IBM zEC12
  - HiperDispatch
  - FICON Express8S
  - Parallel Sysplex InfiniBand (PSIFB) Coupling Links
  - CF Level 18 and 19 Support
  - 24K subchannels for FICON channels
  - High Performance FICON for z System (zHPF)
  - CPU Measurement Facility
  - OSA-Express5S (GbE LX and SX, 1000BASE-T, 10 GbE LR and SR)
  - GRS FICON CTC toleration

- **Plus some z13 functionality**
  - FICON Express16S
  - Greater than 128 Coupling Links per CPC toleration
  - Crypto Express5S toleration
    - Treats Crypto Express5S as Crypto Express4S
  - New z/Architecture Instructions (assembler new OPCODE support)
  - Support architecture for up to 85 Domains on Crypto Express5S

* No longer generally supported as of September 30, 2014. IBM Software Support Services offers a service extension support for z/OS V1.12 for up to three years, beginning October 1, 2014 and available through September 30, 2017

# z/OS V1.13 Exploitation Support for z13

- Provides same functionality as that on the IBM zEC12
  - Java exploitation of the Transactional Execution Facility
  - Exploitation of New Hardware Features - C/C++ Arch(10)/Tune(10)
  - IBM zAware (z/OS Monitoring)
  - RSM Enhancements
    - Flash Express Support
    - Pageable 1MB Large Page Support
    - Dynamic reconfiguration support for Flash Express
    - 2 GB Large Page Support
    - Optional PLPA and COMMON page data set support
  - CF Flash Support
  - CCA 4.4 and other cryptographic enhancement support:
    - RKX Key Export Wrap, UDX Reduction/Simplification, additional EP11 algorithms, expanded EMV support, AP Configuration simplification, CTRACE Enhancements, KDS Key Utilization Stats, DK AES PIN Phase 1, DK AES PIN support Phase 2, PKT UDX, PIN Migrate
- **Plus some z13 functionality**
  - FICON Express16S
  - Changed (node) cache structure optimized by HiperDispatch
  - Greater than 128 Coupling Links
  - PCIe Parallel Sysplex Coupling
  - Crypto Express5S exploitation (if web deliverable is installed)
    - Next Generation Coprocessor support, Support architecture for up to 256 Domains, Format Preserving Encryption (FPE)
  - Up to 85 LPARs
  - Up to six logical channel subsystems (CSSs)
  - 4 Subchannel Sets per CSS
  - zHPF Extended Distance II
  - Manage FICON Dynamic Routing
  - Fabric Priority for an I/O request

# z/OS V2.1 Exploitaton Support for z13

- **z/OS V2.1**
  - Exploitation of new hardware instructions – XL C/C++ ARCH(11) and TUNE(11)
    - New z13 hardware instruction support
    - SIMD (Vector support) and Vector data
    - Decimal Floating Point packed conversion facility support
    - Performance improvements
    - Machine model scheduling and code generation updates
    - Single Instruction Multiple Data (SIMD) instruction set and execution
      - Business Analytics Vector Processing
      - MASS and ATLAS Library, SPSS Modeler and ILOG Cplex
  - Two-way simultaneous multithreaded (SMT-2) operation
  - Increase number of coupling links from 128 to 256 (STP)
  - Up to 4 TB per z/OS LPAR
  - Health Check for FICON Dynamic Routing
  - Miscellaneous PCIe enhancements
    - PCIe extended address translation, greater than 256 PFID support, PCIe function definition enhancements in the I/O configuration, PCIe function measurement block changes
  - Shared RoCE Support

# z13 z/OS Support - System Functions and Features

| **Five hardware models** |
|---|
| Up to 141 processors configurable as CPs, zIIPs, IFLs, ICFs or optional SAPs (no zAAPs)<br>▪100-way on z/OS V1.12 or V1.13<br>▪Up to 141-way on z/OS V2.1 (non-SMT mode)<br>▪Up to 128-way on z/OS V2.1 (SMT mode)<br>- max active threads is 213 |
| **Up to 10 TB of Redundant Array of Independent Memory (RAIM)**<br>▪1 TB per z/OS LPAR on z/OS V1.12 or V1.13<br>▪Up to 4 TB per z/OS LPAR on z/OS V2.1 (SoD) |
| Changed (node) cache structure |
| **96 GB Fixed HSA** |
| Up to 85 LPARs<br>▪ Only up to 60 LPARs can be defined if z/OS V1.12 is running in one of the LPARs |
| Up to six logical channel subsystems (LCSSes) |
| 4 Subchannel Sets per LCSS |
| Single Instruction Multiple Data (SIMD) instruction set and execution |
| Two-way simultaneous multithreading (SMT) support for up to 128 cores (IFLs and zIIPs) |
| New and enhanced instructions |
| XL C/C++ ARCH(11) and TUNE(11) exploitation: New z13 hardware instruction support, SIMD (Vector support) and Vector data, Decimal Floating Point packed conversion facility support, Performance improvements |

(z/OS support in blue)

| IBM zAware: z/OS and Linux on z Systems |
|---|
| CPU Measurement Facility |
| Flash Express (Storage Class Memory-SCM) |
| CF exploitation of Flash Express |
| IBM zEnterprise Data Compression (zEDC) capability using zEDC Express |
| OSA Express5S |
| Shared RoCE Express Support |
| Greater than 256 PFID support |
| PCIe extended address translation |
| Enhanced the PCIe function definition |
| PCIe function measurement block changes |
| FICON Express16S |
| FICON Dynamic Routing |
| High Performance FICON for z System (including zHPF extended distance II) |
| Fabric Priority for an I/O request |
| CryptoExpress5S: New Generation Coprocessor support, Support architecture for up to 85 Domains, VISA Format Preserving Encryption (VFPE) |
| Integrated Coupling Adapter (ICA) Links |
| Increases number of coupling CHPIDs from 128 to 256 per CPC |
| **zBX Model 004 support** |

# Supported z/OS Releases and ICSF Levels

- **z/OS V1.12 Crypto customers can run with:**
  - HCR7770 – Base z/OS V1.12
  - HCR7780 – Cryptographic Support for z/OS V1R10-V1R12
  - HCR7790 – Cryptographic Support for z/OS V1R11-V1R13
  - HCR77A0 – Cryptographic Support for z/OS V1R12-V1R13
- **z/OS V1.13 Crypto customers can run with:**
  - HCR7780 – Base z/OS V1.13
  - HCR7790 – Cryptographic Support for z/OS V1R11-V1R13
  - HCR77A0 – Cryptographic Support for z/OS V1R12-V1R13
  - HCR77A1 – Cryptographic Support for z/OS V1R13-z/OS V2R1
  - HCR77B0 – Enhanced Cryptographic Support for z/OS V1R13-z/OS V2R1
- **z/OS V2.1 Crypto customers can run with:**
  - HCR77A0 – Base z/OS V2.1
  - HCR77A1 – Cryptographic Support for z/OS V1R13-z/OS V2R1
  - HCR77B0 – Enhanced Cryptographic Support for z/OS V1R13-z/OS V2R1

1 – not supported

# z/OS Support for z13

- **Base support is provided by PTFs identified by:**
  - IBM.Device.Server.z13-2964.RequiredService
- **Exploitation of many functions is provided by PTFs identified by:**
  - IBM.Device.Server.z13-2964.Exploitation
- **Recommended service is identified by:**
  - IBM.Device.Server.z13-2964.RecommendedService
- **Exploitation of some functions requires a web deliverable**
  - Exploitation of Crypto Express5S requires the ***Enhanced Cryptographic Support for z/OS V1.13 and z/OS V2.1*** web deliverable
  - Exploitation of new hardware instructions using XL C/C++ ARCH(11) and TUNE(11) or SIMD exploitation by MASS and ATLAS Libraries, requires the ***z13 Exploitation Support for z/OS V2.1 XL C/C++*** web deliverable

# z13 PSP Bucket and Fix Categories

- Support provided via a combination of web deliverables and PTFs
  - Documented in PSP Bucket: Upgrade = 2964DEVICE, Subset = 2964/ZOS
    - Unlike prior server generations PSP buckets, actual PTFs are not listed in the PSP bucket, just pointers to SMP/E Fix Categories, and any web deliverables needed for exploitation
    - As in the past, if you are skipping generations of servers, you need to install all the maintenance and perform required migration actions for the servers that you are skipping:

| Server | UPGRADE | Subset | Fix Category |
|---|---|---|---|
| zBC12 | 2828DEVICE | 2828/ZOS | IBM.Device.Server.zBC12-2828* |
| zEC12 | 2827DEVICE | 2827/ZOS | IBM.Device.Server.zEC12-2827* |
| z114 | 2818DEVICE | 2818/ZOS | IBM.Device.Server.z114-2818* |
| z196 | 2817DEVICE | 2817/ZOS | IBM.Device.Server.z196-2817* |
| z10 BC | 2098DEVICE | 2098/ZOS | IBM.Device.Server.z10-BC-2098* |
| z10 EC | 2097DEVICE | 2097/ZOS | IBM.Device.Server.z10-EC-2097* |
| z9 BC | 2096DEVICE | 2096/ZOS | IBM.Device.Server.z9-BC-2096* |
| z9 EC | 2094DEVICE | 2094/ZOS | IBM.Device.Server.z9-EC-2094* |
| z890 | 2086DEVICE | 2086/ZOS | IBM.Device.Server.z890--2086* |
| z990 | 2084DEVICE | 2084/ZOS | IBM.Device.Server.z990-2084* |

# Other Fix Categories of Interest

- Other PTFs related to z13 (common to other servers) can be identified by SMP/E commands (REPORT MISSINGFIX, LIST, or APPLY) for the following Fix Categories:
  - IBM.Device.Server.*.ParallelSysplexInfiniBandCoupling
  - IBM.Device.Server.*.ServerTimeProtocol
  - IBM.Device.Server.*.zHighPerformanceFICON
  - IBM.Device.Server.*.UnifiedResourceManager
  - IBM.Function.zEDC
- PTFs that allow prior levels of ICSF to coexist with, and fallback from, the Enhanced Cryptographic Support for z/OS V1.13 and z/OS V2.1 web deliverable
  - IBM.Coexistence.ICSF.z/OS_V1R13-V2R1-HCR77B0

# Summary: z/OS Support for z13 Servers

- Base support is provided by PTFs identified by:
  - IBM.Device.Server.z13-2964.RequiredService
- Exploitation of many functions is provided by PTFs identified by:
  - IBM.Device.Server.z13-2964.Exploitation
- Recommended service is identified by:
  - IBM.Device.Server.z13-2964.RecommendedService
- Exploitation of some functions requires a web deliverable
  - Exploitation of Crypto Express5S requires the ***Enhanced Cryptographic Support for z/OS V1.13 and z/OS V2.1*** web deliverable
  - Exploitation of new hardware instructions using XL C/C++ ARCH(11) and TUNE(11) or SIMD exploitation by MASS and ATLAS Libraries, requires the ***z13 Exploitation Support for z/OS V2.1 XL C/C++*** web deliverable
- **All support is planned to be included in the z/OS V2.2 base**

# General Migration Considerations

- z/OS releases do not require z13
- z13 ONLY requires software identified as 'base' support
  - Minimal toleration support needed depending on z/OS release
  - z13 does NOT require any 'functional' software
- z13 capabilities differ depending on z/OS release
  - Web deliverables are needed for some functions on some releases
- Don't migrate software releases and hardware at the same time
- Keep members of the sysplex at the same software level other than during brief migration periods
- Review any restrictions and migration considerations prior to creating an upgrade plan

# General Recommendations and Considerations

- z13 is based on existing z System technology
  - z/Architecture (z900/z800)
  - Multiple Logical Channel Subsystems (z990/z890)
  - OSA-Express2, FICON Express4, Crypto Express2 (z9 EC/z9 BC)
  - HiperDispatch, Large Page, zHPF (z10 EC, z10 BC)
  - Ensembles, native PCIe-based I/O – FICON Express8S and OSA Express4S (z196, z114)
  - Flash Express, RoCE, and zEDC (zEC12/zBC12)

- Very few new migration issues identified
  - z990, z890, z9 EC, z9 BC, z10 EC, z10 BC, z196, z114, zEC12, and zBC12 migration actions “inherited”
  - Many functions are enabled / disabled based on the presence or absence of the required hardware and software.
    - Some functions have exploitation or migration considerations (subsequent charts)

# General Migration Considerations

- New z/Architecture Machine Instructions
  - New mnemonics
- Use of LOADxx MACHMIG statements
  - To disable functions for this IPL
  - D IPLINFO,LOADxx,MACHMIG command to display
- Sysplex and Multisystem Considerations
  - "Inherited" Sysplex Considerations
    - Server participation restriction in a Parallel Sysplex
    - Sysplex Timer environment

A mixed CTN configuration is NO LONGER supported

# Increased Number of Coupling Links from 128 to 256

- z13 now supports 256 Links
  - A single z/OS or CF image supports maximum 128 Links
- When displaying STP (D ETR) from a z/OS image, information is provided for the entire CPC
- If >128 links are defined on z13
  - The z/OS support must be installed on all z/OS releases running on z13
    - Allowing STP information to display > 128 links STP information

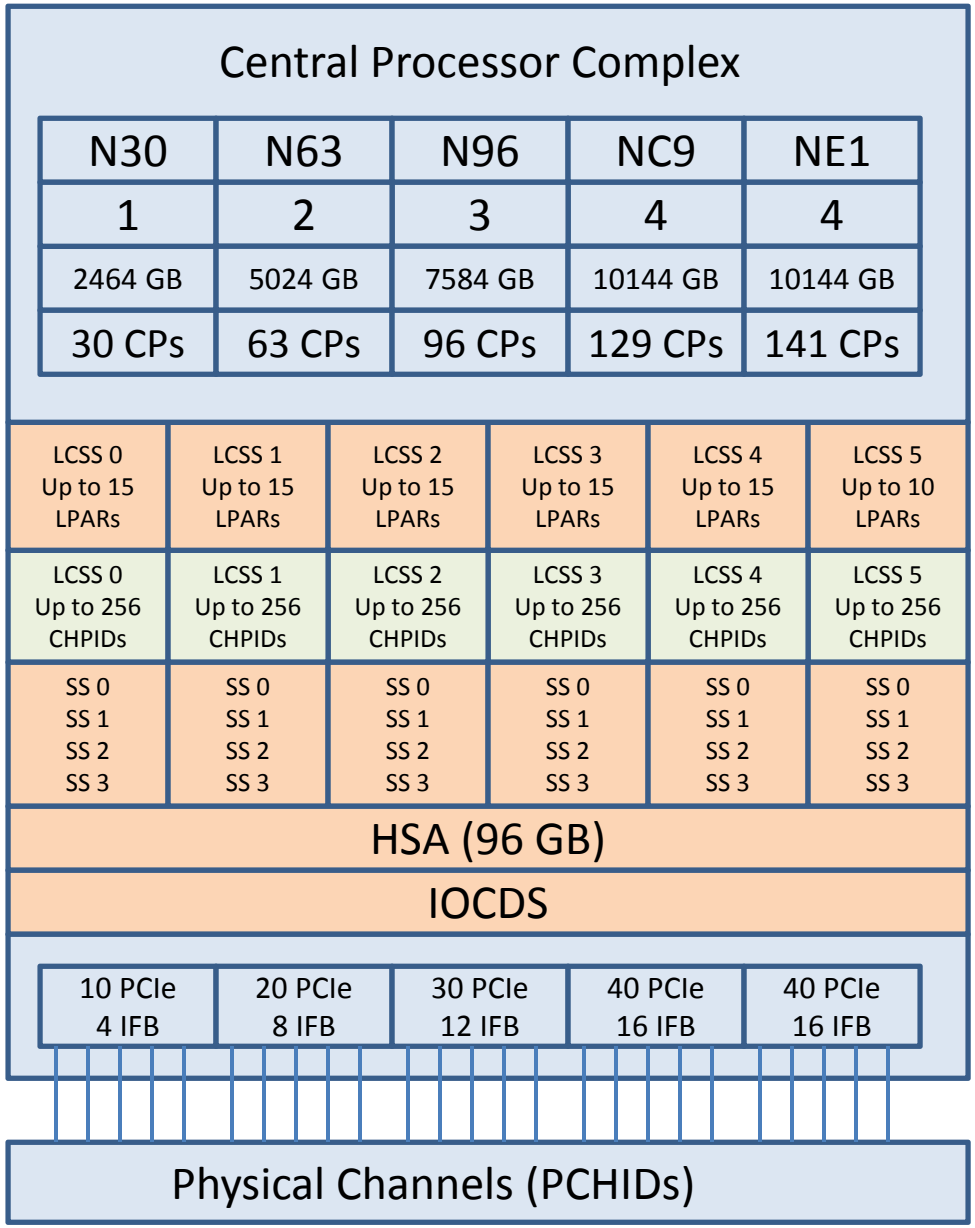
# 4TB per z/OS LPAR Considerations

- z/OS supports real storage configurations of up to 4 TB in a single LPAR
  - RSM increases the amount of IAXSEGMT control blocks and moves them into High Common Area for the UIC calculation
  - No changes planned for existing RCE and RAX interfaces used by RMF

# 4th Subchannel Set Exploitation Considerations

- You can now define a 4th subchannel set, which gives you addressability to another 64K subchannels/devices
  - These subchannels can be used for either PAV alias devices, PPRC secondary devices, or FlashCopy target devices.
- If you need to fall back (hardware or software), then
  - You will lose access to the devices in the 4th subchannel set
    - Which means these devices must be defined in older I/O configuration in the remaining 3 subchannel sets
  - To avoid problems you should:
    - ✓ Define devices into the new subchannel set, do sufficient testing before moving into production.
    - ✓ Consider a separate OSCONFIG for lower servers w/o Subchannel Set 3

# CPC Models and channel subsystems (LCSS) relationship




- Up to four CPC Drawer
- Maximum memory size
- Maximum Processing Units
- Up to 15 LPARs in LCSS 0 - 4
  Up to 10 LPARs in LCSS 5
- Up to 6 Logical Channel Subsystems
- Up to four Subchannel Sets per LCSS
- Single / fixed HSA
- One active IOCDS
- PCIe and IFB Adapters per Drawer
- PCIe and IFB copper cables
- PCIe Drawer and I/O Drawer

# PCIe Parallel Sysplex Coupling Exploitation Considerations

*New ICA-SR adapter*

- Support for PCIe based short distance Coupling Links
  - A new CHPID type (**CS5** – **Coupling Over PCIe**) is being introduced
  - Support is provided to:
    - Recognize the new CHPID type and allow XES to register as the owner of the CHPID type. This allows the CHPID type to be displayed in the D M=CHP command and to be configured online and offline.
    - Recognize the new CHPID type as a coupling related CHPID type and route control to XES to handle CHPID related events.
    - Allow an ACTIVATE command to dynamically add CS5 CHPIDs
  - RMFGAT stores information into Monitor III table CFIG3 and SMF record 74.4
  - Minor changes in the RMF CF Activity Report (Subchannel Activity) section and CF to CF Activity section) as well as to the Monitor III CFSYS Report
    - **Note:** RMF reports must be taken on highest release in a Parallel Sysplex

# New z/Architecture Machine Instructions

- OPTABLE option now supports ZS7
  - The assembler loads and uses the operation code table that contains the symbolic operation codes for the machine instructions specific to z/Architecture systems with the general instructions extensions facility and z13 instructions
- The new mnemonics may collide with (be identical to) the names of Assembler macro instructions you use
  - If you write programs in Assembler Language, you should compare the list of new instructions to the names of Assembler macro instructions you use and/or provide
  - If a conflict is identified, take one of these actions:
    - Change the name of your macro instruction
    - Specify a separate assembler OPCODE table
      - via PARM= , ASMAOPT, or '*PROCESS OPTABLE….' in source
- Use a coding technique that permits both use of a new instruction and a macro with the same name in an assembly such as HLASM's Mnemonic tags (:MAC :ASM)
- Use of XL C/C++ ARCH(11) and TUNE(11) options

# z/VM Release Status Summary

| z/VM | Level | GA | End of Service | End of Marketing | Minimum Processor Level | Security Level |
|---|---|---|---|---|---|---|
| Version 6 | Release 3 | 7/2013 | 4/2017 | | IBM z System10® | EAL 4+[2] OSPP-LS |
| | Release 2 | 12/2011 | 12/2016 | 3Q/2013 | IBM z System10® | - |
| | Release 1 | 10/2009 | 4/2013 | 12/2011 | IBM z System10® | EAL 4+ OSPP-LS |
| Version 5 | Release 4 | 9/2008 | 12/2016[1] | 3/2012 | IBM eServer zSeries 800 & 900 (z800, z900) | - |
| | Release 3 | 6/2007 | 9/2010 | 9/2010 | z800, z900 | EAL 4+ CAPP/LSPP |

[1] Or later (Announced August 2014)
[2] Targeted Security Level in V6.3 SOD

Marketed & Serviced

Serviced, but not Marketed

End of Service & Marketing

Extended support contracts are available

# z/VM Support for z13

- z/VM V6.2, and V6.3 will be supported on z13
  - Supported releases:
    - z/VM V6.2 EoS 12/2016, requires a z10 or later
    - z/VM V6.3 GAed 7/23/2013, EoS 4/30/2017, requires a z10 or later
  - z/VM V5.4 will *not* support z13, EoS recently extended to 12/31/2016
  - z/VM V6.1 is no longer in service as of April 2014

- Guest Exploitation support for the new Crypto Express5S
  - Includes support for the AP-Extended-Addressing Facility
    - Support for 85 domains with z13

# z/VM z13 Compatibility Support

- **Guest support for the following new hardware facilities:**
  - Load/Store-On-Condition Facility 2
  - Load-and-Zero-Rightmost-Byte Facility
  - Decimal-Floating-Point Packed Conversion Facility
  - Compare and Delay Facility
  - PCIe: Extended-I/O Address-Translation Facility guest exploitation
- **Integer or Binary Floating Point for Capability Numbers**
  - Accounting / Monitor will now report integer and binary floating point numbers for capability values
  - Q CAPABILITY will now report decimal numbers for capability values.
- **Removal of guest zAAP support**
- **Toleration of STP Hardware-Based TOD-Clock Steering**
- **Toleration of ESA/390 SIE Removal: facility masked, instead z/VM will provide guest simulation**
- **Toleration of SMT feature on machine**
  - SMT exploitation will only be provided by z/VM V6.3
- **Toleration of z/Architecture Vector Registers: mask from guests**
- **Dynamic I/O support for HiperSockets VCHID and CS5 Coupling**
- **StandAlone dump compatibility**

# z/VM Support Schedule

- **Compatibility APARs (z/VM V6.2 and V6.3 at GA):**
  - VM65577: GA1 processor compatibility support
  - VM65577: GA1 I/O compatibility support
  - VM65577: CEX5S crypto and 85 Domains support
  - VM65588: DirMaint support for 85 crypto domains
  - VM65527: Performance Toolkit support
  - VM65489: VMHCD support
  - VM64437: VMHCM support
  - VM65495: EREP support
  - PM79901: HLASM support
  - VM65568: IOCP support
- **Exploitation APARs (z/VM V6.3 March 13, 2015)**
  - VM65586: Support for 64 cores (single threaded) or 64 threads
  - VM65529: Performance Toolkit support for 64 threads
- **Exploitation APARs (z/VM V6.3 June 26, 2015)**
  - VM65583 and PI21053: Multi-Vswitch Link Aggregation Support
  - VM65528: Performance Toolkit support for Multi-Vswitch Link Aggregation
- **Updates will be available at announce:** http:/www.ibm.com/vm
- **Hardware PSP bucket z/VM subset should be reviewed**

# z/VSE Support for IBM z System Servers

| *IBM Servers* | z/VSE V5.2 | z/VSE V5.1 | z/VSE V4.3 |
|---|---|---|---|
| **IBM z13** | ✔ | ✔ | ⊘ |
| **IBM zEnterprise EC12 & BC12** | ✔ | ✔ | ✔ |
| **IBM zEnterprise 196 & 114** | ✔ | ✔ | ✔ |
| **IBM z System10 EC & z10 BC** | ✔ | ✔ | ✔ |
| **IBM z System9 EC & z9 BC** | ✔ | ✔ | ✔ |

Notes:

- z/VSE 4.3 End of Service: December 31, 2014
- z/VSE V5.2 will be the last release that supports IBM z System9. Future releases of z/VSE will support IBM z System10 and higher.

# z/VSE Support for z13

- **Toleration Support for z13**
  - Supported releases: z/VSE 5.1, z/VSE 5.2
  - Toleration PTFs (z/VSE 5.1, 5.2) required for the new Crypto Express5S card
    - z/VSE supports two modes of operation: CCA coprocessor mode and accelerator mode
  - Toleration support includes new FICON Express16S card
    - Supports:
      - FICON (no zHPF)
      - FCP for FCP-attached SCSI disks
  - EREP, IOCP PTFs for the new processor
  - No other toleration PTFs are expected
  - SCRT for subcapacity pricing
- **Exploitation support**
  - Crypto Express5S - more domains per adapter
    - PTF will be provided for z/VSE 5.2 only

# z/TPF

- TPF V4.1 went out of service on 12/30/2010
  - TPF 4.1 support is still provided through TPF 4.1 Service Extension Agreements
  - TPF 4.1 is only supported on hardware up to z10

- z/TPF V1.1 (with PTFs) will support z13
  - z/TPF will ***not*** be updated to exploit new functionality
  - Will implicitly benefit from:
    - •Per-engine performance
    - •Increased I/O bandwidth from 16Gbps FICON
    - •Improved performance of crypto cards and existing algorithms

| | | z10 EC (WdfM) | z10 BC (WdfM) | z196 | z114 | zEC12 | z13 | Ship Date | End of Service |
|---|---|---|---|---|---|---|---|---|---|
| TPF | 4.1 | x | x | No | No | No | No | 2/01 | 12/10 |
| z/TPF | 1.1 | x | x | x | x | x | x | 9/05 | TBD |

- z/TPF Migration Portal
  - http://www.ibm.com/tpf/ztpfmigration

# z/TPF Storage and Network Connectivity

- Storage
  - Increase FICON subchannels from 24K to 32K
  - FICON Express16S
- z/TPF Support
  - Increased I/O bandwidth
  - Customers will be able to simplify / reduce their channel infrastructure, possibly reducing the number of directors
  - Allows workload to grow without needing to grow current infrastructure
- Network
  - OSA Express4S and OSA Express5S
- z/TPF Support
  - z/TPF will tolerate the new OSA Express5S card
- z/TPF Cryptography
  - Improved performance of existing crypto card algorithms
  - Crypto express accelerator provides additional capacity
    - Customers are not currently limited
  - Will not exploit any new algorithms at GA

# Linux on z System Support

| | z10 EC WdfM | z10 BC WdfM | z196 | z114 | zEC12 | Availability Date |
|---|---|---|---|---|---|---|
| **RHEL 5** | x | x | x | x | x | 03/2007 |
| **RHEL 6** | x | x | x | x | x | 11/2010 |
| **SLES 10** | x | x | x | x | x | 08/2006 |
| **SLES 11** | x | x | x | x | x | 03/2009 |

| | End of Production Ph 1 | End of Production Ph 2 | End of Production Ph 3 |
|---|---|---|---|
| **RHEL 5 support*** | **4Q 2011** | **4Q 2012** | **03/31/2014** |
| **RHEL 6 support*** | **4Q 2014** | **4Q 2015** | **11/30/2017** |

| | General support | Extended support | Self support |
|---|---|---|---|
| **SLES 10 support*** | **07/31/2013** | **07/31/2016** | **07/31/2016** |
| **SLES 11 support*** | **03/31/2016** | **03/31/2019** | **03/31/2019** |

- **For latest information and details contact your Linux distributor**
- Recommendation: use RHEL 6 or SLES 11 for new projects
- For latest information about supported Linux distributions on z System refer to: http://www.ibm.com/systems/z/os/linux/resources/testedplatforms.html

* SLES = SUSE Linux Enterprise Server
RHEL = Red Hat Enterprise Linux
Support dates may be changed by Linux distributors

# Linux is NOT an IBM Product

- The IBM team working on Linux on z Systems usually does not talk (or write) about its hardware-exploitation in public before the Announcement of the corresponding hardware feature

- After legal clearance IBM can talk about new items when it gives code to the Open Source community
  - We have to provide the code to the Open Source Community BEFORE we can submit them for integration into future distributions

- Distributions like SUSE Linux Enterprise Server and Red Hat Enterprise Linux are products of IBM's Linux distribution partners (LDPs): SUSE and Red Hat, Inc. IBM does NOT own these distributions:
  - We may have assumptions on content, GA-dates, etc. – but these are assumptions, nothing more
  - Future distributions or distribution release, as well as distribution schedules may not be mentioned by IBM

# Linux is NOT an IBM Product …

## Linux on z Systems distributions

- Are products owned by IBM's Linux Distribution Partners (LDPs)
- IBM's LDPs are: SUSE and Red Hat, Inc.
- IBM does not talk about the future of 3rd party products

IBM is working with its Linux distribution partners to include support in future Linux on z Systems distribution releases.

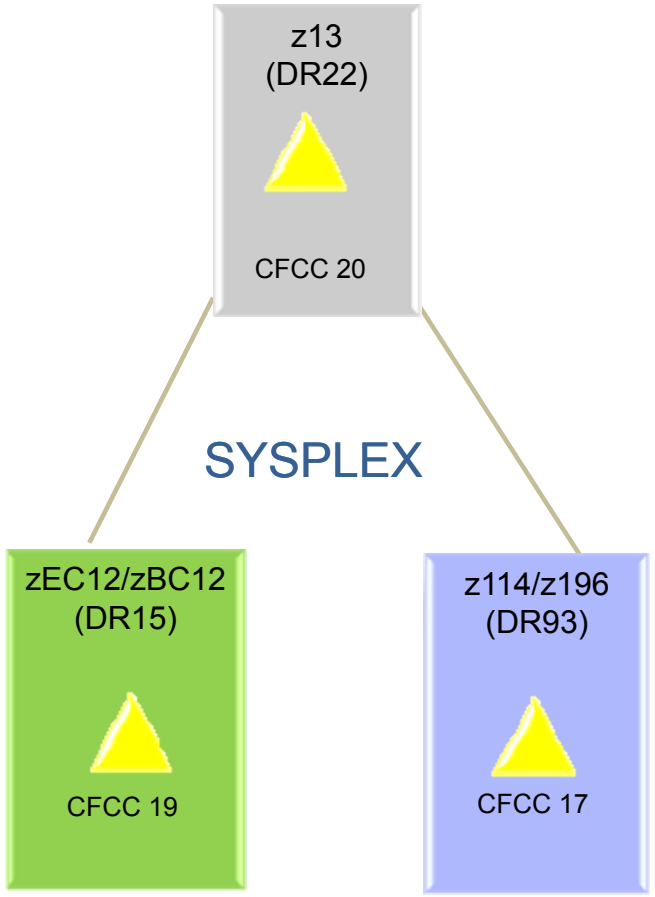
# Linux on z Systems - General Hardware Support

- **Usually, a new machine is transparent to Linux on z Systems**
  - Toleration is provided for the CPC
  - Some features like FICON Express16S require no code-change
- **IBM support statements for Linux on z Systems distributions are published on** www.ibm.com/systems/z/os/linux/resources/testedplatforms.html

# z13
# Parallel Sysplex and CFCC

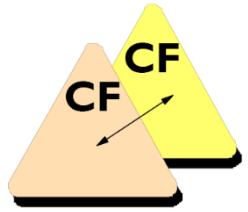
# Supported CFCC Levels for z13

- Coupling between z13 and zEC12 (2827) / zBC12 (2828)
  - Recommended minimal code level for zEC12 / zBC12:
    - CFCC Product Release 19 Service Level 2.14
    - Driver 15 bundle 21 / MCL H49559.011
- Coupling between z13 and z196 (2817) / z114 (2818)
  - Recommended minimal code level for z196 / z114
    - CFCC Product Release 17 Service Level 10.31
    - Driver 93 bundle 73 / MCL N48162.023

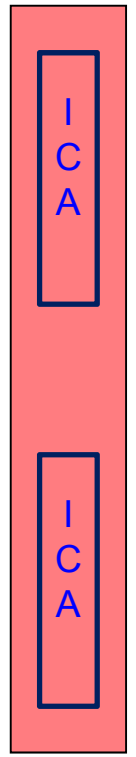



1. For latest recommended levels see the current exception letter published on Resource Link: https://www.ibm.com/servers/resourcelink/lib03020.nsf/pages/exceptionLetters?OpenDocument.
2. Additional CFCC info available at http://www.ibm.com/systems/z/advantages/pso/cftable.html

# Parallel Sysplex CFCC Level 20




- Support for up to 141 ICF processors
  - The maximum number of logical processors in a Coupling Facility Partition remains at 16
- Large memory Support
  - Improve availability for larger CF cache structures and data sharing performance with larger DB2 Group Buffer Pools (GBP). This support removes inhibitors to using large CF structures, enabling use of Large Memory to appropriately scale to larger DB2 Local Buffer Pools (LBP) and Group Buffer Pools (GBP) in data sharing environments.
  - Removes inhibitors to using large CF structures, enabling use of Large memory to appropriately scale to larger Local Buffer Pools (LBPs) and Group Buffer Pools (GBPs) in data sharing environments
  - CF structure size remains at a maximum of 1 TB
- Support for new ICA coupling adapters
- Structure and CF Storage Sizing with CFCC level 20
  - May increase storage requirements when moving from earlier CFCC levels to CF Level 20
  - Use of the CF Sizer Tool is recommended: http://www.ibm.com/systems/z/cfsizer/



ICA SR

IBM zEnterprise System®: Performance Report on Exploiting Large Memory for DB2 Buffer Pools with SAP®
➔ http://www.ibm.com/support/techdocs/atsmastr.nsf/WebIndex/WP102461

# Increased Number of Coupling CHPIDs

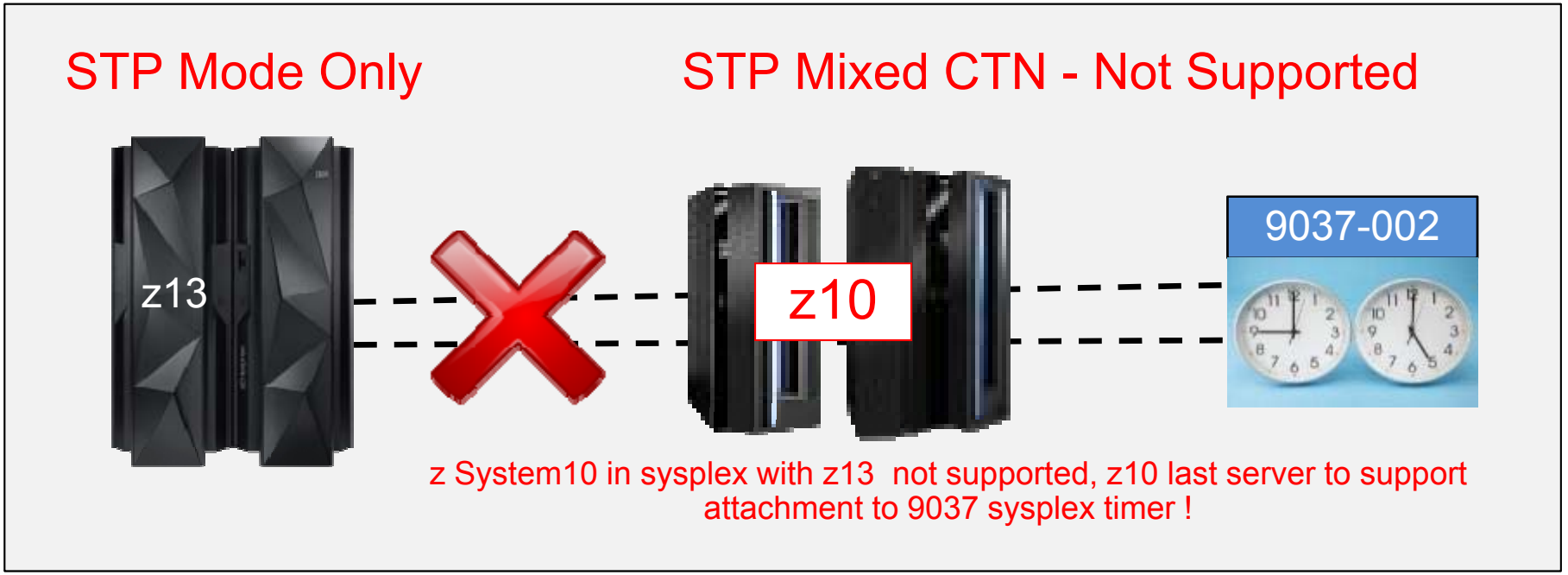
- Background
  - z Systems prior to the z13 supported a maximum of 128 Coupling CHPIDs
    - Combined total across CS5, ICP, and CIB CHPID types
  - Some customers are approaching the CHPID limit and may need to exceed it in the z13 timeframe
    - ICA SR coupling link and channel type introduced on z13
    - Migration configurations supporting old and new channel types tend to increase the number of links and CHPIDs used
- z13 supports up to 256 Coupling CHPIDs
  - 256 Coupling CHPIDs per z13
    - Double the number of coupling CHPIDs compared to the zEC12
    - Each CF image will continue to support max 128 CHPIDs
- Requirements
  - z13
  - z/OS V2.1, V1.13, V1.12*

* z/OS V1.12 will run on z13 provided the customer has IBM Software Support Services to get the PTFs

# Removal of Mixed CTN Support

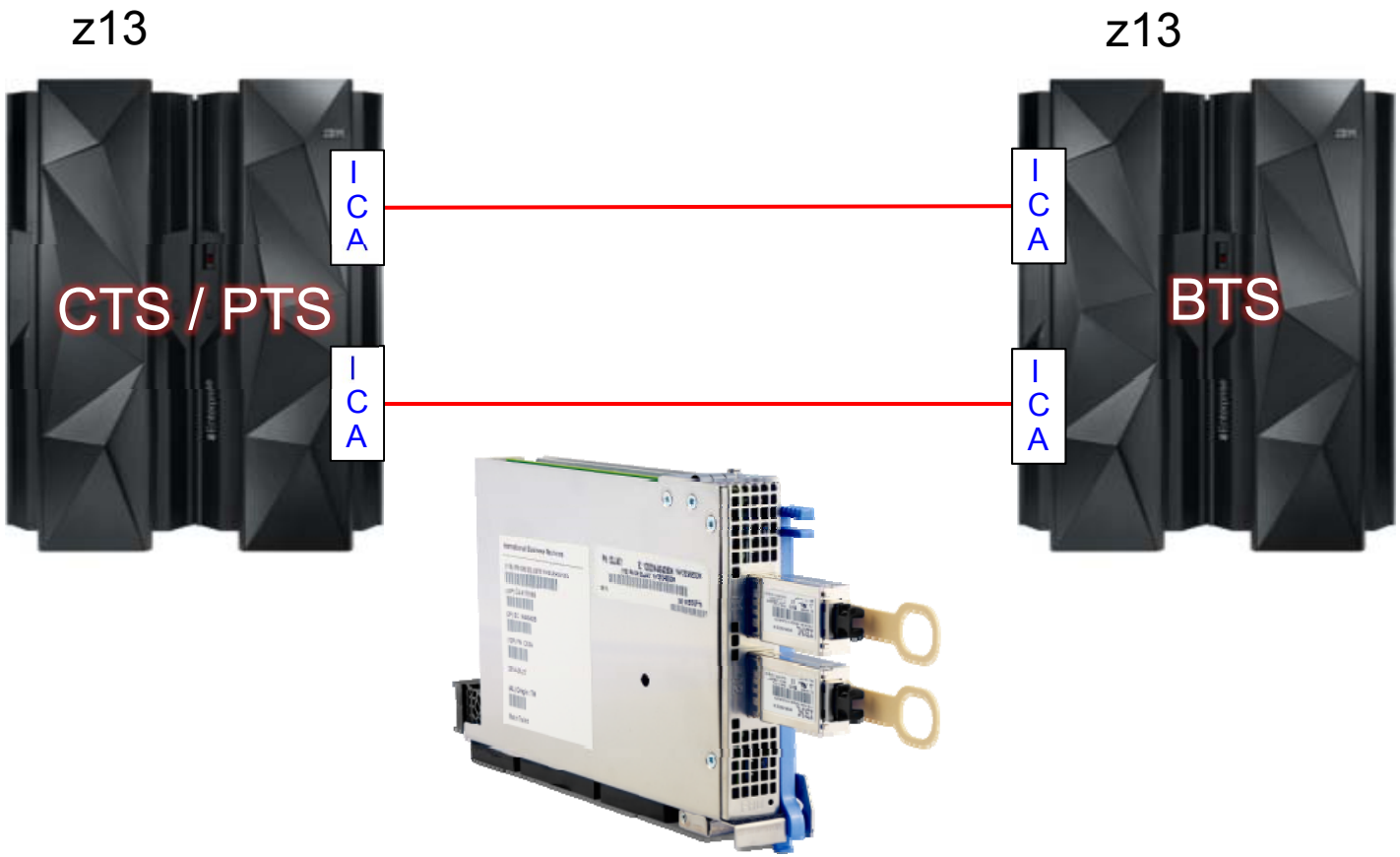
**z13 may not participate in a mixed Coordinated Timing Network (CTN)**

- Matches Statement Of Direction from zEC12 announce
- N-2 machine is z196 which does not support ETR
- Simplifies the code base
- Provides flexibility for future systems



# STP Support via ICA

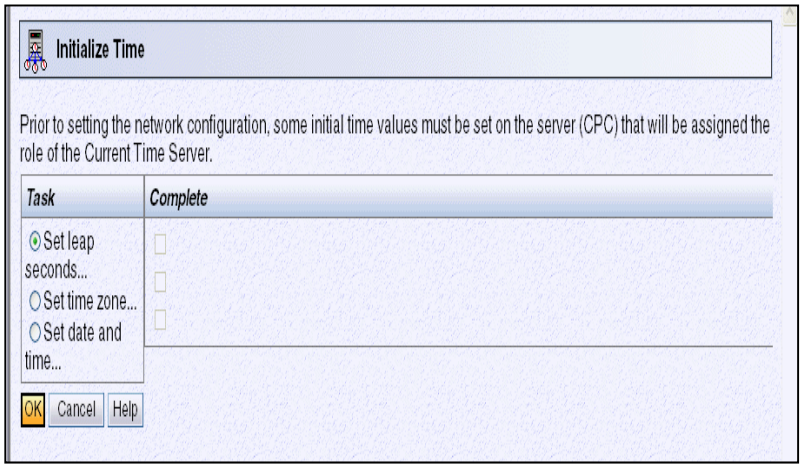
- **Support added to enable STP communications via IBM Integrated Coupling Adapter**



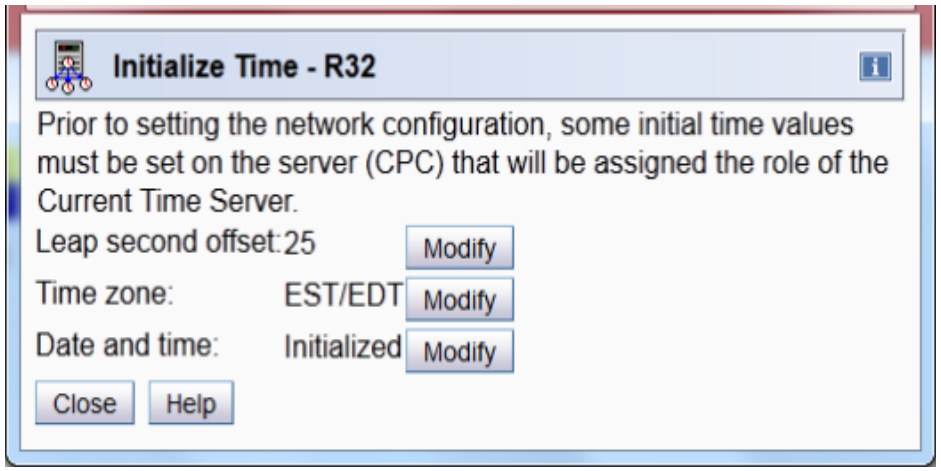
# STP Initialize Time Panel Enhancement

- Initialize Time Panel modified
  - Lists time zone and leap second offset, and indicates if system time was set
  - Customer can quickly check fields during CTN configuration

## Before (OLD)



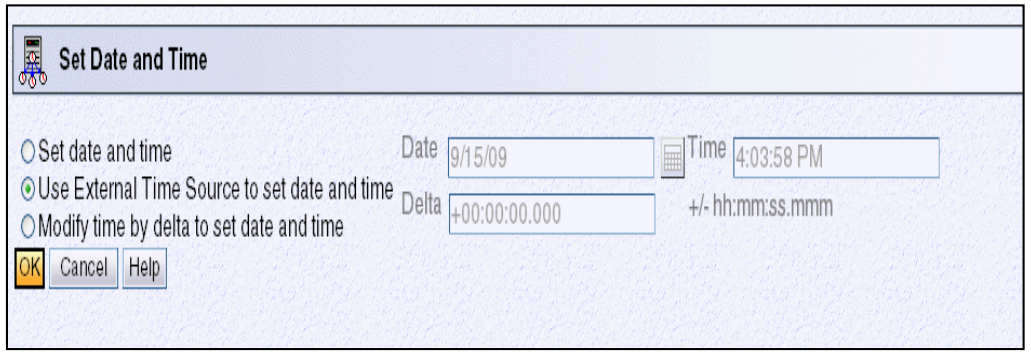

## After (NEW)



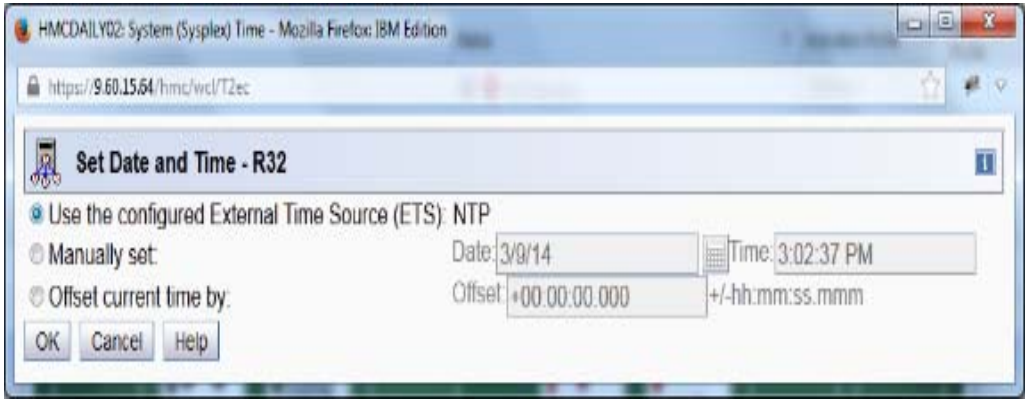
# STP Set Date and Time Panel Enhancement

- **Changed Set Date and Time initialization panel to encourage use of External Time Source to set CTN time**
  - Changed selection defaults, reordered selections, and added confirmation messages to other selections to ensure that customer is indeed using the appropriate time initialization during CTN configuration

Before (OLD)

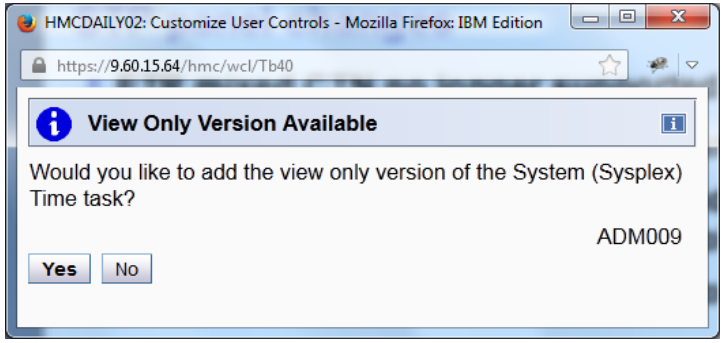


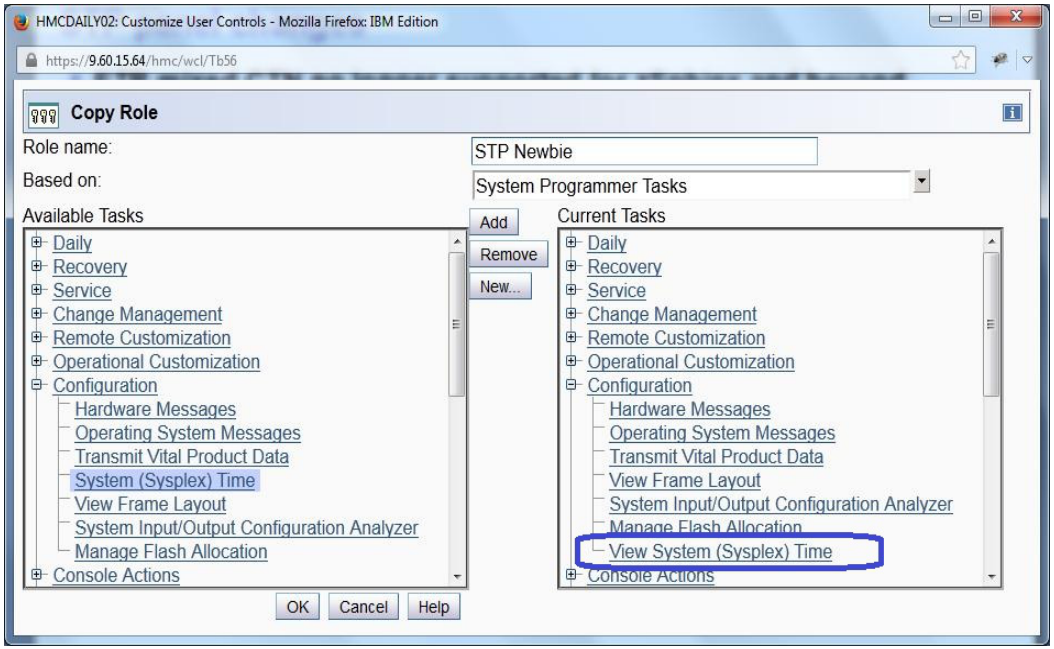

After (NEW)



# STP View-Only mode enhancement

- Added support for view-only STP panels. To implement:
  - Copy to create new task role, removing and adding STP.
  - View-only STP prompt to create task role with that attribute
  - Create user with that new task role to give attribute to user



# z13
# Connectivity for Coupling links and STP

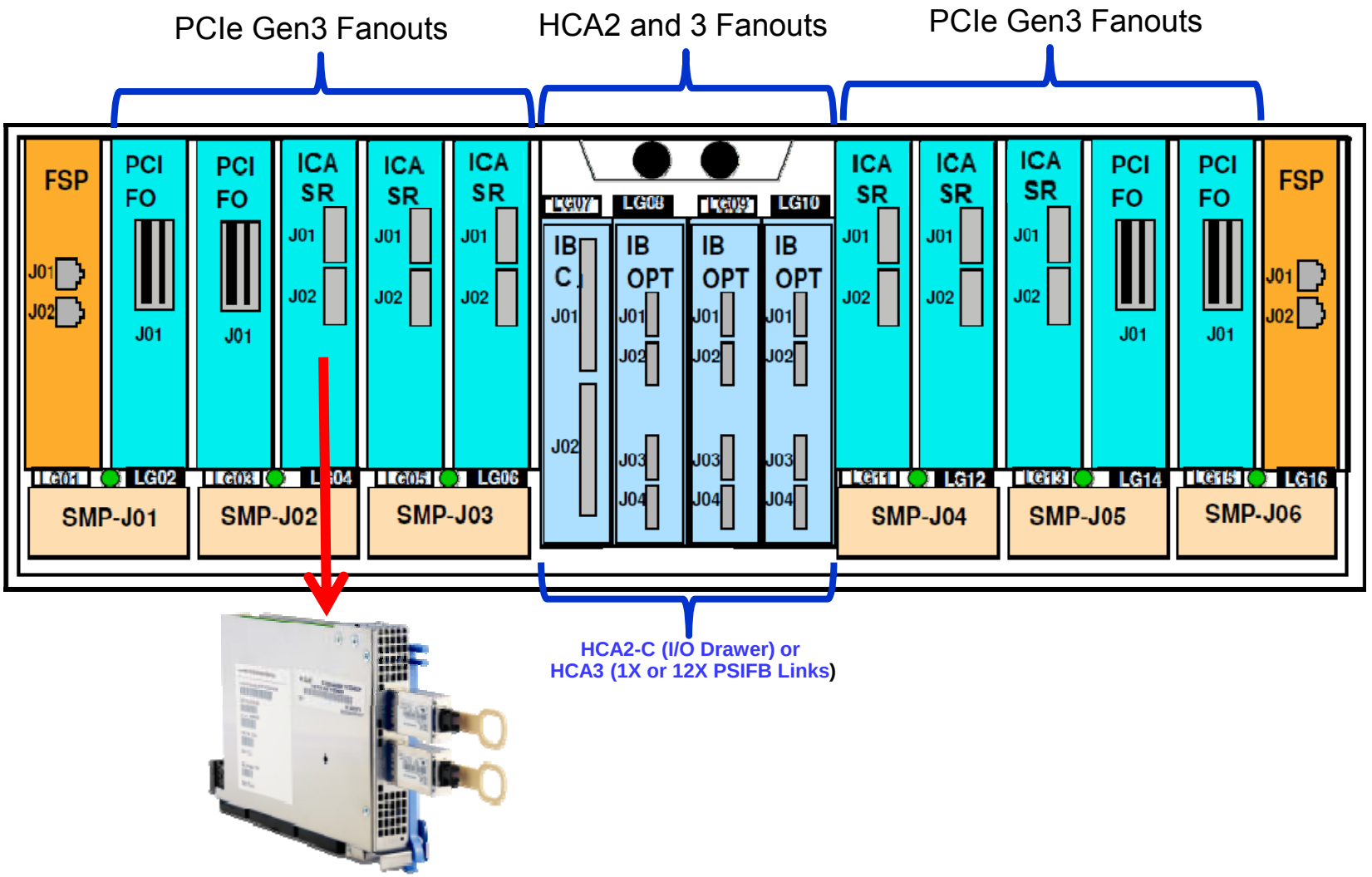
# z13 supports two different internal coupling infrastructures

- PCI Express Generation 3 (PCIe Gen3) I/O infrastructure introduced with z13
  - New Build for PCIe Gen3 Integrated Coupling Adapter (ICA) SR Coupling Fanout

- Host Channel Adapter I/O Fanouts (Infiniband coupling links)
  - New build and Carry Forward for HCA3-O only, 12x InfiniBand (#0171 - HCA3-O fanout) or 1x InfiniBand (#0170 - HCA3-O LR fanout) coupling links.
  - HCA2-O fanout for 12x IFB coupling links (#0163) and HCA2-O LR fanout for 1x IFB coupling links (#0168) New Build and Carry Forward are NOT SUPPORTED

ISC3 Links - FC 0217, 0218 and 0219, New Build and Carry Forward are NOT SUPPORTED

# CPC Drawer Front View – Coupling Links




(Integrated Coupling Adapter)

# Integrated Coupling Adapter (ICA SR)

Integrated Coupling Adapter SR (ICA SR), Fanout in the CPC drawer

- Recommended for Short Distance Coupling z13 to z13
  - not available on older servers
- No performance degradation compared to Coupling over Infiniband 12X IFB3 protocol

Hardware Details

- Short reach adapter, distance up to 150 m
- Up to 32 ports maximum
- IOCP Channel Type = CS5
- Feature code 0172, 2 ports per adapter
  - Up to 4 CHPIDs per port, 8 per feature, 7 buffers (i.e. 7 subchannels) per CHPID
- ICA requires new cabling for single MTP connector
  - Differs from 12X Infiniband split Transmit/Receive connector

Software Requirements

CF: z13 ; z/OS: z13

z/OS V2.1, V1.13, or V1.12 with PTFs for APARs OA44440 and OA44287

# Integrated Coupling Adapter (ICA SR) – AID Info

- **ICA SR is z13 to z13 only**
  - New CHPID type = CS5
  - AID is used for defining CS5 CHPIDs in HCD/IOCP
  - Plugs into CPC Drawer PCIe adapter slot (not associated with Resource Groups)
- **When installed, each ICA SR is assigned an Adapter ID (AID), same as IFB Links**
  - The AID has a number range of 24-37
  - The AID is permanently assigned to an ICA SR, based on the ICA SR serial number, for as long as it's installed in the same CPC
  - The algorithm for assigning AIDs will be based on physical location to enable the Order Process to accurately predict the AID for a new HCA
    - AIDs are shown on PCHID Report from eConfig when ICA SR is ordered

# ICA SR – eConfig example

```
Machine: 2964-N30  NEW1
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
 Source           Cage  Slot  F/C    PCHID/Ports or AID    Comment
 A15/LG07         A15A  LG07  0171   AID=0C                IFB 12x

 A15/LG10         A15A  LG10  0171   AID=0F                IFB 12x

 A15/LG02         A15A  LG02  0172   AID=2E                ICA SR

 A15/LG15         A15A  LG15  0172   AID=37                ICA SR


 Legend:
 Source  Book Slot/Fanout Slot/Jack
 A15A    CEC Drawer 1 in A frame
 0171    HCA3 O PSIFB 12x 2 Links
 0172    ICA SR 2 Links
```

Note: Minimum order for ICA SR is 1 adapter (2 ports). For availability customers should order adapters in pairs

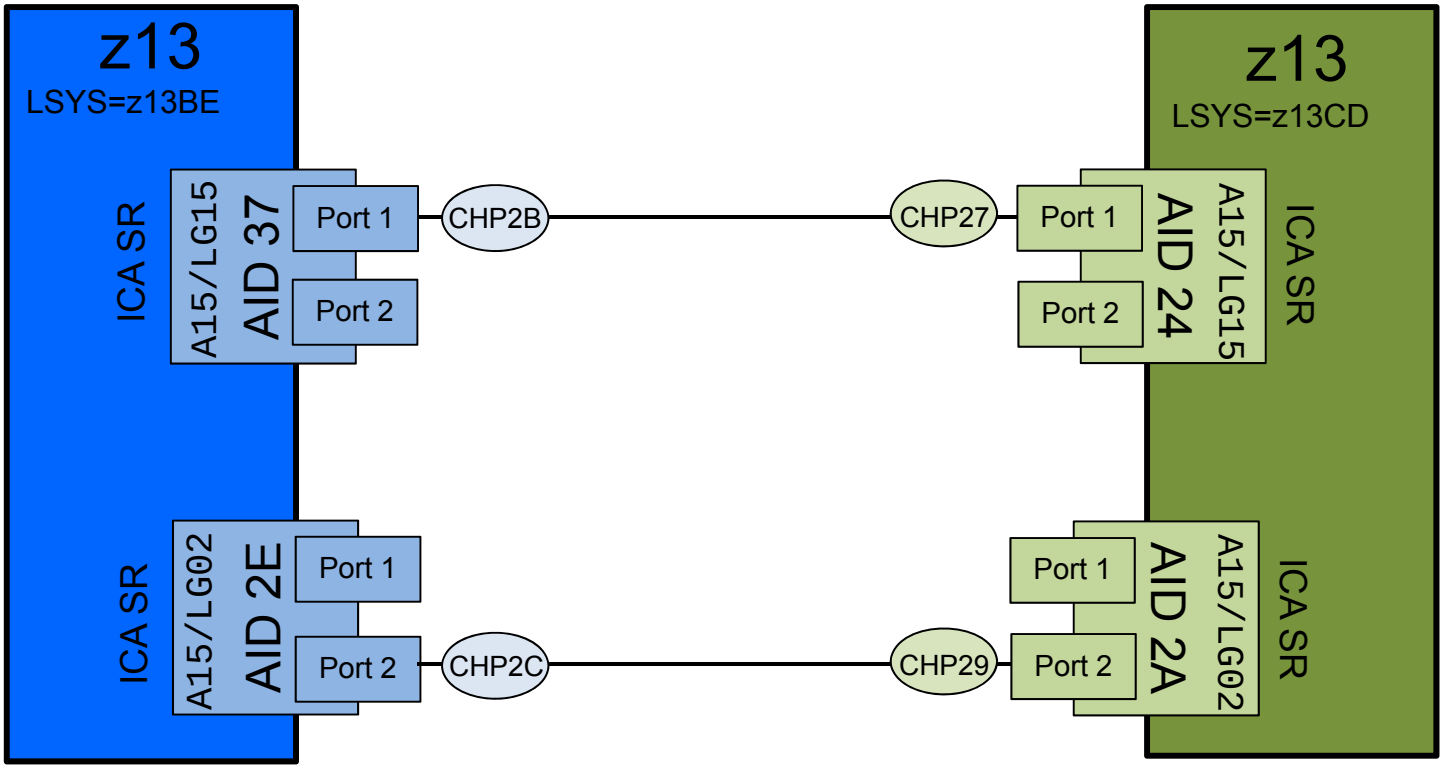
# ICA SR – AID Layout

## CPC Drawer AID (HEX Numbers)

| Adapter Slot# | Adapter Type | Logical Drawer0 (A27) | Logical Drawer1 (A23) | Logical Drawer2 (A19) | Logical Drawer3 (A15) |
|---|---|---|---|---|---|
| LG01 | FSP2 | - | - | - | - |
| LG02 | ICASR | 10 | 1A | 24 | 2E |
| LG03 | ICASR | 11 | 1B | 25 | 2F |
| LG04 | ICASR | 12 | 1C | 26 | 30 |
| LG05 | ICASR | 13 | 1D | 27 | 31 |
| LG06 | ICASR | 14 | 1E | 28 | 32 |
| LG07 | IFB | 00 | 04 | 08 | 0C |
| LG08 | IFB | 01 | 05 | 09 | 0D |
| LG09 | IFB | 02 | 06 | 0A | 0E |
| LG10 | IFB | 03 | 07 | 0B | 0F |
| LG11 | ICASR | 15 | 1F | 29 | 33 |
| LG12 | ICASR | 16 | 20 | 2A | 34 |
| LG13 | ICASR | 17 | 21 | 2B | 35 |
| LG14 | ICASR | 18 | 22 | 2C | 36 |
| LG15 | ICASR | 19 | 23 | 2D | 37 |
| LG16 | FSP2 | - | - | - | - |

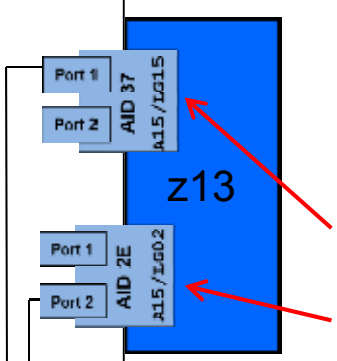
Note: eConfig will enforce plugging rules that will attempt to evenly distribute the ICASR and IFB adapters across multiple CPC drawer Slots.

# ICA SR – IOCP Example



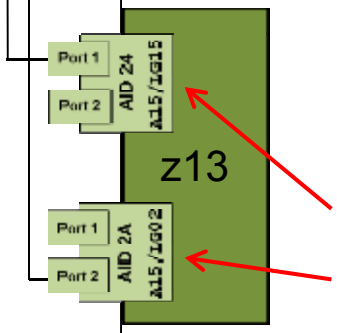

- Supports up to 4 CHPIDs per port
  - 8 CHPIDs per feature
  - 7 buffers (i.e. 7 subchannels) per CHPID.
- Supports IFB3 mode
- When a production IODF is built, all CS5 channel paths have to be connected

# ICA SR – IOCP Example




z13BE

```
ID    MSG1='''SYS0.IODF52 z13BE IODF''',                                    *
            MSG2='SYS0.IODF52 - 2010-10-15 10:48',SYSTEM=(2964,1),          *
            LSYSTEM=z13BE                                                   *
            TOK=('z13BE',00800002B16529641048142301102 88F00000000,00*
            000000,'14-10-07','10:48:14','SYS0','IODF52')
      RESOURCE PARTITION=((CSS(0),(LPSB,1),(LPSE,2),                        *
      CHPID PATH=(CSS(0),2B),SHARED,PARTITION=((LPSB,LPSE),(=)),            *
            CPATH=(CSS(0),27),CSYSTEM=z13CD,AID=37,PORT=1,TYPE=CS5
      CHPID PATH=(CSS(0),2C),SHARED,PARTITION=((LPSB,LPSE),(=)),            *
            CPATH=(CSS(0),29),CSYSTEM=z13CD,AID=2E,PORT=2,TYPE=CS5
```




z13CD

```
ID    MSG1='''SYS0.IODF52 z13CDG IODF''',                                   *
            MSG2='SYS0.IODF52 - 2010-10-15 10:48',SYSTEM=(2964,1),          *
            LSYSTEM=z13CD,                                                  *
            TOK=('z13CDG',00800002B16529641606380401102 50F00000000,0       *
            0000000,'14-10-07','16:06:38','SYS0','IODF52')
      RESOURCE PARTITION=((CSS(0),(LPC5,3),(LPSC,1),(LPSD,2),               *
      CHPID PATH=(CSS(0),27),PARTITION=((LPC5),(=)),                        *
            CPATH=(CSS(0),2B),CSYSTEM=z13BE,AID=24,PORT=1,TYPE=CS5
      CHPID PATH=(CSS(0),29),PARTITION=((LPC5),(=)),                        *
            CPATH=(CSS(0),2C),CSYSTEM=z13BE,AID=2A,PORT=2,TYPE=CS5
```

# ICA SR AIDs and CPC Drawer Upgrades

Upgrades from z13 Model N30 to higher CPC drawer configurations

- Adapter placement will be rebalanced across multiple CPC drawers
- Retains existing adapter ID's to avoid IOCP definition changes (moves noted in eConfig placement report)

```
28361817                        PCHID REPORT                          Oct 10,2014
 Machine: 2964-N63  SN1
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
 Source           Cage  Slot  F/C    PCHID/Ports or AID              Comment
 A15/LG02         A15A  LG02  0172   AID=??

 A15/LG15         A15A  LG15  0172   AID=??

 A19/LG02         A19A  LG02  0172   AID=??                          AID Moved

 A19/LG15         A19A  LG15  0172   AID=??                          AID Moved

                           I/O Movement Report
       Source           Cage  Slot  F/C    PCHID/Ports or AID        Comment
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
 FROM  A15/LG14         A15A  LG14  0172
 TO    A19/LG15         A19A  LG15  0172
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
 FROM  A15/LG03         A15A  LG03  0172
 TO    A19/LG02         A19A  LG02  0172

 Legend:
 Source  Book Slot/Fanout Slot/Jack
 A15A    CEC Drawer 1 in A frame
 A19A    CEC Drawer 2 in A frame
 0172    ICA SR 2 Links
```

# ICA SR Advantages

- Greater Connectivity
  - z13 provides more ICA coupling fanouts per CPC drawer when compared to 12X Coupling over Infiniband on either z196 or zEC12
  - A single z13 CPC drawer supports up to 20 ICA links vs 16 12X on z196 / zCE12, 8 12X on z13
- Flexibility
  - Utilizing ICA frees HCA slots for *essential* Coupling over Infiniband during migration
- Minimize Impact to Infrastructure Cost
  - For z13 to z13 connectivity, using ICA in place of Coupling over Infiniband may enable clients to remain in the same CPC footprint as their z196 or zEC12 enterprises

| PSIFB and ICA Coupling Link Maximums | | | | |
|---|---|---|---|---|
| Books / Drawers ➔ | 1 | 2 | 3 | 4 |
| **ICA (2 port/fanout, short distance) [1 & 3]** | | | | |
| z196/zEC12 Links (ports) | n/a | | | |
| z13 Links (ports) | 20 | 32 | 32 | 32 |
| **12X IFB (2 port/fanout, short distance) [2 & 3]** | | | | |
| z196/zEC12 Links (ports) | 16 | 32 | 32 | 32 |
| z13 Links (ports) | 8 | 16 | 24 | 32 |
| **1X IFB (4 port/fanout, long distance) [2 & 3]** | | | | |
| z196/zEC12 Links (ports) | 32 | 64 | 64 | 64 |
| z13 Links (ports) | 16 | 32 | 48 | 64 |

*NOTES*

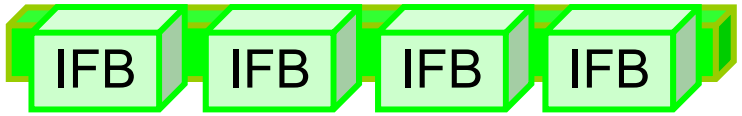
1) *ICA supports z13 to z13 connectivity only*
2) *PSIFB links contend for adapter space. Total port counts vary depending upon mix of 1x and 12x links configured and will never exceed the single 1x maximum of 64 ports total.*
3) *PSIFB and ICA links type do not contend with each other for adapter space, can have a max of 64 PSIFB 1x ports and 32 ICA ports for 96 ports total*

# HCA3 for Coupling Links

HCA3-O for 12x IFB & 12x IFB3


Up to 16 CHPIDs – across 2 ports*

HCA3-O LR for 1x IFB




Up to 16 CHPIDs – across 4 ports*

- 12x InfiniBand and 1x InfiniBand fanout features
- Exclusive to z13, zEC12, zBC12, z196 and z114
  - HCA3-O fanout for 12x InfiniBand coupling links
    - CHPID type – CIB
      - Improved service times with 12x IFB3 protocol
      - Two ports per feature
      - Fiber optic cabling – 150 meters
      - Supports connectivity to HCA2-O
      - Link data rate of 6 GBps
  - HCA3-O LR fanout for 1x InfiniBand coupling links
    - CHPID type – CIB
      - Four ports per feature
      - Fiber optic cabling
        - 10 km without repeaters, RPQ 8P2263 or 8P2340 is required for 20 km support
        - Extended distances of up to 100 km are also possible using Dense Wavelength Division Multiplexors (DWDMs)
        - Over 100 km requires RPQ 8P2263 or 8P2340
      - Supports connectivity to HCA2-O LR
      - Link data rate server-to-server 5 Gbps
      - Link data rate with DWDM; 2.5 or 5 Gbps

* Performance considerations may reduce the number of CHPIDs per port

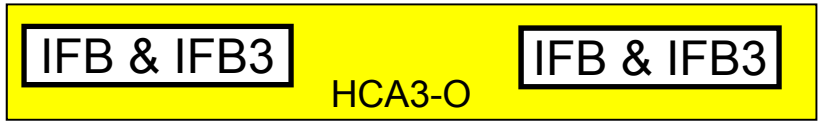
Note: The InfiniBand link data rates of 6 GBps, 3 GBps, 2.5 Gbps, or 5 Gbps do not represent the performance of the link. The actual performance is dependent upon many factors including latency through the adapters, cable lengths, and the type of workload.

# Coupling links on z13

| Type | Speed | Distance | Fanout |
|---|---|---|---|
| **ICA SR** | 8 GBps | 150 meters | ICA SR |
| **12x InfiniBand** | 6 GBps | 150 meters | HCA3-O |
| **1x InfiniBand** | 5 or 2.5 Gbps | 10 km | HCA3-O LR |

Up to 4 CHPIDs – per port


Up to 16 CHPIDs – across 2 ports




Up to 16 CHPIDs – across 2 ports*


Up to 16 CHPIDs – across 4 ports*

- Ports exit from the front of a CPC drawer with HCA3s or ICA SRs.
- ICA SR
  - 8 GBps
- 12x InfiniBand
  - 6 GBps
- 1x InfiniBand
  - 5 Gbps (Server to Server and with DWDM)
  - 2.5 Gbps (with DWDM)

* Performance considerations may reduce the number of CHPIDs per port

# 24x PCIe Gen3 Cable OM3/OM4 50/125 um MMF Cabling

- 24x PCIe Gen3 Cable required for new IBM Integrated Coupling Adapter (ICA SR)
- IBM strongly recommends clients order cabling for the ICA SR through Anixter or IBM Global Technology Services to get IBM qualified cables
  - Cable Distributor:
    - Anixter ibmcabling@anixter.com
  - Cable Suppliers:
    - Computer Crafts Inc. www.computer-crafts.com/
    - Tyco http://www.te.com/
    - Fujikura RBFiber@fujikura.com

- Fiber Core – 50 / 125 um MF
- Light Source – SX Laser
- Fiber bandwidth @ wavelength
  - 2000 MHz-km @850 nm OM3 for 100m Max Length
  - 4700 MHz-km @850 nm OM4 for 150m Max Length
- For more information, refer to
  - IBM z Systems Planning for Fiber Optic Links (FICON/FCP, Coupling Links, and Open System Adapters), GA23-1407, available in the Library section of Resource Link at http://www.ibm.com/servers/resourcelink/svc03100.nsf?OpenDatabase

# 24x PCIe Gen3 Cable Lengths OM3/OM4 50/125 um MMF Cabling

- Sample set of OM3,OM4 Tab Drawings and 24-fiber cable assembly lengths (for ICA SR)

| Item Description | Cable Length (m) | Cable Type | Connector Type |
|---|---|---|---|
| Tab Drawing: Fiber Optics – MTP / 24 OM4 (E1) | N/A | NA | N/A |
| Single 24-fiber cable assembly | 8.0m | OM4 | MTP-MTP |
| Single 24-fiber cable assembly | 10.0m | OM4 | MTP-MTP |
| Single 24-fiber cable assembly | 13.0m | OM4 | MTP-MTP |
| Single 24-fiber cable assembly | 15.0m | OM4 | MTP-MTP |
| Single 24-fiber cable assembly | 20.0m | OM4 | MTP-MTP |
| Single 24-fiber cable assembly | 40.0m | OM4 | MTP-MTP |
| Single 24-fiber cable assembly | 80.0m | OM4 | MTP-MTP |
| Single 24-fiber cable assembly | 120.0m | OM4 | MTP-MTP |
| Single 24-fiber cable assembly | 150.0m | OM4 | MTP-MTP |
| Single 24-fiber cable assembly | Custom Length < 150.0m | OM4 | MTP-MTP |
| | | | |
| Tab Drawing: Fiber Optics – MTP / 24 OM3 (E1) | N/A | NA | N/A |
| Single 24-fiber cable assembly | 8.0m | OM3 | MTP-MTP |
| Single 24-fiber cable assembly | 10.0m | OM3 | MTP-MTP |
| Single 24-fiber cable assembly | 13.0m | OM3 | MTP-MTP |
| Single 24-fiber cable assembly | 15.0m | OM3 | MTP-MTP |
| Single 24-fiber cable assembly | 20.0m | OM3 | MTP-MTP |
| Single 24-fiber cable assembly | 40.0m | OM3 | MTP-MTP |
| Single 24-fiber cable assembly | 80.0m | OM3 | MTP-MTP |
| Single 24-fiber cable assembly | 100.0m | OM3 | MTP-MTP |
| Single 24-fiber cable assembly | Custom Length < 100.0m | OM3 | MTP-MTP |

# Coupling links using InfiniBand Trade Association standard

- 12x Multi-fiber Push-On (MPO) connector
- 24-fiber cable with Duplex MPO connectors
  - 12 fibers for transmit and 12 fibers for receive
  -

| | | 3 GBps | | 6 GBps | |
|---|---|---|---|---|---|
| **Fiber Core (µ ) (Light source)** | **Fiber Bandwidth @ wavelength** | **Unrepeated distance** | **Optical passive loss** | **Unrepeated distance** | **Optical passive loss** |
| 50µ MM (SX laser) | 2000 MHz-km @ 850 nm | 150 meters 492 feet | 2.06 dB | 150 meters 492 feet | 2.06 dB |

12x InfiniBand links operating at 6 GBps (5.0 Gbps per lane) are used to connect z13/zEC12/zBC12/z196/z114 servers

# Supported 12x InfiniBand cable lengths

*OM3 50/125 micrometer multimode fiber optic cabling*

- **Cables available from:**
  - IBM Global Technology Services (GTS)
  - Anixter www.anixter.com/
  - Computer Crafts Inc. www.computer-crafts.com/
  - Tyco www.tycoelectronics.com/
  - Fujikura www.fujikura.com/
- **Fiber core – 50u multimode**
- **Light source – SX laser**
- **Fiber bandwidth @ wavelength: 2000 MHz-km @ 850 nm**
- **IBM cable part numbers highly recommended**

| Item Description | Cable IBM P/N | Cable Length Meters | Cable Length Feet | Connector Type |
|---|---|---|---|---|
| Duplex 24-fiber cable Assembly | 41V2466 | 10.0 m | 32.8 f | MPO - MPO |
| Duplex 24-fiber cable Assembly | 15R8844 | 13.0 m | 42.7 f | MPO - MPO |
| Duplex 24-fiber cable Assembly | 15R8845 | 15.0 m | 49.2 f | MPO - MPO |
| Duplex 24-fiber cable Assembly | 41V2467 | 20.0 m | 65.6 f | MPO - MPO |
| Duplex 24-fiber cable Assembly | 41V2468 | 40.0 m | 131.2 f | MPO - MPO |
| Duplex 24-fiber cable Assembly | 41V2469 | 80.0 m | 262.4 f | MPO - MPO |
| Duplex 24-fiber cable Assembly | 41V2470 | 120.0 m | 393.7 f | MPO - MPO |
| Duplex 24-fiber cable Assembly | 41V2471 | 150.0 m | 492.1 f | MPO - MPO |
| Duplex 24-fiber cable Assembly | 42V2083 | Custom | N/A | MPO - MPO |

# Coupling links using InfiniBand Trade Association standard

- **1x InfiniBand**
- **LC Duplex connector**
- **One pair of fiber (1x) – one fiber for transmit and one fiber for receive**

| | | 2.5 Gbps | | 5 Gbps | |
|---|---|---|---|---|---|
| **Fiber Core (µ ) (Light source)** | **@ wavelength** | **Unrepeated distance** | **Optical passive loss** | **Unrepeated distance** | **Optical passive loss** |
| 9µ SM LR laser | @ 1310 nm | 10 km 6.2 miles | 5.66 dB | 10 km 6.2 miles | 5.66 dB |

- **All attachments to an outside cable plant (including public "dark fiber") are supported only through a patch panel or Wavelength Division Multiplexer (WDM) product.**
- **10 to 100 km repeated with an InfiniBand qualified DWDM. (STP qualification is also required if STP is in use.)**

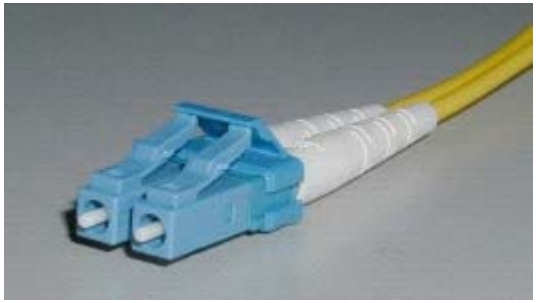
# 1x InfiniBand

*9/125 micrometer single mode fiber optic cabling*

- **Cables available from:**
  - IBM Global Technology Services (GTS)
  - Your preferred cable provider
- **Fiber core – 9µ single mode**
- **Light source – LX laser @ wavelength: @ 1310 nm**

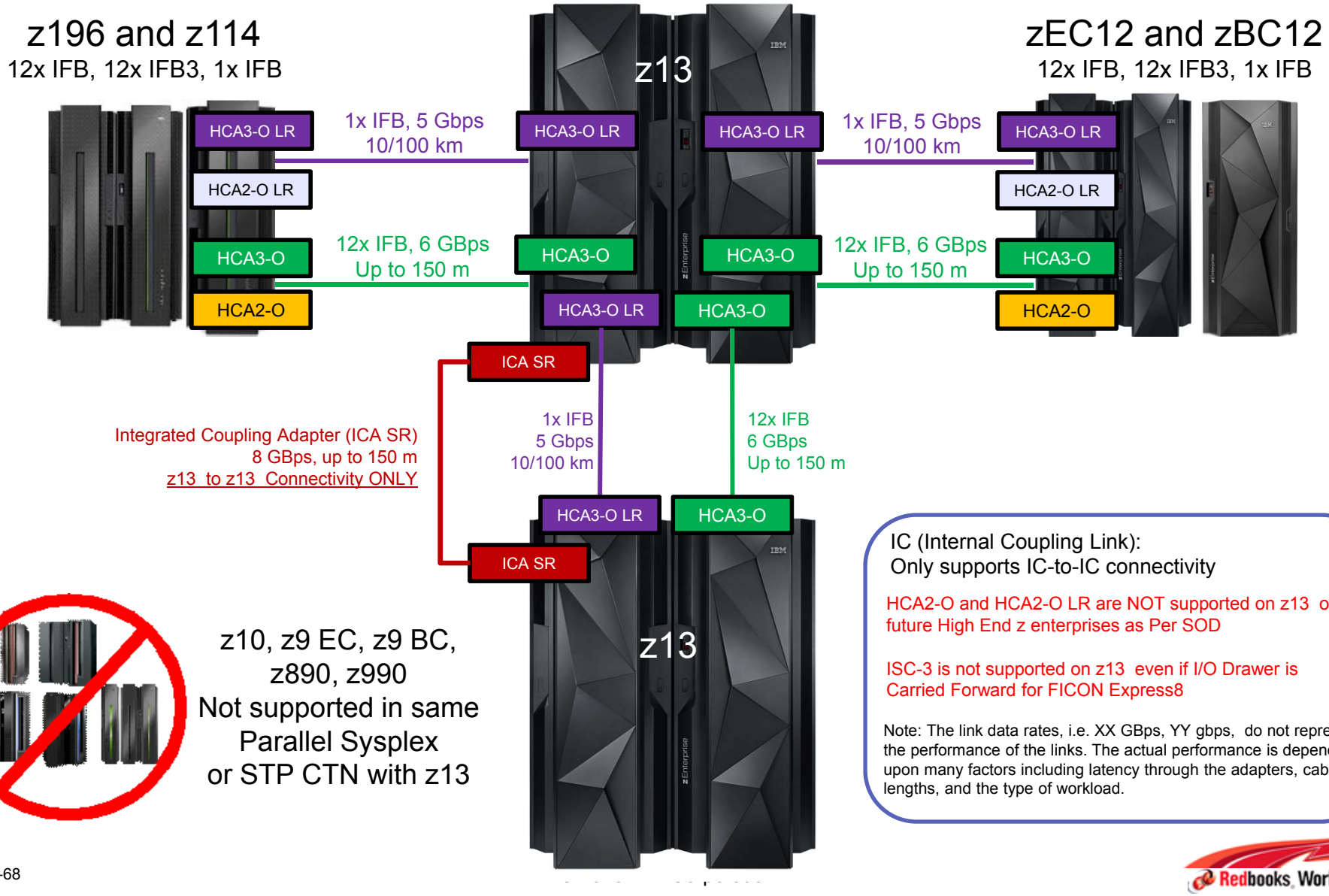
**Note: the fiber optic cabling is the same as used with ISC-3, FICON LX, 10 GbE LR, and GbE LX**

LC Duplex connector



LC Duplex harness

# z13 Parallel Sysplex Coupling Connectivity



# Coupling Link History (z10 to current)

| Sysplex Coexistence ➔ | N - 3 | N - 2 | N - 1 | N | |
|---|---|---|---|---|---|
| | **z10 EC** (WDfM) | **z196** (WDfM) | **zEC12** | **z13** | **Comments** |
| **ICB** | NB, CF | Not Supported | Not Supported | Not Supported | Short Distance High Bandwidth |
| **ISC3** | NB & CF | NB & CF | CF | Not Supported | Long Distance Lower Bandwidth |
| **HCA2-O 12x** | NB | NB & CF | CF | Not Supported | Short Distance High Bandwidth |
| **HCA2-O 1x LR** | NB | NB & CF | CF | Not Supported | Long Distance Lower Bandwidth |
| **HCA3-O 12x** | Not Available | NB | NB & CF | NB & CF | Short Distance High Bandwidth |
| **HCA3-O 1x LR** | Not Available | NB | NB & CF | NB & CF | Long Distance Lower Bandwidth |
| **ICA SR** | Not Available | Not Available | Not Available | NB | Short Distance High Bandwidth |
| **INTERNAL COUPLING** | Yes | Yes | Yes | Yes | Internal to server only High Bandwidth |

NB = New Build, Technology Exchange, Migration Offering
CF = Carry Forward, available via MES upgrade from pervious technology only

Note: z13 and zEC12 available for marketing, all other servers withdrawn from marketing

# z13 Parallel Sysplex Coupling Link Summary

- InfiniBand Coupling Links Support (same HCA3-O adapters as used on zEC12)

  - HCA3-O LR 1x, 5 Gbps long distance links – Up to 16 features (4 per drawer) = 64 ports
  - Up to 4 CHPID definitions per port, 4 ports per feature
  - CHPID TYPE=CIB

  - HCA3-O 12x, 6 GBps (150 m) – Up to 16 features (Up to 4 per drawer) = 32 ports
  - Recommend up to 4 CHPID definitions per port for IFB3 protocol, 2 ports per feature
  - CHPID TYPE=CIB

- ICA SR (PCIe-O SR), 2 ports per feature

  - PCIe-O SR, 8 GBps (150 m) – Up to 16 features (Up to 10 per drawer) = 32 ports
  - Up to 4 CHPIDs per port, 8 CHPIDs per feature
  - CHPID TYPE=CS5

  – Cable/point to point maximum distance options:
  150 Meters – OM4 (24 fiber, 4700 MHz-km 50/125 micron fiber with MTP connectors)
  100 Meters – OM3 (24 fiber, 2000 MHz-km 50/125 micron fiber with MTP connectors)
  (Note: InfiniBand 12x DDR links also use 24 fiber OM3 cabling with different MPO connectors)

- Internal Coupling Links
  - Microcode - no external connection
  - Only between LPARs same processor

# z13
# Migrations Considerations and Recommendations

# Migration Considerations and Recommendations

- **OBJECTIVE**
  - Enable clients to migrate to z13, supporting legacy coupling where essential and adopting ICA SR where possible to avoid potential need for additional CPC drawers and other migration hurdles
- **Statements of Direction**
  - zEC12/zBC12 is the last generation to support ISC-3, 12X HCA2-O, 1X HCA2-O LR, and participate in a Mixed CTN; for z13, clients must migrate to ICA SR, PSIFB Coupling links, and STP only CTNs
- **Consider Long Distance Coupling Requirements First**
  - 1X is the only long distance coupling link available on z13; keep IFB fanout slots free for 1x PSIFB where possible
  - ICA SR or 12x PSIFB can fulfill short distance requirements
- **ISC-3 Migration: z13 does not support ISC-3**
  - Evaluate client's current ISC-3 usage (long distance, short distance, coupling data, timing only, etc.) to determine how to fulfill ISC-3 requirements with the links available on z13
  - Clients can migrate from ISC-3 to ICA SR, 12x PSIFB, or 1x PSIFB on z13
  - 1:1 Mapping of ISC-3 to Coupling over Infiniband
    - Today, HCA2-C CPC fanouts enable ISC-3 coupling in the I/O Drawer
      - 2 HCA2-C fanouts can by replaced by 2 1x PSIFB fanouts (8 1x links) or 2 12x PSIFB fanouts fanouts (4 12x links)
    - ISC-3 supports 1 CHPID/link
      - Consolidate ISC-3 across ICA SR or PSIFB Couplink links; leverage multiple CHPIDs/link
- **Eliminate FICON Express8, Keep IFB fanout slots free for PSIFB Coupling links**
  - HCA2-C fanouts connect to I/O Drawer(s); HCA2-C utilize IFB fanout slots (shared with PSIFB Coupling links)
  - Legacy I/O Drawer only supports FICON Express8 on z13
  - Replace FICON Express8 with PCIe version; eliminate need for I/O Drawer and HCA2-C fanouts

# Migration Considerations and Recommendations cont.

- **Evaluate customer configurations for opportunities to eliminate or consolidate Infiniband links**
  - Eliminate any redundant links; 2 links between CPCs is the minimum needed for RAS/availability
  - Consolidate logical (CHPID), physical (link) connections to reduce the usage of Infiniband links in z13
  - Coupling Link Analysis: Capacity Planning and services can help. See next chart
- **Adopt the new ICA SR coupling link**
  - Use ICA SR in place of some (or all) of existing PSIFB links for z13 to z13 connectivity
- **Install all the ICA SR links required to fulfill future short distance coupling requirements**
  - When upgrading a CPC to z13, configure the z13 EC with all the ICA SR coupling links that will eventually be needed (i.e. avoid loose piece MES with ICA SR links) in an all z13 and beyond sysplex
  - Even if the links won't be used right away due to PSIFB being used for connectivity back to z196 or zEC12, if the ICA SR links are already installed, then they will be available for eventual ICA SR-to-ICA SR connectivity when the rest of the CPCs are upgraded to z13 or future Servers
- **Upgrade the least coupling constrained CPCs first**
  - **Where possible, choose CPCs where additional z13 CPC drawers would not be needed**
  - Test out new ICA SR link on least constrained CPCs (ex: z/OS Host CPCs that only have a few links)
    - For CPCs that don't have a CF, this may require adding a CF LPAR and ICF engine to one of the CPCs
  - Then, when migrating the more coupling constrained CPCs to z13, begin utilizing enough ICA SR links in place of PSIFB links (ex: ½ ICA SR, ½ 12X) to maintain the CPC footprint
- **Large I/O Configurations Introducing ICA Coupling on 1 or 2 CPC Drawer Footprints**
  - Identify when the CPC requires high PCIe I/O slot usage to support both PCIe Gen3 and ICA fanouts
  - Reduce the PCIe I/O feature count to require fewer PCIe Gen3 fanouts or install fewer ICA fanouts

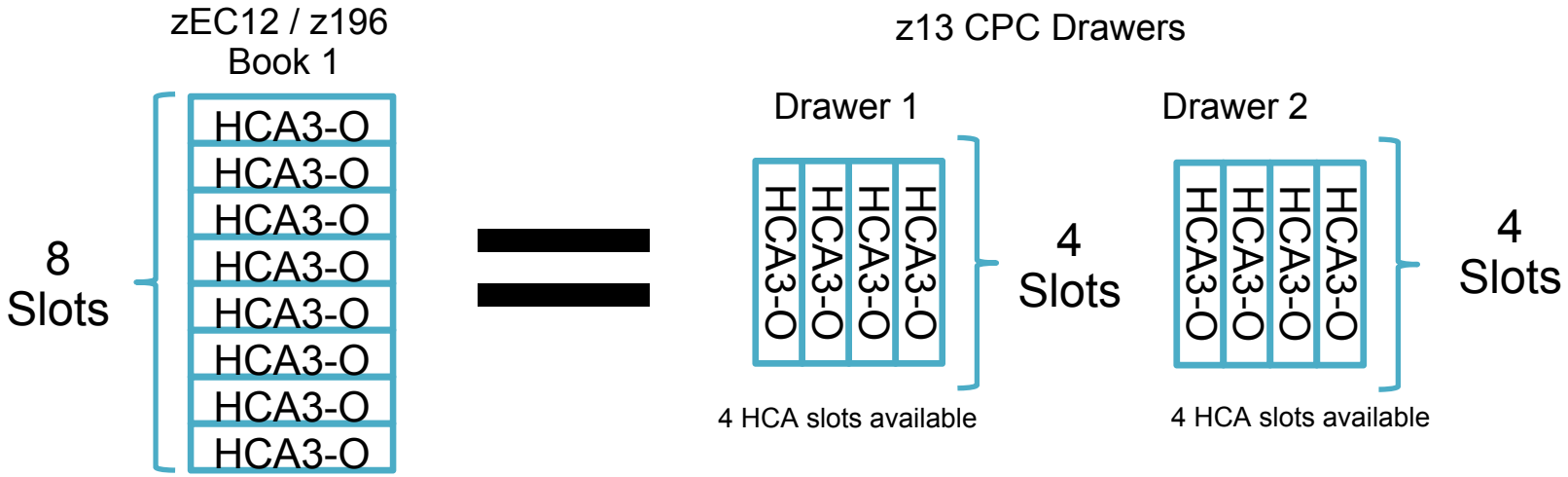
# Capacity Planning Resources for Coupling Links

- **Clients may consider changing their coupling link configuration when migrating to z13**
  - This may help clients avoid the need for additional processor drawers
- **Capacity planning recommended for scenarios with complexity beyond 1:1 re-mapping into z13**
- **zCP3000** (User-Driven Analysis) http://w3-03.ibm.com/support/techdocs/atsmastr.nsf/WebIndex/PRS1772
  - Can identify model coupling link performance deltas (Ex: 12X IFB vs. 12X IFB3)
  - Can identify current request queueing issues
  - Can identify model service time change or CF or SYS moving to a faster engine
  - 2 relevant zCP3000 reports
    - Available on Analysis menu for a specific CF-SYS link
    - CFL004 - Subchannel busy: subchannel busy appears only if partitions are sharing CHPIDs
    - CFL007 - Delayed requests: if a subchannel is unavailable when z/OS wants to run a request
- **Global Techline** (Services Team-Driven Analysis) http://w3.ibm.com/support/techline
  - Resource for pre-sales capacity planning and CF Analysis; works closely with ATS
  - Will work with client teams on specific configuration issues and analysis; will drive zCP3000 analysis
  - Techline team has been notified about the z13 Coupling Link Migration considerations and can address field requests by client teams who may need capacity planning help, particularly to support their z13 proposal writing and sales
  - Techline Link for Data Collection Guide for Capacity Planning
    - http://w3-03.ibm.com/support/techline/tskms/kms_content/PRS2664_migrated.html

# HCA3-O Fanouts: z13 verses z196 / zEC12


If on z13, clients choose to maintain the same (or greater) number of PSIFB coupling links that exist on their z196/zEC12 enterprises, this may drive additional CPC drawers

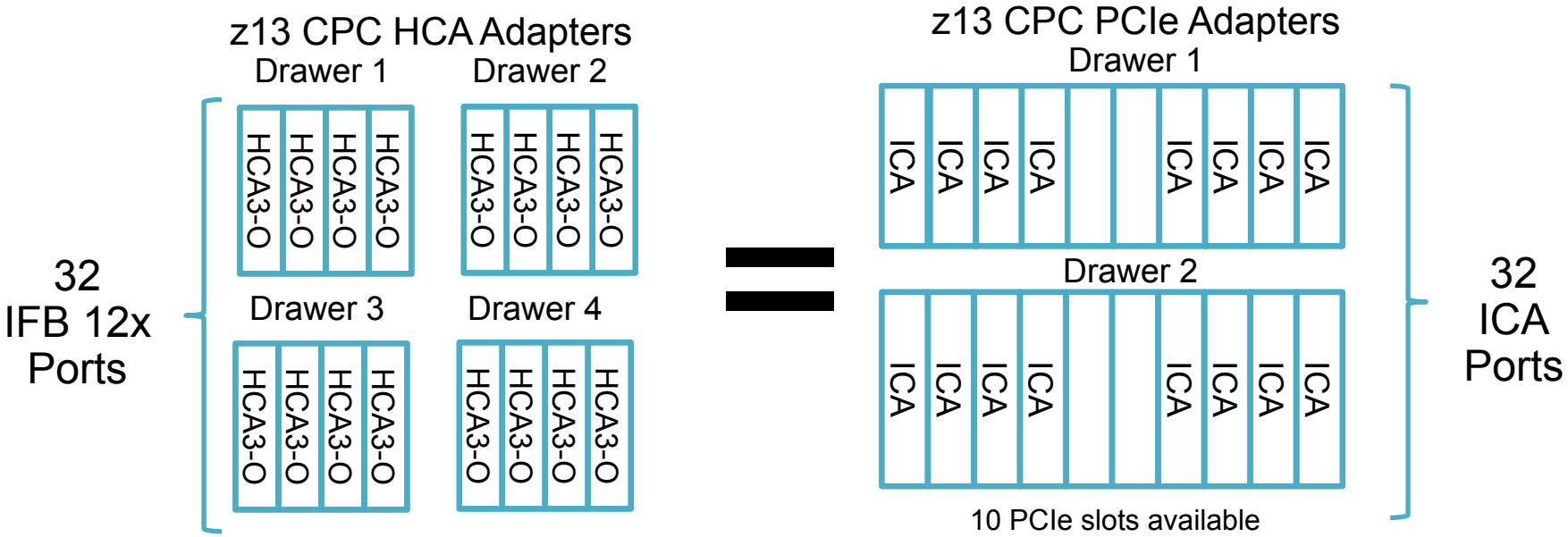
**On z196/zEC12 - 8 HCA3-O fanouts per book changes on z13 to: 4 HCA3-O fanouts per CPC drawer**



# ICA SR Fanouts: z13 verses z196 / zEC12


On z13 you are limited to 8 HCA3-O 12x ports per drawer (4 adapters), requires 4 drawers to support 32 HCA3-O 12x ports – assuming customer has no I/O drawers

The new integrated coupling adapters can and should be used to lower the dependency for the older HCA3-O links when possible which can reduce the need to add additional CPC drawers.

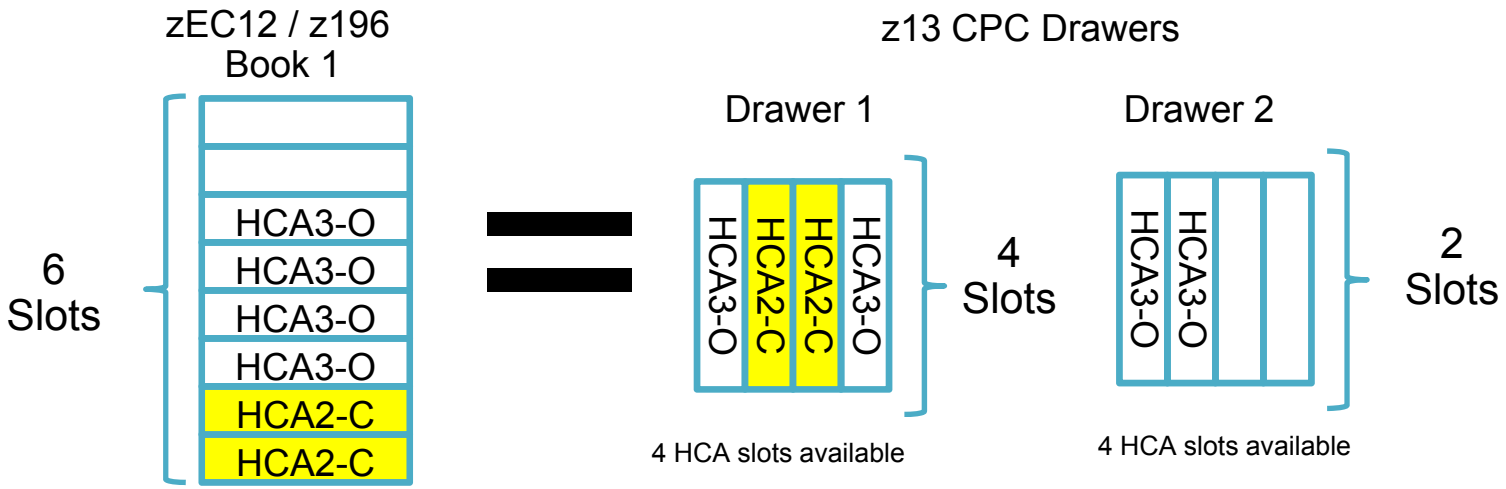



ICA = z13 to z13 Only

# Legacy I/O Drawers: z13 verses z196 / zEC12

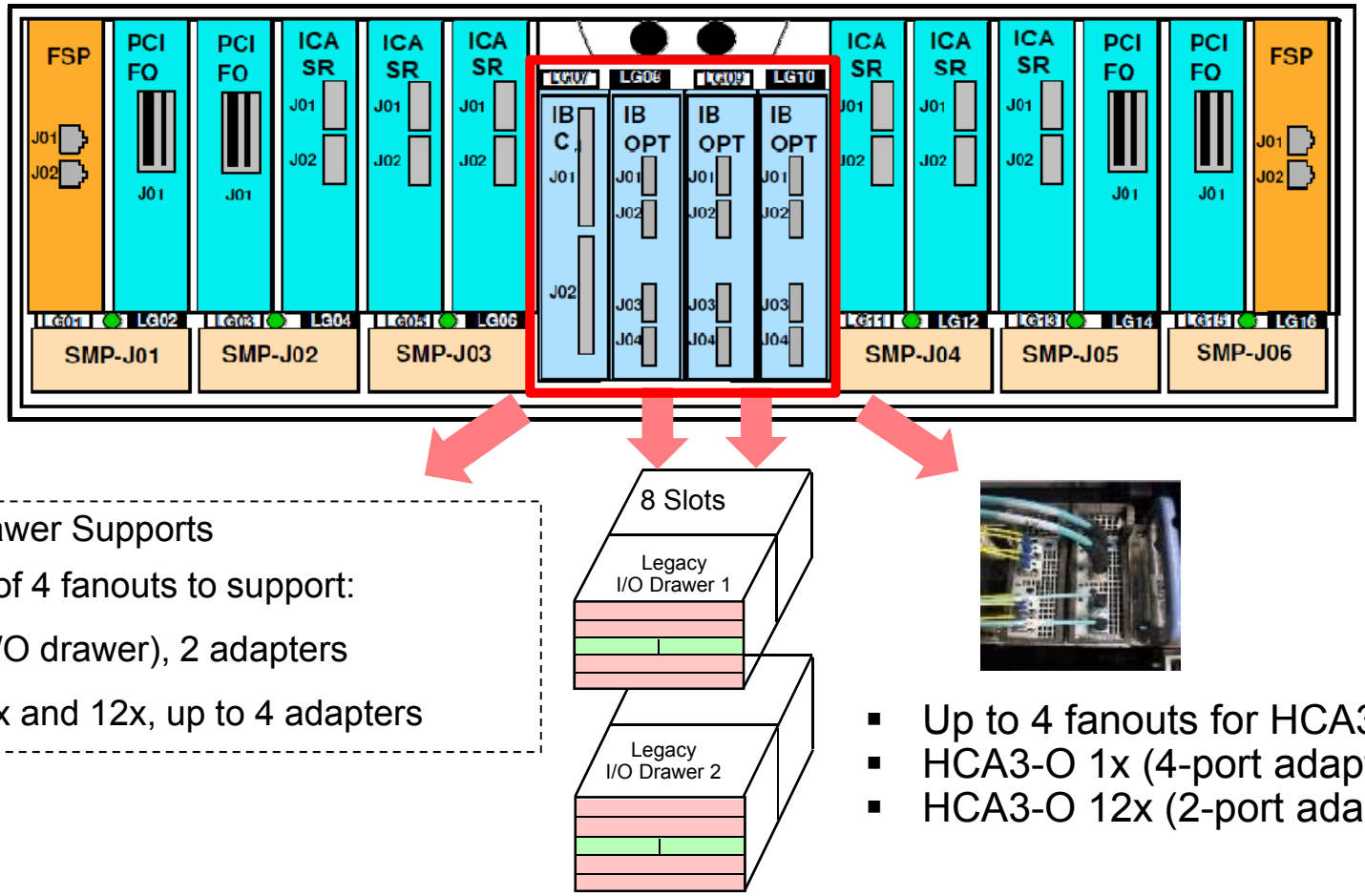

On MES upgrades to z13, clients can choose to Carry Over up to 2 legacy I/O drawers. This may drive additional CPC drawers when combined with the need to add HCA3-O links.

Eliminate FICON Express8, keep HCA Slots free for PSIFB Coupling links
- HCA2-C fanouts are used for I/O Drawer(s); HCA2-C utilize slots that are shared with HCA3-O
- Legacy I/O Drawer only supports FICON Express8 on z13
- Replace FICON Express8 with PCIe version; eliminate need for I/O Drawer and HCA2-C fanouts



# Host Channel Adapter Support HCA3-O and Legacy I/O Drawer

## CPC Drawer Fanouts View




Single z13 Drawer Supports

- Maximum of 4 fanouts to support:
- HCA2-C (I/O drawer), 2 adapters
- HCA3-O 1x and 12x, up to 4 adapters



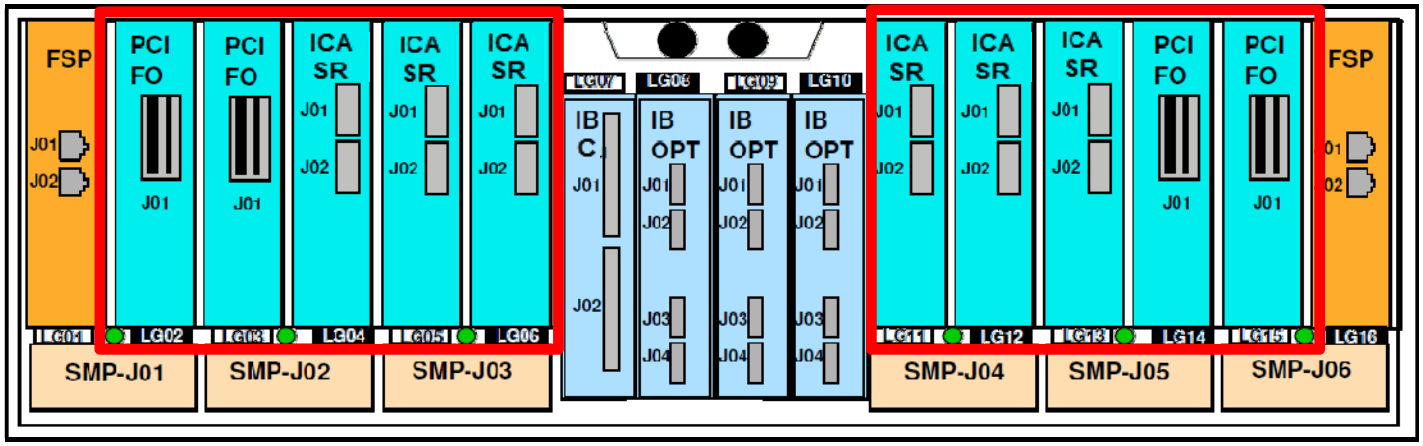



- Up to 4 fanouts for HCA3-O
- HCA3-O 1x (4-port adapters)
- HCA3-O 12x (2-port adapters)

- Max of 2 I/O Drawers, FC 4008 (Carry forward only)
- 8 slots (FICON Express8 only) per drawer, 16 slots total with 2 drawers
- Requires 2 HCA2-C adapters to support 1 or 2 drawers

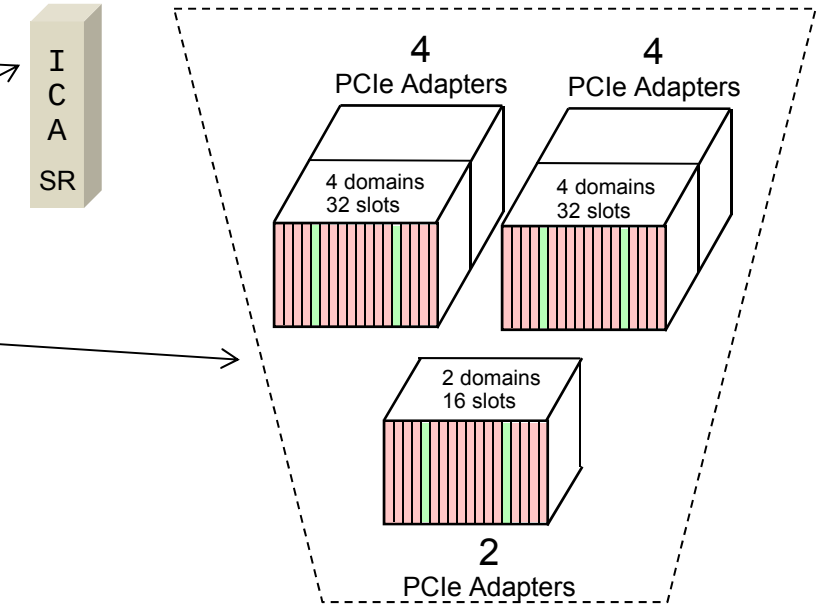
# PCIe Gen3 and ICA SR Adapter Support

## CPC Drawer Fanouts View



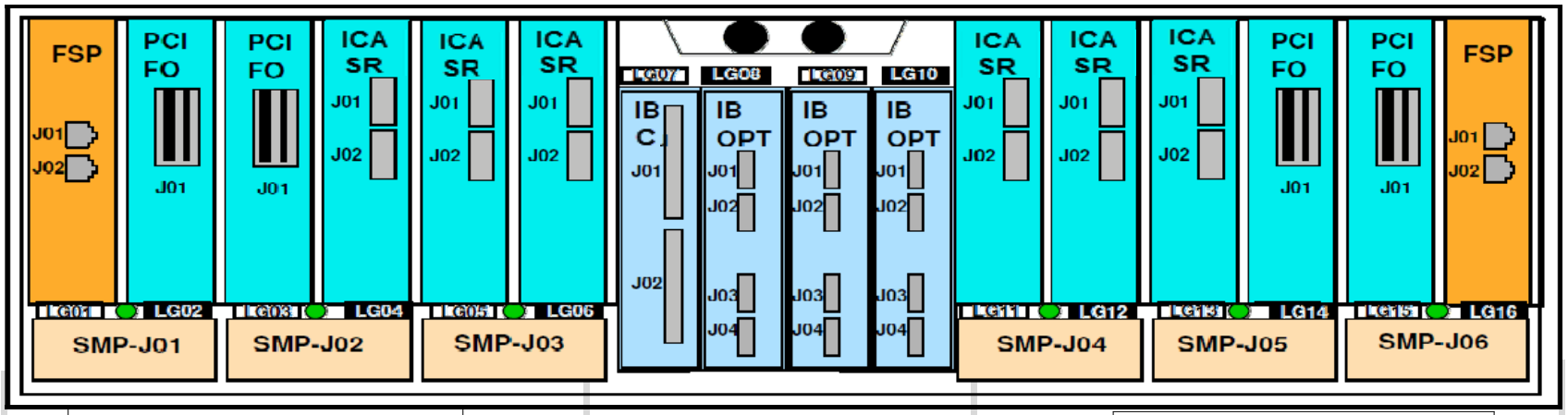

Single z13 Drawer Supports

- PCIe Gen3 Adapters (drawers)
- PCIe Integrated Coupling Adapters (ICA SR)
- Maximum 10 PCIe adapters
- N30 model – supports 2.5 drawers
  - Drawer 1 = 4 adapters, 4 domains (32 cards)
  - Drawer 2 = 4 adapters, 4 domains (32 cards)
  - Drawer 3 = 2 adapters, 2 domains (16 cards)



# z13 CPC Drawer– Fanout Summary

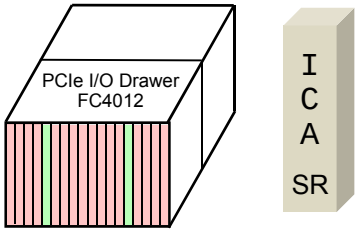
## Up to 10 PCIe Adapters / Up to 4 (HCA) Adapters




| | |
|---|---|
| FC 0172 | ICA 2-port Fanout |
| FC 0173 | PCI-E Drawer 1-port Fanout |
| FC 0174 | PCI-E Airflow |

| | |
|---|---|
| FC 0170 | HCA3-O PSIFB3 1x |
| FC 0171 | HCA3-O PSIFB3 12x |
| FC 0162 | HCA2-C Fanout (IO Drawer) |
| FC 0165 | Fanout Airflow |

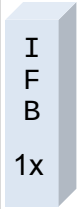
| | |
|---|---|
| FC 0172 | ICA 2-port Fanout |
| FC 0173 | PCI-E Drawer 1-port Fanout |
| FC 0174 | PCI-E Airflow |



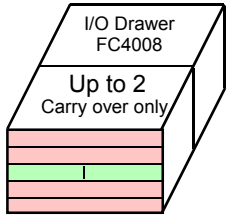

32 slots



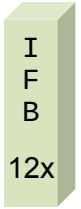

2 ports



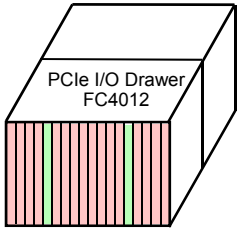

4 ports



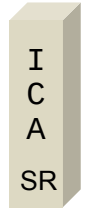

8 slots (FEX8 only)




2 ports




32 slots




2 ports

# Removal of Support for the HCA2-O fanouts for 12x IFB and 1x IFB PSIFB coupling links

Host Channel Adapter 2 PSIFB Coupling Links – Not Supported

- Fulfills Statement Of Direction
- No support for Carry Forward (MES) or New Build Configurations
- Simplifies the code base

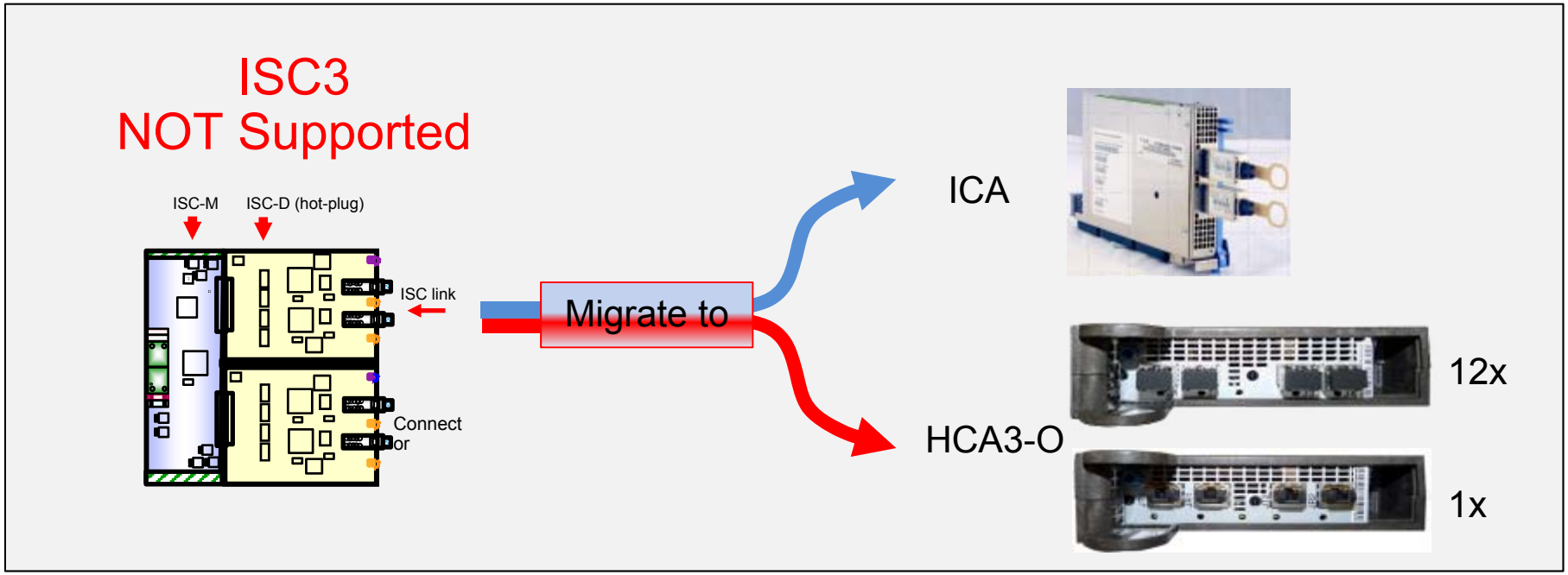
## HCA2-O 1x and 12x NOT Supported


## HCA3-O 1x and 12x Supported

# Removal of Support for ISC-3 support on z Systems

InterSystem Channel-3 (ISC-3) – Not Supported

- Fulfills Statement Of Direction
- No support for Carry Forward (MES) or New Build Configurations
- Simplifies the code base



# z13 and zEC12 – I/O and Coupling Migration Comparisons

| Type - Model | Books or Drawers | PCIe 16 GB Fanouts | PSIFB or PCIe 8 GB Fanouts | Maximum PCIe Drawers | Maximum PSIFB Fanouts | Drawers with Maximum PSIFB | Maximum PCIe Coupling Fanouts |
|---|---|---|---|---|---|---|---|
| **Notes:** | | 1 | 2, 3 | 4, 5 | 3 | 4,5 | 6 |
| **2827-H20** | 1 | N/A | 8 | 4 | 8 | 0 | N/A |
| **2964-N30** | 1 | 10 | 4 | 2.5 | 4 | 2.5 | 10 |
| **2827-H43** | 2 | N/A | 16 | 5 | 16 | 0 | N/A |
| **2964-N63** | 2 | 20 | 8 | 5 | 8 | 5 | 16 |
| **2827-H66** | 3 | N/A | 20 | 5 | 16 | 2 | N/A |
| **2964-N96** | 3 | 30 | 12 | 5 | 12 | 5 | 16 |
| **2827-H89 or HA1** | 4 | N/A | 24 | 5 | 16 | 4 | N/A |
| **2964 NC9 or NE1** | 4 | 40 | 16 | 5 | 16 | 5 | 16 |

- Notes: These comparisons assume no 8-slot I/O drawers, no FICON Express8 carried forward
  1. PCIe 16 GBps z13 only: One port to a PCIe I/O drawer domain or two ports of PCIe Coupling
  2. PCIe 8 GBps fanout zEC12 only: Two ports to PCIe I/O drawer domains
  3. PSIFB fanout: Two ports 6 GBps 12x IFB short distance coupling or four ports 5 Gbps 1x IFB long distance coupling
  4. A fully populated PCIe I/O drawer in z13 needs four 16 GBps PCIe fanouts
  5. A fully populated PCIe I/O drawer in zEC12 needs two 8 GBps PCIe fanouts
  6. PCIe Coupling Fanout z13 only: Two ports 8 GBps PCIe short distance coupling

# z13 Coupling Link Connectivity Summary

| Features | Offered As | Maximum # of Features | Maximum Connections | Increments per Feature | Purchase Increments |
|---|---|---|---|---|---|
| **ICA SR** | NB | 16 | 32 links[1] | 2 links | 2 links |
| **HCA3-O LR (1x)** [2] | NB/CF | 16 | 64 links | 4 links | 4 links |
| **HCA3-O (12x)** [2] | NB/CF | 16 | 32 links | 2 links | 2 links |

[1] Same physical number of links as 12x PSIFB on zEC12

NB = New build, Migration Offering, z Systems Exchange Program
CF = Carry Forward

| Link Type | Port Qty | CHPID | Protocol | Link Data Rate | Fiber Core | Fiber Bandwidth | Fiber Type | Light Source | Cable | Connector | Maximum Distance | Repeated Distance |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Short Distance** | | | | | | | | | | | | |
| HCA3-O fanout (12X IFB) | 2 | CIB | IFB | 6 GBps | 50 micron | 2 GHz-km @ 850 nm | OM3 Multimode | SW | Duplex 12x 24-fiber cable assembly | MTP (split) TX & RX | 150 meters | N/A |
| Integrated Coupling Adapter (ICA SR) CPC Fanout | 2 | CS5 | PCIe Gen3 | 8 GBps | 50 micron | 4.7 GHz-km @ 850 nm | **OM4** Multimode | SW | Single 24-fiber cable assembly | MTP (new) | **150** meters | N/A |
| | | | | | | 2 GHz-km @ 850 nm | **OM3** Multimode | SW | Single 24-fiber cable assembly | MTP (new) | **100** meters | N/A |
| **Long Distance** | | | | | | | | | | | | |
| HCA3-O LR fanout (1X IFB) | 4 | CIB | IFB | 5 Gbps | 9 micron | 50 GHz-km @ 1310 nm | Single Mode | LW | 1 fiber pair | LC Duplex | 10 km | 100 km |

# z13 I/O Connectivity Summary

| Features | Offered As | Maximum # of features | Maximum channels | Increments per feature | Purchase increments |
|---|---|---|---|---|---|
| **Storage** | | | | | |
| FICON Express16S | NB | 160 | 320 channels | 2 channels | 2 channels |
| FICON Express8S | NB*/CF | 160 | 320 channels | 2 channels | 2 channels |
| FICON Express8 | CF | 16 | 64 channels | 4 channels | 4 channels |
| **Networking** | | | | | |
| OSA-Express5S | NB | 48 | 96 (48 for 10 GbE) ports | 1 (10 GbE) / 2 | 1 feature |
| OSA-Express4S | CF | 48 | 96 (48 for 10 GbE) ports | 1 (10 GbE) / 2 | 1 feature |
| **Crypto** | | | | | |
| Crypto Express5S | NB | 16 | 16 PCIe adapters | 1 PCIe adapter | 2 features** |
| **Special purpose** | | | | | |
| 10GbE RoCE Express | NB/CF | 16 | 16 PCIe adapters | 2 ports per adapter | 1 feature |
| Flash Express | NB/CF | 8 (4 pairs) | 8 PCIe adapters | 1 PCIe adapter | 2 features Shipped in pairs |
| zEDC Express | NB/CF | 8 | 8 PCIe adapters | 1 PCIe adapter | 1 feature |
| **Coupling Links** | | | | | |
| ICA SR | NB | 16 | 16 PCIe adapters | 2 | 1 feature |
| HCA3-O (12x) | NB/CF | 16 | 16 HCA3 adapters | 2 | 1 feature |
| HCA3-O LR (1x) | NB/CF | 16 | 16 HCA3 adapters | 4 | 1 feature |

*FICON Express8S available on New Build for 2Gb connectivity
** 2 features initially, one thereafter
CF = Carry Forward , NB = New Build, and if previously offered carried forward

# Statements of Direction

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# Statements of Direction

- IBM plans to accept for review certification requests from cryptography providers by the end of 2015, and intends to support the use of cryptography algorithms and equipment from providers meeting IBM's certification requirements in conjunction with z/OS and z Systems processors in specific countries. This is expected to make it easier for customers to meet the cryptography requirements of local governments
- KVM offering for IBM z Systems: In addition to the continued investment in z/VM, IBM intends to support a Kernel-based Virtual Machine (KVM) offering for z Systems that will host Linux on z Systems guest virtual machines. The KVM offering will be software that can be installed on z Systems processors like an operating system and can co-exist with z/VM virtualization environments, z/OS, Linux on z Systems, z/VSE and z/TPF. The KVM offering will be optimized for z Systems architecture and will provide standard Linux and KVM interfaces for operational control of the environment, as well as providing the required technical enablement for OpenStack for virtualization management, allowing enterprises to easily integrate Linux servers into their existing infrastructure and cloud offerings
- In the first half of 2015, IBM intends to deliver a GDPS/Peer to Peer Remote Copy (GDPS/PPRC) multiplatform resiliency capability for customers who do not run the z/OS operating system in their environment. This solution is intended to provide IBM z Systems customers who run z/VM and their associated guests, for instance, Linux on z Systems, with similar high availability and disaster recovery benefits to those who run on z/OS. This solution will be applicable for any IBM z Systems announced after and including the zBC12 and zEC12

# Statements of Direction

- Enhanced RACF password encryption algorithm for z/VM: In a future deliverable an enhanced RACF/VM password encryption algorithm is planned. This support will be designed to provide improved cryptographic strength using AES-based encryption in RACF/VM password algorithm processing. This planned design is intended to provide better protection for encrypted RACF password data in the event that a copy of RACF database becomes inadvertently accessible.

- IBM intends that a future release of IBM CICS Transaction Server for z/OS will support 64-bit SDK for z/OS, Java Technology Edition, Version 8 (Java 8). This support will enable the use of new facilities delivered by IBM z13 which are exploited by Java 8, including Single Instruction Multiple Data (SIMD) instructions for vector operations and simultaneous multithreading (SMT).

- z/VM support for Single Instruction Multiple Data (SIMD): In a future deliverable IBM intends to deliver support to enable z/VM guests to exploit the Vector Facility for z/Architecture (SIMD).

- Removal of support for Expanded Storage (XSTORE): z/VM V6.3 is the last z/VM release that will support Expanded Storage (XSTORE) for either host or guest usage. The IBM z13 server family will be the last z Systems server to support Expanded Storage (XSTORE).

# Statements of Direction

- The IBM z13 will be the last z Systems server to support running an operating system in ESA/390 architecture mode; all future systems will only support operating systems running in z/Architecture mode. This applies to operating systems running native on PR/SM as well as operating systems running as second level guests. IBM operating systems that run in ESA/390 mode are either no longer in service or only currently available with extended service contracts, and they will not be usable on systems beyond IBM z13. However, all 24-bit and 31-bit problem-state application programs originally written to run on the ESA/390 architecture will be unaffected by this change.

- Stabilization of z/VM V6.2 support: The IBM z13 server family is planned to be the last z Systems server supported by z/VM V6.2 and the last z systems server that will be supported where z/VM V6.2 is running as a guest (second level). This is in conjunction with the statement of direction that the IBM z13 server family will be the last to support ESA/390 architecture mode, which z/VM V6.2 requires. z/VM V6.2 will continue to be supported until December 31, 2016, as announced in announcement letter # 914-012.

- Product Delivery of z/VM on DVD/Electronic only: z/VM V6.3 will be the last release of z/VM that will be available on tape. Subsequent releases will be available on DVD or electronically.

- Removal of support for Classic Style User Interface on the Hardware Management Console and Support Element: The IBM z13 will be the last z Systems server to support Classic Style User Interface. In the future, user interface enhancements will be focused on the Tree Style User Interface.

# Statements of Direction

- Removal of support for the Hardware Management Console Common Infrastructure Model (CIM) Management Interface: IBM z13 will be the last z Systems server to support the Hardware Console Common Infrastructure module (CIM) Management Interface. The Hardware Management Console Simple Network Management Protocol (SNMP), and Web Services Application Programming Interfaces (APIs) will continue to be supported.

- The IBM z13 will be the last z Systems server to support FICON Express8 channels: IBM z13 will be the last high-end server to support FICON Express8. Enterprises should begin migrating from FICON Express8 channel features (#3325, #3326) to FICON Express16S channel features (#0418, #0419). FICON Express8 will not be supported on future high-end z Systems servers as carry forward on an upgrade.

- The IBM z13 server will be the last z Systems server to offer ordering of FICON Express8S channel features. Enterprises that have 2 Gb device connectivity requirements must carry forward these channels.

- Removal of an option for the way shared logical processors are managed under PR/SM LPAR: The IBM z13 will be the last high-end server to support selection of the option to "Do not end the timeslice if a partition enters a wait state" when the option to set a processor run time value has been previously selected in the CPC RESET profile. The CPC RESET profile applies to all shared logical partitions on the machine, and is not selectable by logical partition.

# Statements of Direction

- IBM intends to provide support for the Read Diagnostic Parameters Extended Link Service command for fiber channel SANs as defined in the T11.org FC-LS-3 draft standard. Support for the Read Diagnostic Parameters Extended Link Service command is intended to improve SAN reliability and fault isolation.

- The IBM z13 will be the last generation of z Systems hardware servers to support configuring OSN CHPID types. OSN CHPIDs are used to communicate between an operating system instance running in one logical partition and the IBM Communication Controller for Linux on z Systems (CCL) product in another logical partition on the same CPC. See announcement letter #914-227 dated 12/02/2014 for details regarding withdrawal from marketing for the CCL product.

# Statements of Direction

- z/OS V2.1 is planned to provide support for up to 4 TB of real memory in a single LPAR on z13 processors. This support will be intended to help support more workload per z/OS image and more memory-intensive applications.

- IBM plans to add OpenSSH to z/OS and enhance it by providing Kerberos support, which is designed to enable single sign-on from Microsoft Windows domains, and also to leverage the capabilities of IBM zEnterprise Data Compression (zEDC). These capabilities are also planned to be made available in the version of OpenSSH that is part of IBM Ported Tools for z/OS. Secure z/OS Software Delivery

- 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

- z/OS V2.2 is planned to be the last release to support the HCD LDAP backend for use with the IBM Tivoli Directory Server for z/OS (LDAP)

- z/OS V2.2 is planned to be the last release to support the DRXRC log stream option for system logger. IBM recommends you use other available mirroring options with IBM z/OS Global Mirror (zGM), also known as Extended Remote Copy (XRC), or GDPS instead

- z/OS V2.2 is planned to be the last release to include the RMF XP support for Microsoft Windows Server

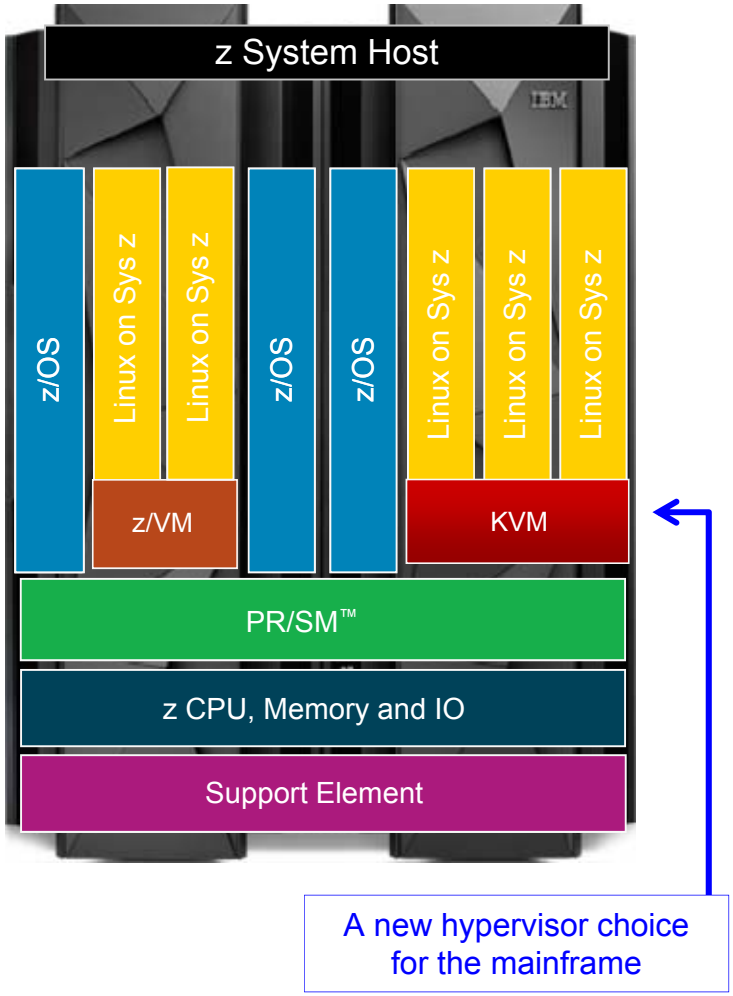
- z/OS V2.2 is planned to provide support for the new vector extension facility (SIMD) instructions available on z13 servers. This new support, also planned to be available for z/OS V2.1 with the PTFs for APARs OA43803 and PI12412 in February 2015, is intended to help enable high performance analytics processing and is planned to be exploited by z/OS XML System Services; IBM 31-bit SDK for z/OS, Java Technology Edition, Version 8 (5655-DGG); IBM 64-bit SDK for z/OS, Java Technology Edition, Version 8 (5655-DGH); Enterprise PL/I for z/OS, V4.5 (5655-W67); and Enterprise COBOL for z/OS, V5.2 (5655-W32) in February 2015

- IBM intends to exploit the 64-bit SDK for z/OS, Java Technology Edition, Version 8 in IBM WebSphere Liberty Profile for z/OS, and in the full profile of WebSphere Application Server for z/OS, which is also expected to benefit from SIMD exploitation.

# Standardized virtualization for z System

## *SOD at announcement for KVM optimized for z System*

- *Expanded audience* for Linux on z Systems
  - KVM on z System will co-exist with z/VM
  - Attracting new clients with in house KVM skills
  - Simplified startup with standard KVM interfaces
- Support of modernized *open source* KVM hypervisor for Linux
  - Provisioning, mobility, memory over-commit
  - Standard management and operational controls
  - Simplicity and familiarity for Intel Linux users
- *Optimized for z System* scalability, performance, security and resiliency
  - Standard software distribution from IBM
- Flexible *integration to cloud* offerings
  - Standard use of storage and networking drivers (including SCSI disk)
  - No proprietary agent management
  - Off-the-shelf OpenStack and cloud drivers
  - Standard enterprise monitoring and automation (i.e. GDPS)

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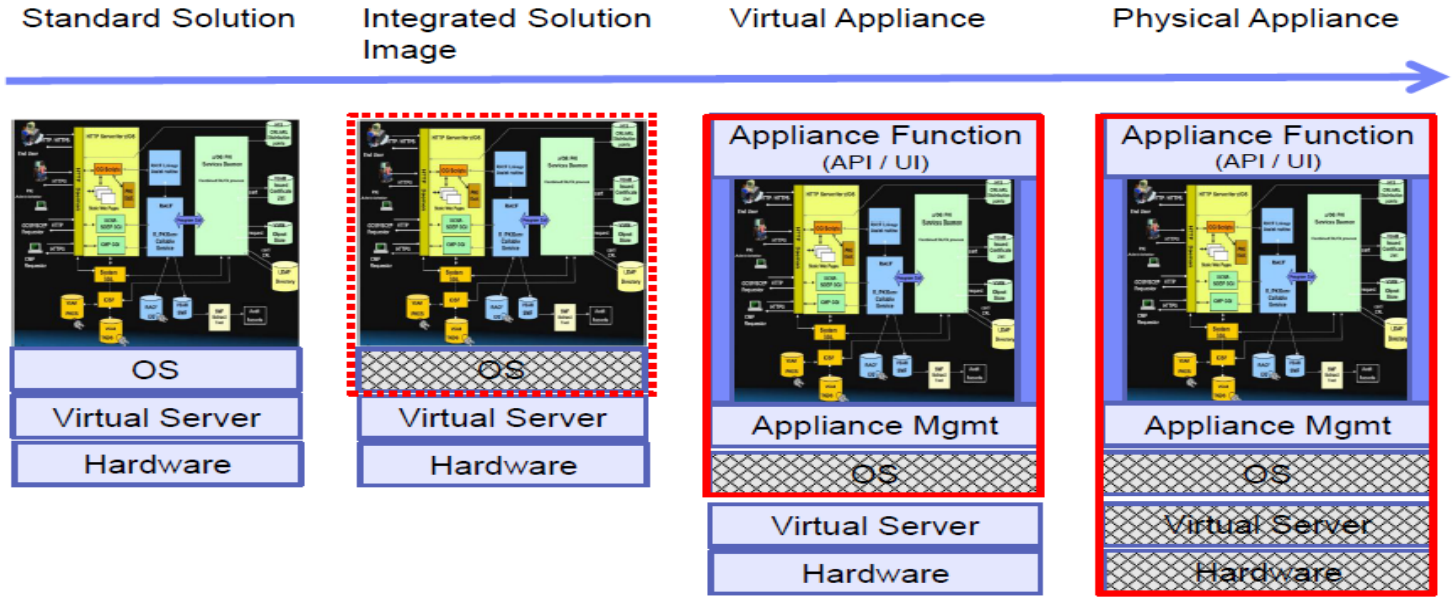
# What is GDPS Virtual Appliance*

- Fully integrated Continuous Availability & Disaster Recovery solution for Linux on z Systems customers with no or little z/OS skills
  - It is an image comprising of an operating system, the application components, an appliance management layer which makes the image self-containing, and APIs / UIs for customization, administration, and operation tailored to the appliance function
  - It improves both consumability and time-to-value for customers

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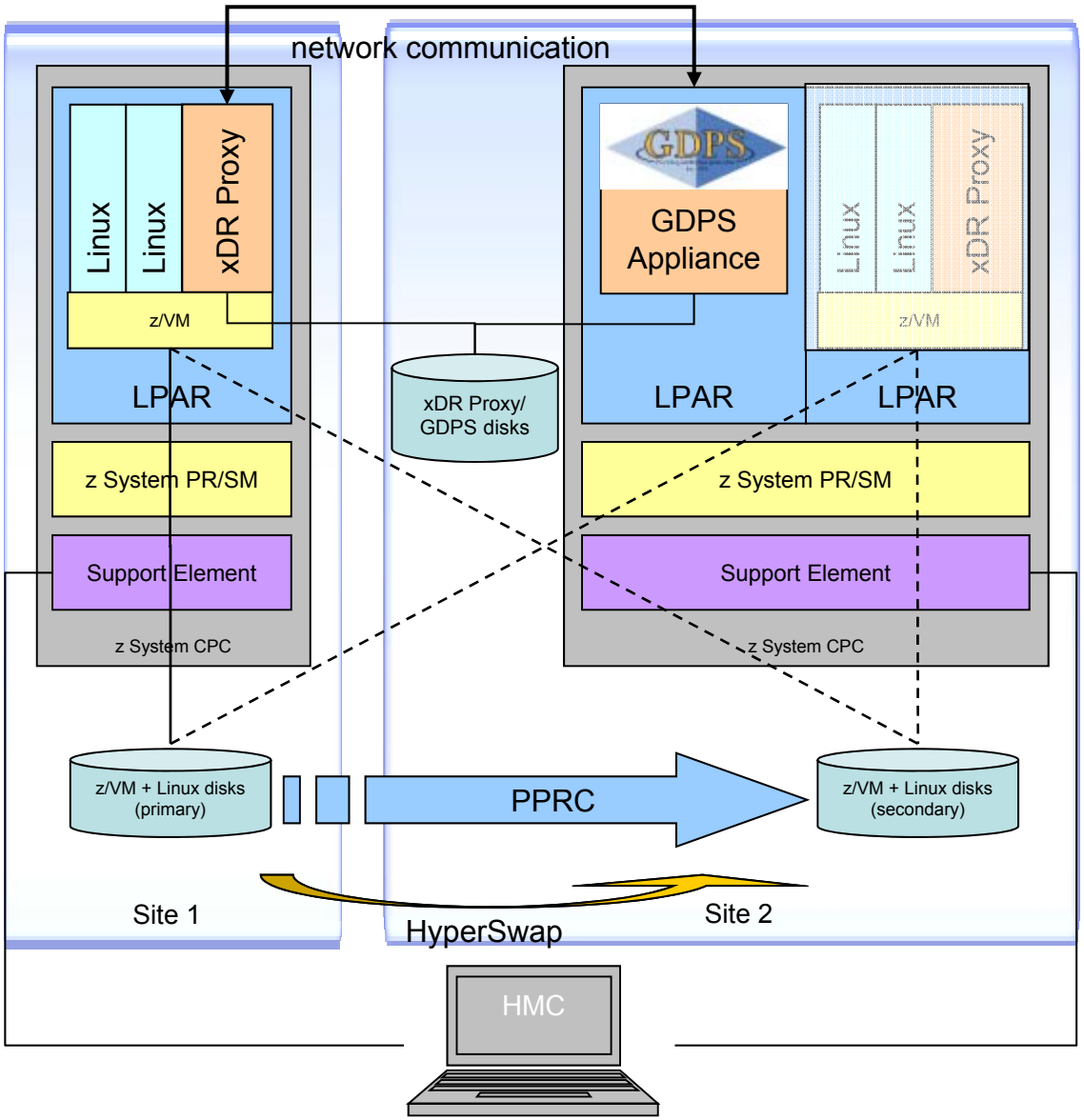
# GDPS Virtual Appliance* in Linux on z System Environments




- PPRC (point-to-Point Remote Copy) ensures the remote copy is identical to the primary data. The synchronization takes place at the time of I/O operation
- One dedicated Linux guest is configured as xDR Proxy for GDPS which is used for tasks that have z/VM scope (HyperSwap, shutdown z/VM, IPL z/VM guest)
- Manages remote copy environment using HyperSwap function and keeps data available & consistent for operating systems and applications
- Disaster Detection and ensures successful & faster recovery via automated processes
- Single point of control from GDPS Appliance. No need for availability of all experts for e.g. storage team, hardware team, OS team, application team etc.

# Reference Charts

# IBM z13 Redbooks

- **IBM z13 Technical Introduction, SG24-8250:** This publication provides concepts, positioning, and a business value view of IBM z13 capabilities, hardware functions/features, and associated software support. It is intended for IT Managers, consultants, IT Architects and Specialists, and anyone who wants to understand the basic elements of the IBM z13.
- **IBM z13 Technical Guide, SG24-8251:** This publication provides specific information about the IBM z Systems z13 (z13) and its functions, features, and associated software support. Greater detail is offered in areas relevant to technical planning. It is intended for systems engineers, system programmers (IT Specialists), planners, and anyone wanting to understand the z13 functions and plan for their usage.
- **IBM z Systems Connectivity Handbook, SG24-5444:** This publication highlights the hardware and software components, typical uses, coexistence, and relative merits of the z System I/O features. It is intended for data center planners, IT Specialists, system engineers, technical sales staff, and network planners who are involved in planning connectivity solutions for z System servers.
- **IBM z13 Configuration Setup, SG24-8260:** This publication helps you install, configure, and maintain the IBM z13. This book is intended for systems engineers, hardware planners, and anyone who needs to understand IBM z Systems® configuration and implementation. Readers should be generally familiar with current IBM z Systems technology and terminology. For details about the z13, see IBM z13 Technical Introduction, SG24-8250, and IBM z13 Technical Guide, SG24-8251.
- **The z13 IBM Redbooks launch page will be:**
  http://www.redbooks.ibm.com/redbooks.nsf/pages/z13?Open

# z13 Functional Comparison to zEC12

| | | |
|---|---|---|
| Performance and Scale | ▪ Uniprocessor Performance | ▪ Up to 10% performance improvement over zEC12[1] |
| | ▪ System Capacity | ▪ Up to 40% system total z/OS capacity performance improvement over zEC12[1] |
| | ▪ SMT | ▪ SMT delivers up to 32% price performance improvement for Linux on z Systems and up to 38% price performance improvement for zIIP workloads versus single threaded only on zEC12 |
| | ▪ SIMD | ▪ Vector processing (SIMD) model provides construction of richer, complex analytics models, increased programmer productivity and faster mathematical modeling versus no SIMD on zEC12 |
| | ▪ Cache | ▪ z13 has 2x the cache versus zEC12 |
| | ▪ Models | ▪ Five models with up to 4 CPC drawers (zEC12 has five models with up to 4 books) |
| | ▪ Processing cores | ▪ Up to 141 cores to configure, up to 101 on zEC12 |
| | ▪ Granular Capacity | ▪ Up to 231 capacity settings versus 161 on the zEC12 |
| | ▪ Memory | ▪ Up to 10 TB RAIM memory versus 3 TB RAIM memory on zEC12 |
| | ▪ Fixed HSA | ▪ Up to 3x HSA (96 GB) versus zEC12 (32 GB) fixed HSA |
| | ▪ Compression | ▪ Continued support of zEDC Express and hardware compression on coprocessor |
| | ▪ Internal I/O Bandwidth | ▪ 832 GB/sec I/O bandwidth versus 384 on zEC12 (Note: servers exploit a subset of its designed capacity |
| Virtualization | ▪ LPAR virtualization | ▪ 85 partitions versus 60 on zEC12 |
| | ▪ LPAR memory support | ▪ Full memory support per LPAR (10 TB) versus 1 TB on zEC12 (OS exploitation varies) |
| | ▪ RoCE adapter virtualization | ▪ 10 GbE RoCE Express shared across LPARs versus dedicated 10GbE RoCE Express on zEC12 |
| Infrastructure Efficiency | ▪ Networking | ▪ New OSA-Express5S supported by both |
| | ▪ FICON | ▪ FICON Express16S plus increased FICON subchannels to 32K versus FICON Express 8S and 24K on zEC12 |
| | ▪ zHPF | ▪ zHPF extended distance II offers faster remote site recovery with improved I/O service time improvement when writing data remotely (GDPS HyperSwap) versus zHPF only on z13 |
| | ▪ ROCE | ▪ 10GbE RoCE Express supported on both – enhancement to share feature only on z13 |
| | ▪ Forward Error Correction | ▪ Industry standard FEC for optical connections for substantially reduced I/O link errors not on zEC12 |
| | ▪ Fabric I/O priority | ▪ z/OS WLM extended to SAN fabric leveraging capabilities of the SAN vendors not available on zEC12 |
| | ▪ FICON dynamic routing | ▪ Dynamic Routing allows for sharing of switches between FICON and FCP without creating separate virtual switches not available on zEC12 |
| | ▪ LCSS/Subchannel sets | ▪ Up to six LCSS versus four on zEC12 and 4 Subchannel sets verus 3 on zEC12 |
| | ▪ WWPN | ▪ I/O serial number migration allows keeping same serial number on replacement server not on zEC12 |
| Resiliency and Availability | ▪ Coupling – HCA-3 | ▪ Coupling with HCA-3 InfiniBand Coupling Links – long and short distance – same as zEC12 |
| | ▪ Coupling – ICA SR | ▪ New short distance coupling with PCIe-based links versus not available on zEC12 |
| | ▪ STP | ▪ Simplified sysplex management with STP enhancements not available on zEC12 |
| | ▪ Sparing | ▪ Enhanced integrated sparing on z13 reducing the number of on site service and maintenance events |
| | ▪ IBM zAware | ▪ IBM zAware offers high speed analytics to consume large quantities of message logs for smarter monitoring – available for both z/OS and Linux – IBM zAware for z/OS only supported on zEC12 |
| | ▪ Environmentals | ▪ Optional non raised floor, overhead cabling, water cooling and DC power – same on zEC12 |
| Security | ▪ Cryptographic Coprocessor | ▪ CPACF improves performance by 2.5x for AES/TDES and 3.5x for SHA versus zEC12 |
| | ▪ Crypto Express | ▪ Crypto Express 5S with performance increase plus new algorithms for elliptic curve, SHA, VISA FPE versus zEC12 Crypto Express4S |
| | ▪ Crypto Key Management | ▪ Cryptographic key support for management, simplification and compliance |

[1] For average LSPR workloads running z/OS 1.13. Official performance data are available and can be obtained online at LSPR (Large Systems Performance Reference) website at: https://www.ibm.com/servers/resourcelink/lib03060.nsf/pages/lsprindex?OpenDocumen. Actual performance results may vary by customer based on individual workload, configuration and software levels.

# z13 Functional Comparison to z196

| | | |
|---|---|---|
| Performance and Scale | ▪ Uniprocessor Performance | ▪ Up to 38% performance improvement over z196[1] |
| | ▪ System Capacity | ▪ Up to 110% system total z/OS capacity performance improvement over z196[1] |
| | ▪ SMT | ▪ SMT delivers up to 72% price performance improvement for Linux on z Systems and up to 65% price performance improvement for zIIP workloads versus single threaded only on z196 |
| | ▪ SIMD | ▪ Vector processing (SIMD) model provides construction of richer, complex analytics models, increased programmer productivity and faster mathematical modeling versus no SIMD on z196 |
| | ▪ Cache | ▪ z13 has ~4.4x the cache versus z196 |
| | ▪ Models | ▪ Five models with up to 4 CPC drawers (z196 has five models with up to 4 books) |
| | ▪ Processing cores | ▪ Up to 141 cores to configure, up to 80 on z196 |
| | ▪ Granular Capacity | ▪ Up to 231 capacity settings versus 125 on the z196 |
| | ▪ Memory | ▪ Up to 10 TB RAIM memory versus 3 TB RAIM memory on z196 |
| | ▪ Fixed HSA | ▪ Up to 6x HSA (96 GB) versus z196 (16 GB) fixed HSA |
| | ▪ Compression | ▪ zEDC Express not aviable on the z196 and improved performance of H/W compression on coprocessor |
| | ▪ Internal I/O Bandwidth | ▪ 832 GB/sec I/O bandwidth versus 384 on z196 (Note: servers exploit a subset of its designed capacity |
| Virtualization | ▪ LPAR virtualization | ▪ 85 partitions versus 60 on z196 |
| | ▪ LPAR memory support | ▪ Full memory support per LPAR (10 TB) versus 1 TB on z196 (OS exploitation varies) |
| | ▪ RoCE adapter virtualization | ▪ 10 GbE RoCE Express shared across LPARs versus no 10GbE RoCE Express on z196 |
| Infrastructure Efficiency | ▪ Networking | ▪ OSA-Express5S, not available on the z196 |
| | ▪ FICON | ▪ FICON Express16S plus increased FICON subchannels to 32K versus FICON Express 8S and 16K on z196 |
| | ▪ zHPF | ▪ zHPF extended distance II offers faster remote site recovery with improved I/O service time improvement when writing data remotely (GDPS HyperSwap) versus zHPF only on z13 |
| | ▪ ROCE | ▪ 10GbE RoCE Express not available on z196 |
| | ▪ Forward Error Correction | ▪ Industry standard FEC for optical connections for substantially reduced I/O link errors not on z196 |
| | ▪ Fabric I/O priority | ▪ z/OS WLM extended to SAN fabric leveraging capabilities of the SAN vendors not available on z196 |
| | ▪ FICON dynamic routing | ▪ Dynamic Routing allows for sharing of switches between FICON and FCP without creating separate virtual switches not available on z196 |
| | ▪ LCSS/Subchannel sets | ▪ Up to six LCSS versus four on z196 and 4 Subchannel sets verus 3 on z196 |
| | ▪ WWPN | ▪ I/O serial number migration allows keeping same serial number on replacement server not on z196 |
| Resiliency and Availability | ▪ Coupling – HCA-3 | ▪ Coupling with HCA-3 InfiniBand Coupling Links – long and short distance – same as z196 |
| | ▪ Coupling – ICA SR | ▪ New short distance coupling with PCIe-based links versus not available on z196 |
| | ▪ STP | ▪ Simplified sysplex management with STP enhancements not available on z196 |
| | ▪ Sparing | ▪ Enhanced integrated sparing on z13 reducing the number of on site service and maintenance events |
| | ▪ IBM zAware | ▪ IBM zAware offers high speed analytics to consume large quantities of message logs for smarter monitoring – available for both z/OS and Linux – IBM zAware not available on z196 |
| | ▪ Environmentals | ▪ Optional non raised floor, overhead cabling, water cooling and DC power – non-raised not available on z196 |
| Security | ▪ Cryptographic Coprocessor | ▪ CPACF performance improved comparing to z196 |
| | ▪ Crypto Express | ▪ Crypto Express 5S with performance increase plus new algorithms for elliptic curve, SHA, VISA FPE versus z196 Crypto Express4S and Crypto Express3 |
| | ▪ Crypto Key Management | ▪ Cryptographic key support for management, simplification and compliance |

[1] For average LSPR workloads running z/OS 1.13. Official performance data are available and can be obtained online at LSPR (Large Systems Performance Reference) website at: https://www.ibm.com/servers/resourcelink/lib03060.nsf/pages/lsprindex?OpenDocumen. Actual performance results may vary by customer based on individual workload, configuration and software levels.

# zEC12 Functional Comparison to z196

| | | |
|---|---|---|
| Processor / Memory | • Uniprocessor Performance<br>• System Capacity<br>• Processor Design<br>• Cache | • Up to 25% performance improvement over z196 uniprocessor [1]<br>• Up to 50% system capacity performance improvement over z196 80-way [1]<br>• New 5.4-6[1] GHz processor chip versus 5.2 GHz<br>• zEC12 has 33% more L2 cache, instruction and data (total 2 MB versus total 1.5 MB on z196), 100% more L3 cache (total 48 MB versus 24 MB on z196), 100% more L4 cache (384 MB versus 196 on z196) |
| | • Models<br>• Processing cores<br>• Granular Capacity<br>• Memory<br>• Fixed HSA | • Five models with up to 4 books (z196 had five models)<br>• Up to 101 cores to configure, up to 80 on z196<br>• Up to 161 capacity settings versus 125 on the z196<br>• Up to 3 TB RAIM memory (same as z196)<br>• Up to 32 GB fixed HSA versus z196 has 16 GB fixed HSA<br>• New zEDC Express |
| Virtualization and Alternative Processors | • Virtualization | • zEnterprise Unified Resource Manager provides virtualization management for blades installed in the zBX Mod 003.<br>• zEnterprise Unified Resource Manager has “resource workload awareness” where hybrid resources can be managed and optimized across the zEnterprise.<br>• zEnterprise System is a truly integrated hardware platform that is able to span and intelligently manage resources across mainframe and distributed technologies – including select POWER7 and IBM System x blades |
| | • IBM z BladeCenter Extension (zBX) | • Supported optimizer is DataPower XI50z in the zBX Mod 003.<br>• zBX Model 003 (versus zBX Model 002 which attaches to z196) |
| Connectivity | • HiperSockets™<br>• FICON<br>• I/O subsystem<br>• Internal I/O Bandwidth | • Both zEC12 and z196 support of 32 HiperSockets<br>• New OSA-Express5S, FICON Express8S 10GbE RoCE Express features<br>• zEC12 has industry standard 8 GBps InfiniBand supports high speed connectivity and high bandwidth |
| | • Coupling<br>• Cryptography | • Coupling with HCA-3 InfiniBand Coupling Links<br>• Crypto Express4S enhanced with new FIPS 140-2 Level 4 cert and PKCS#11 support<br>• Elliptic Curve Cryptography (ECC) |
| RAS | • RAS Focus | • New IBM IBM zAware offers high speed analytics facilitates the ability to consume large quantities of message logs for smarter monitoring<br>• zEC12 offers advanced memory enhancements (RAIM) and advanced power and thermal optimization and management that can help to control heat / improve RAS |
| | • Availability | • New PCIe Flash Express on zEC12 to handle paging workload spikes and improve availability – not available on z196 |
| Environmentals | • Energy<br>• Cooling | • Power Save modes for processor<br>• New improved integrated cooling system<br>• Optional Non Raised Floor and overhead cabling options for both I/O and (New!) Power<br>• Optional water cooling and DC power |

[1] Based on preliminary internal measurements and projections. Official performance data will be available upon announce and can be obtained online at LSPR (Large Systems Performance Reference) website at: https://www.ibm.com/servers/resourcelink/lib03060.nsf/pages/lsprindex?OpenDocumen. Actual performance results may vary by customer based on individual workload, configuration and software levels.

# Questions ?

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**IBM z13**

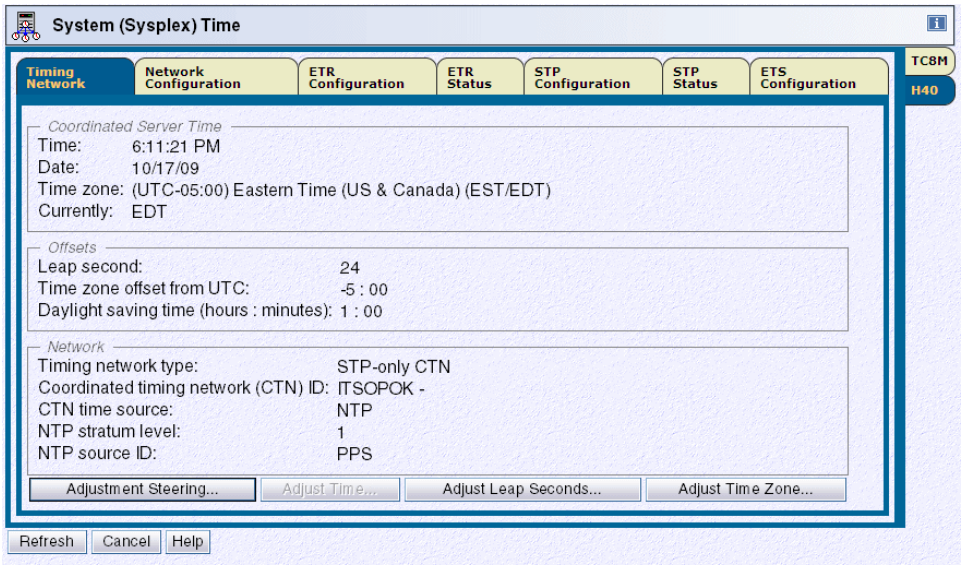
Reinventing enterprise IT
for digital business

# Change not confirmed (ITSO z13)

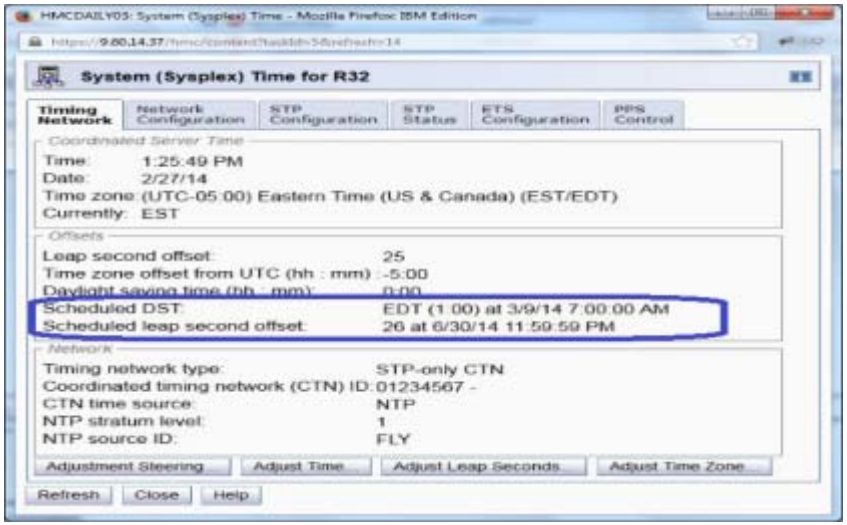
## STP Time Zone panel enhancement

- Added confirmation messages when setting STP time zone via Adjust Time Zone panel on the Current Time Server (CTS)
- Listing scheduled switch times for leap seconds and time zone/daylight saving time on the Timing Network tab

### Before (OLD)




### After (NEW)



# Coupling Technology versus Host Processor Speed

Host effect with primary application involved in data sharing
Chart is based on 9 CF ops/Mi – may be scaled linearly for other rates

| CF \ Host | z114 | z196 | zBC12 | zEC12 | z13 |
|---|---|---|---|---|---|
| **z114 ISC-3** | 17% | 21% | 19% | 24% | N/A |
| **z114 1x IFB** | 14% | 17% | 17% | 21% | 22% |
| **z114 12x IFB** | 12% | 15% | 15% | 17% | 19% |
| **z114 12x IFB3** | 10% | 12% | 12% | 13% | 14% |
| **z196 ISC-3** | 17% | 21% | 19% | 24% | N/A |
| **z196 1x IFB** | 13% | 16% | 16% | 18% | 21% |
| **z196 12x IFB** | 11% | 14% | 14% | 15% | 17% |
| **z196 12x IFB3** | 9% | 11% | 10% | 12% | 13% |
| **zBC12 ISC-3** | 17% | 21% | 19% | 24% | N/A |
| **zBC12 1x IFB** | 14% | 18% | 17% | 20% | 22% |
| **zBC12 12x IFB** | 12% | 15% | 14% | 17% | 18% |
| **zBC12 12x IFB3** | 10% | 11% | 11% | 12% | 14% |
| **zEC12 ISC-3** | 17% | 21% | 19% | 24% | N/A |
| **zEC12 1x IFB** | 13% | 16% | 16% | 18% | 20% |
| **zEC12 12x IFB** | 11% | 13% | 13% | 15% | 17% |
| **zEC12 12x IFB3** | 9% | 10% | 10% | 11% | 12% |
| **z13 1x IFB** | 14% | 17% | 16% | 19% | 20% |
| **z13 12x IFB** | 12% | 14% | 14% | 16% | 17% |
| **z13 12x IFB3** | 9% | 11% | 10% | 12% | 12% |
| **z13 ICA SR** | N/A | N/A | N/A | N/A | 11% |

With z/OS 1.2 and above, synch-> asynch conversion caps values in the table at about 18%
IC links scale with the speed of the host technology and would provide an 8% effect in each case