Smarter Systems for a Smarter Planet

MVS Core Technologies Project Opening z/OS Hot Topics

Session 09698 - August 8, 2011

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Agenda

- Operating Systems status
- Washington Systems Center Flashes
- Announcements
- Parallel Sysplex™

z/OS Key Dates

- **z/OS Version 1 Release 12**
  - **July 22, 2010:** Announcement
  - **September 24, 2010:** GA via ServerPac, CBPDO and SystemPac
  - **October 11, 2011:** Recommended last date for submitting z/OS 1.12 via fee based customized offerings
  - **October 25, 2011:** Last date for processing orders for z/OS 1.12 via ServerPac and CBPDO

- **z/OS Version 1 Release 13**
  - **February 15, 2011:** Preview Announcement
  - **July 12, 2011:** Announcement
  - **September 30, 2011:** General availability via ServerPac, CBPDO and SystemPac

z/OS and Server Support

	z800/ z900	z890/ z990	z9 EC/BC	z10 EC/ BC	z196	z114	DS8000 DS6000®	TS1130	End of service	Lifecycle Extension for z/OS	Coexists with	Ship date
R7	X	X	X	X (1,2)	X(1)	NO	X(1)	X	9/2008	9/2010	R9	9/2005
R8	X	X	X	X	X	X(4)	X	X	9/2009	9/2011	R10	9/2006
R9	X	X	X	X	X	X(4)	X	X	9/2010	9/2012	R11	9/2007
R10	X	X	X	X	X(3)	X(3,4)	X	X	9/2011	9/2013	R12	9/2008
R11	X	X	X	X	X	X	X	X	9/2012*		R13	9/2009
R12	X	X	X	X	X	X	X	X	9/2013*		R14*	9/2010
R13	X	X	X	X	X	X	X	X	9/2014*		R15*	9/2011*
R14*	X	X	X	X	X	X	X	X	9/2015*		R16*	9/2012*

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(1) IBM Lifecycle Extension for z/OS V1.7 (5637-A01) was required for the z10 BC, z196, and disk storage

(2) IBM Lifecycle Extension for z/OS V1.7 (5637-A01) required for support for some z10 EC features

(3) z/OS V1.10 and later required for zBX and Ensemble management exploitation

(4) IBM Lifecycle Extension for z/OS V1.8 (5638-A01) and for z/OS V1.9 (5646-A01) required for z114. Lifecycle Extension for z/OS V1.10 (5656-A01) required starting October 2011.

(5) See IBM GTS services for additional fee-based extended service options

Out of service (5)

Lifecycle Extension withdrawal 2 years later

General support

IBM Lifecycle Extension for z/OS V1R10 (5665-A01)

- The IBM Lifecycle Extension for z/OS V1.10 provides fee-based corrective service (a fix, bypass, or restriction to a problem) for up to two years beyond the September 30th 2011 end of service date for z/OS V1.10

- This Lifecycle Extension for z/OS V1.10 enables z/OS V1.10 users to continue to receive corrective service for z/OS V1.10 for the 2 year period of October 1, 2011 through September 30, 2013.

- The Lifecycle Extension for z/OS V1.10 was announced February 15, 2011 and is planned to be available October 1, 2011.

- **For details: Announcement Letter 211-002 Dated February 15, 2011**

IBM Lifecycle Extension for z/OS V1R9 (5645-A01)

- The IBM Lifecycle Extension for z/OS V1.9 provides fee-based corrective service (a fix, bypass, or restriction to a problem) for up to two years beyond the September 30th 2010 end of service date for z/OS V1.9 (5694-A01).
- This Lifecycle Extension for z/OS V1.9 enables z/OS V1.9 users to continue to receive corrective service for z/OS V1.9 for the 2 year period of October 1, 2010 through September 30, 2012.

- The Lifecycle Extension for z/OS V1.9 was available as of October 1, 2010
- **For more information:** Announcement letters : 210-027

z/OS on DVD

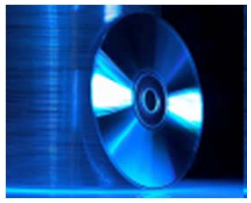
- **z/OS and related software (such as ServerPac®, CBPDO, SystemPac®, ProductPac®) are available on DVD media.**
  - z/OS (such as ServerPac or CBPDO) is no longer available on 3480, 3480 Compressed (3480C), and 3490E tape media.

- **Your choice for z/OS delivery media is now:**
  - **Over the Internet**.
  - Internet delivery is the most popular delivery option, see:

    http://www-03.ibm.com/systems/z/os/zos/serverpac_internet_delivery.html

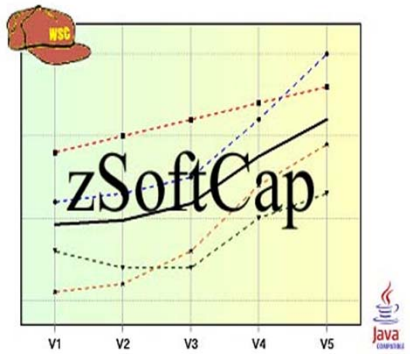
  - **IBM 3590 and 3592 Enterprise Tape**
  - Our highest-density media means there are much fewer tapes to manage!

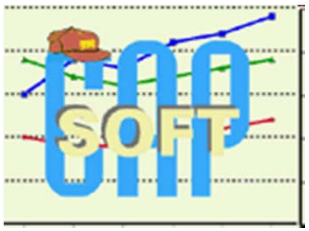
  - **DVD**
  - Requires a workstation with a DVD drive that can read discs in DVD-5 (single-sided, single layer) format and a network connection to your z/OS system
    - z/OS Customized Offering Driver (COD) is also available on DVD, but requires the DVD drive in and installation from the HMC.



zSoftCap - New !

- What is zSoftCap ?
  - zSoftCap is a work station based tool that will evaluate the effect on z/Architecture and System z processor capacity when migrating to newer levels of software, including z/OS, CICS and IMS.
- z/OS 1.13 Planning will refer to zSoftCap
  - Old SoftCap will remain available for some time by request
- What's removed from zSoftCap ?
  - Goal Mode and 31bit to 64bit Migration
- What has been added to zSoftCap ?
  - Changes to IMS workload Algorithms
    - Results will not exactly match when compared with results from SoftCap
  - Both SoftCap and the new zSoftCap can co-exist
  - z/VSE support
    - Migration from any release beginning with VSE/ESA 2.3 up to and including z/VSE 4.3
  - CICS/TS 4.2 (zSoftCap 4.1a)
  - z114 support (zSoftCap 4.1a)
- zSoftCap 4.1a is the latest release
- Customer version available as of July18, 2011





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Configuring z/OS to Ensure Successful DASD Swap using the CRITICALPAGING Function

- **Flash10733**
- During a DASD Swap, using Basic HyperSwap, GDPS HyperSwap Manager or other swap technologies, a system may require access to a page that is currently paged out.
- To resolve the page fault, I/O to a paging DASD device is required. If the page device is among the devices that are frozen/suspended during the DASD Swap, the page fault will not be immediately resolved. The page fault will be resolved when I/O to the device is resumed.
- If the page fault is not resolved in a timely fashion the DASD Swap may fail due to a timeout. Depending on the specific page that took the page fault, a system may be removed from the sysplex during a DASD Swap.
- This may result in a system being removed during a DASD Swap. Depending on the SFM policy, SFM may remove the system. Alternatively, in a GDPS HyperSwap Manager environment, GDPS may remove a system if it fails to respond to a phase of the HyperSwap
- IBM strongly recommends enabling CRITICALPAGING function

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Important Considerations for STP Server Role Assignments

- **WP101833**

- If you have configured a Server Time Protocol (STP) Coordinated Timing Network (CTN) with three or more servers, and have assigned the roles:
  - Preferred Time Server (PTS), the server preferred to be the Stratum 1 (S1)
  - Backup Time Server (BTS), whose role is to take over as the S1 server when planned/unplanned outages affect the PTS.
  - Current Time Server (CTS), the server that is the Active Stratum 1 server. There can be only one Active S1, and only the PTS or the BTS can be assigned as the CTS. Typically the PTS is assigned as the CTS, and is therefore the Active S1. The BTS is typically the Inactive S1.
  - Arbiter, which provides a means to determine if the Inactive S1 should take over as the Active S1 when unplanned outages affect the CTN
- Recommendations for reassigning STP server roles when any of the assigned role servers has a planned or unplanned outage are documented.

  NOTE: The recommendations, if not followed, MAY result in all the servers in the CTN becoming unsynchronized, a condition that results in a sysplex wide outage.

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WSC IBM zEnterprise Experience and Usage

- **WP101857**
- The purpose of this document is to provide a collection of the early installation and usage experiences, tips and guidance on IBM zEnterprise from IBM Washington Systems Center, Advanced Technical Support, Gaithersburg Maryland.
- Early hands-on experience has been gathered in internal early support programs (IESP) and by working with customers who received the product during customer ESP.
- In general, this document is not meant to repeat information that is readily available in product publications, announcement letters
- This document will be delivered in “editions,” each of which will build on the previous edition. In the second edition, the topics in the first edition will be updated and new topics will be added.

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Mission: Available
How to achieve high availability in Parallel Sysplex

- **WP101966**
- The paper details all of the latest z/OS functions and features, as well as new functions of the System z196 and z114 hardware platform that promote parallel sysplex high availability

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The zEnterprise System …

Designed to significantly enhance the user capabilities to implement and manage multiple platforms and applications as an integrated whole

- zEnterprise 196 (z196)
- zEnterprise BladeCenter Extension (zBX)
  - Select IBM Blades
  - Optimizers
- Unified Resource Manager (zManager)
- Mathematically:
  - zEnterprise = z196 + zBX + zManager

z/OS support z196 Functions and Features (GA2)

Five hardware models
Quad-core 5.2 GHz processor chips
Up to 80 processors configurable as CPs, zAAPs, zIIPs, IFLs, ICFs, or optional SAPs (up to 32-way on R7, 64-way on R9, 80-way on R11)
Out of order instruction execution
Improved processor cache design
Up to 15 subcapacity CPs at capacity settings 4, 5, or 6
Up to 3TB real memory (1TB per LPAR)
Improved availability with Redundant Array of Independent Memory **(**RAIM)
Power save functions
On Demand enhancements
IBM zEnterprise Unified Resource Manager (from HMC)
New and enhanced instructions
Changes to the Common Cryptographic Architecture, Crypto Express3, and Trusted Key Entry
IPL from an alternate sub channel set
PCIe-based I/O infrastructure - – FICON Express8S and OSA Express4S
32 sub channels per CHIPD for PSIFB links
Large send for IPv6 packets

z196 **zBX**

(z/OS support in blue)

(Sept 2011 support in red)

Capacity Provisioning enhanced
6.0 GB/sec InfiniBand I/O interrupt
Three subchannel sets per LCSS
FICON Discovery and AutoConfiguration (zDAC)
OSA-Express3 Inbound Workload Queing (IWQ)
IWQ for Enterprise Extender
Low latency virtual network between logical partitions with HiperSockets Completion Queue (preview)
CFCC Level 17 enhancements
Up to 104 External Coupling Link
Up to 128 Coupling Link CHPIDs Defined
Optional water cooling
Optional High Voltage DC power
Optional overhead I/O cable exit
Support for OSX and OSM CHPIDs
zBX-002 IBM Smart Analytics Optimizer
zBX-002 select POWER7 and IBM System x Blades
zBX-002 IBM WebSphere DataPower Integration Appliance X150 for zEnterprise
HiperSockets optimization for IntraEnsemble Data Network (preview)

Introducing z114

- **Machine Type**
  - 2818
- **2 Models**
  - M05 and M10
  - Single frame, air cooled
  - Non-raised floor option available
  - Overhead Cabling and DC Power Options
- **Processor Units (PUs)**
  - 7 PU cores per processor drawer (One for M05 and two for M10)
  - Up to 2 SAPs per system, standard
  - 2 spares designated for Model M10
  - Dependent on the H/W model - up to 5 or 10 PU cores available for characterization
    - Central Processors (CPs), Integrated Facility for Linux (IFLs), Internal Coupling Facility (ICFs), System z Application Assist Processors (zAAPs), System z Integrated Information Processor (zIIP), optional - additional System Assist Processors (SAPs)
  - 130 capacity settings
- **Memory**
  - Up to 256 GB for System including HSA
    - System minimum = 8 GB (Model M05), 16 GB (Model M10)
    - 8 GB HSA separately managed
    - RAIM standard
    - Maximum for customer use 248 GB (Model M10)
    - Increments of 8 or 32 GB
- **I/O**
  - Support for non-PCIe Channel Cards
  - Introduction of PCIe channel subsystem
    - Up to 64 PCIe Channel Cards
  - Up to 2 Logical Channel Subsystems (LCSSs)
- **STP - optional (No ETR)**

zEnterprise 114 Functions and Features (GA Driver 93 – September, 2011)

Two hardware models
Up to 10 processors configurable as CPs, zAAPs, zIIPs, IFLs, ICFs, or optional SAPs
Up to 26 subcapacity settings across a maximum of 5 CPs
Up to 256 GB of Redundant Array of Independent Memory (RAIM) for System
Dedicated Spares on the Model M10
Increased capacity processors
Out of order instruction execution
Improved processor cache design
New and additional instructions
On Demand enhancements
CFCC Level 17 enhancements
Cryptographic enhancements
6 and 8 GBps interconnects
2 New OSA CHPIDs – OSX and OSM

Doubled HiperSockets to 32
Additional STP enhancements
Doubled Coupling CHPIDs to 128
Improved PSIFB Coupling Link
Physical Coupling Links increased to 72 (Model M10)
New 32 slot PCIe Based I/O Drawer
Increased granularity of I/O adapters
New form factor I/O adapters i.e FICON Express8S and OSA-Expres4S
Humidity and altimeter smart sensors
Optional High Voltage DC power
Optional overhead I/O cable exit
zBX-002 with ISAOPT, POWER7, DataPower XI50z and IBM System x Blades*

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Load (IPL) from Alternate Subchannel Set

Exclusive to z196 and z114

- **Today Load (IPL) devices must be in Subchannel set 0 – this restriction is being removed.**
- **The ability to Load (IPL) from an alternate Subchannel set is now supported.**
  - IPL from Subchannel set 1 (SS1) or Subchannel set 2 (SS2), in addition to Subchannel set 0.
- **Enables customers to utilize the additional device addressability we have provided with less complexity involved.**
- **The Load Address value was expanded to 5 hex digits – the highorder (left most digit) represents the Subchannel set and is restricted to 0, 1 or 2.**
- **Impacted tasks included: Load, Customize/Delete Activation Profiles (Image and Load profiles), and HMC APIs (SNMP and CIM).**
- **IPL from an alternate Subchannel set is supported by z/OS V1.13, as well as V1.12 and V1.11 with PTFs and applies to the FICON and zHPF protocols.**

z/OS Support for IBM zEnterprise z196 and z114

- **The minimum z/OS requirements:**
  - **z/OS R11, R12, R13 and higher**
  - **z/OS R8, R9, R10 with Lifecycle Extension for z/OS**
  - **IBM System z BladeCenter Extension (zBX) and Ensemble support with z/OS R10 and later**

IBM® zEnterprise™ System

IBM zEnterprise 114 (z114)

IBM® zEnterprise™ BladeCenter® Extension (zBX)

Unified Resource Manager

zBX Overview

- MT/Model 2458-002
  - One Model with 5 configurations for IBM Smart Analytics Optimizer
- Racks – Up to 4 (B, C, D and E)
  - 42U Enterprise, (36u height reduction option)
  - 4 maximum, 2 chassis/rack
  - 2-4 power line cords/rack
  - Non-acoustic doors as standard
  - Optional Rear Acoustic Door
  - Optional Rear Door Heat Exchanger (conditioned water required)
- Chassis – Up to 2 per rack
  - 9U BladeCenter
  - Redundant Power, cooling and management modules
  - Network Modules
  - I/O Modules
- Blades (Maximum 112 in 4 racks)
  - IBM Smart Analytics Optimizer Blades (0 to 7 to 56)
    - Can not mix other Blades in the same Chassis
  - Customer supplied POWER7 Blades (0 to 112)
  - Customer supplied IBM System x Blades* (0 to 28)
  - IBM WebSphere DataPower Integration Appliance XI50 for zEnterprise, M/T 2462-4BX (up to 28 – double width)
  - Non-IBM Smart Analytics Optimizer Blades can be mixed in the same chassis
- Management Firmware
  - Unified Resource Manager
- Top of Rack (TOR) Switches - 4
  - 1000BASE-T IntraNode Management Network (INMN)
  - 10 GbE IntraEnsemble Data Network (IEDN)
- I/O
  - 8 Gb Fibre Channel (FC) connected to customer supplied disks
  - IBM Smart Analytics Optimizer uses DS5020 disks
    - DS5020s not shared with Customer supplied Blades

2458-002 Blades

IBM Smart Analytics Optimizer
Pre-packaged

IBM Power7 Blade
Separately ordered

DataPower XI50z
Pre-packaged
Double Wide

IBM System x Blade
Separately ordered

IBM zEnterprise™ BladeCenter® Extension (zBX)
IBM System x® Blades

MT 7873 (HX5)

Announced on July 12th GA September 26th

Customer Configuration

- Intel 8 core Processor
- 2 Processor sockets
- 2.13 GHz 105W
- Max 14 A16M's per BC-H
- Memory 1066 MHz with 6.4 GTs
- 16 DIMM slots
- 100GB SSD Internal Disk

- Blades acquired by the customer through existing channels or through IBM.

- Virtualization: Integrated Hypervisor supplied by Unified Resource Manager

http://www.ibm.com/systems/z/hardware/zenterprise/zbx.html

zBX - Linux on System x
Operating Systems

- For HX5 7873 blades in the zBX, Linux must be 64 bit
- The supported HX5 7873 is a single wide two socket blade.
- **Red Hat**
  With RHEL 5.5 you should order the feature for 2 sockets.

  See the Red Hat website for more information – www.redhat.com.
- **Novell**
  For Novell SLES 11 SP1 you should select 'SUSE Linux Enterprise Server' with 1-32 sockets.

  See the Novell website for more information - http://www.novell.com/products/server/
- **Microsoft Windows**
- IBM's intent is to support
  - Microsoft Windows Server 2008 – Datacenter Edition on the HX5 7873 blades installed in the zBX, 64 bit version only.
  - NOTE that this information is ***a statement of direction only***.

http://public.dhe.ibm.com/common/ssi/ecm/en/zsl03128usen/ZSL03128USEN.PDF

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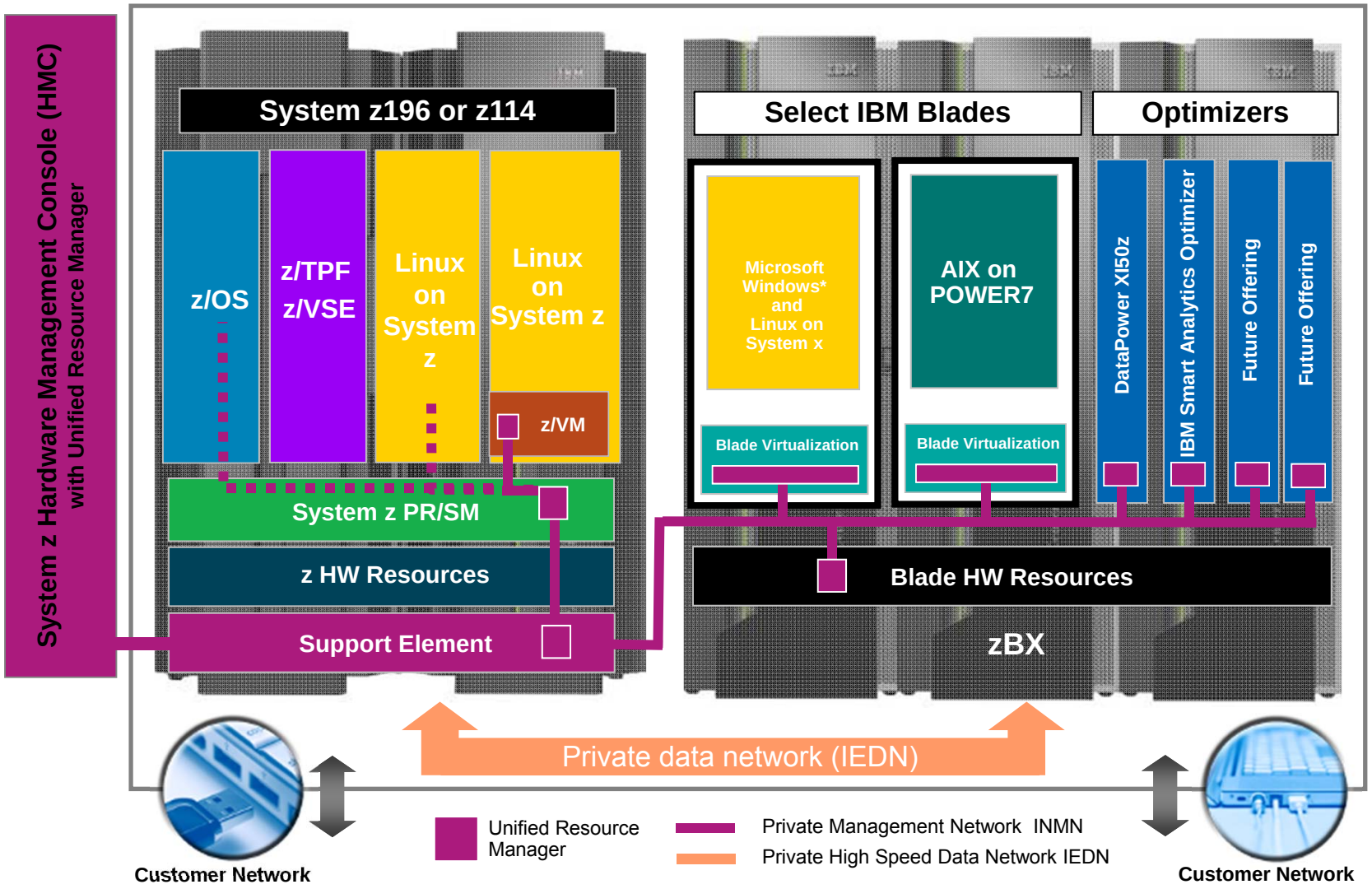
Putting zEnterprise System to the task

Use the smarter solution to improve your application design



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z/OS Version 1 Release 13*…

….. get more value from your workloads with performance, programming, and operations improvements.

z/OS V1.13 plans several enhancements designed to:

- **Help you shorten batch windows** using JCL improvements in JES2 environments.
- **Simplify application programming** with a new z/OS base component, z/OS Batch Runtime environment, designed to enable COBOL and Java to interoperate for DB2 with transactional integrity so you can enhance and extend existing COBOL batch application programs using Java.
- **Improved performance for z/OS UNIX workloads** in a Parallel Sysplex using direct I/O with fully-shared zFS file systems, and improve zFS availability with a new zFS internal restart function.
- **Help you get early warning of system issues** before they become obvious to help you act quickly and decisively with updated z/OS Predictive Failure Analysis and Runtime Diagnostics functions.
- **Provide more options you can use to secure your data** with newer, faster, and more scalable encryption and security capabilities incorporated in IBM Tivoli Directory Server for z/OS (LDAP), RACF, z/OS System SSL, and z/OS PKI Services.
- **Provide a simplified set of XCF interfaces** for passing messages within a parallel sysplex

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z/OS Management Facility – *the new face of z/OS*

Streamlined processes and built-in guidance address a broad scope of activities and helps create a more integrated z/OS experience.

- **Configuration**
  - Configuration Assistant for z/OS Communication Server (R11) – Simplified configuration and setup of TCP/IP policy-based networking functions
- **Performance**
  - Capacity Provisioning (R13) - simplified monitoring of CP status for domains
  - Resource Monitoring and System Status (R12) – single view of sysplex and Linux® performance status and dynamic real time resource metrics.
  - Workload Management – creation, editing, and activation of WLM policies (R12)
- **Problem Determination**
  - Incident Log (R11) – Simplified capture, packaging, sending of SVC dump diagnostic data
- **Software**
  - Deployment (R13) - Clone z/OS images, deploy software more easily and consistently
- **Storage**
  - DASD Management (R13) - Define new SMS storage volumes quickly and easily*
- **z/OS Classic Interface**
  - ISPF Task integrates existing ISPF into z/OSMF to launch to ISPF functions directly (R13)
- **Base**
  - A new web-based (REST) interface enables you to submit batch jobs and access batch data from non-z/OS systems (R13)
  - Leverage IBM System z® Specialty engines
  - IBM Assistance available to help with pre-planning, early discovery, and readiness review for new z/OSMF environment

* The DASD Management task is planned to be made available in 1Q 2012 with the PTF for APAR PM40869

z/OS Availability Enhancements

- **Availability enhancements (with R13)**
  - **Avoid JES2 re-starts** with JES2 dynamic spool migration, rapidly discontinue and drain spool volumes quickly
  - **Avoid JES3 re-starts** with JES3 dynamic spool add
  - **Improved channel recovery** - track errors and automatically remove failing paths (on a controller level) faster
  - **zFS internal restart** - automatically recover disabled aggregates in Sysplex aware mode – avoiding lengthy manual system recovery process.
  - **Automatic rerouting and recovery of z/OS system name server resolver**
  - **Concurrent service for DADSM and CVAF and DADSM dynamic exits** – avoid planned outages

z/OS Availability Enhancements

Parallel Sysplex updates for R13

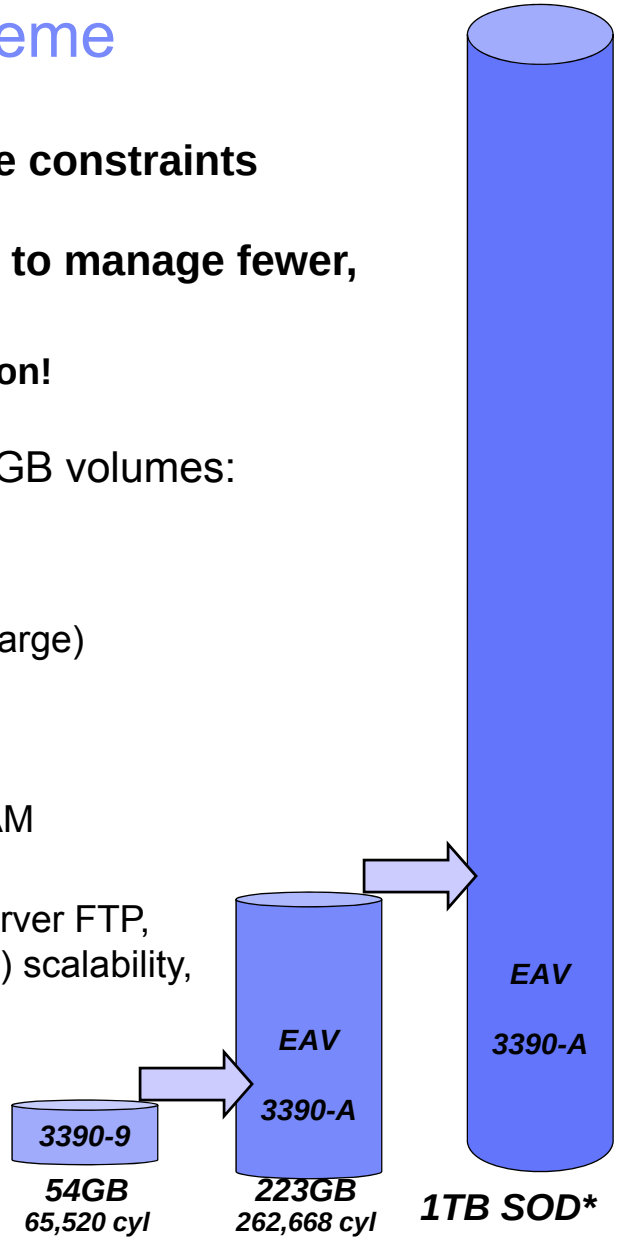
- **Fully shared zFS in a sysplex!**
  - **Between 50% (1.5x) and 150% (2.5x)* I/O performance improvement** for any z/OS UNIX workload using shared zFS in a Parallel Sysplex®. Applications that use zFS, such as z/OS UNIX System Services and WebSphere Application Server for z/OS, are expected to benefit
  - Also: Less-disruptive recovery from most internal zFS problems (for both single system and sysplex-aware systems)
  - Also: A new health check for zFS configuration files

- Eliminate the need for WebSphere MQ for SDSF Sysplex environments.
- Automatic monitoring, takeover, and recovery to prevent CSM-constrained conditions
- NEW Easier to use XCF signaling protocol
- Updated volume information on all systems in the sysplex when DFSMSdss™ or DFSMShsm™ Fast Replication Backup and Recovery processing complete
- More responsive to VIPA changes
- Workload balancing of IPsec IKEv2 and IPv4.

* I/O performance improvements measured for fully shared zFS ranged from very small to 900%, with the majority of workload conditions tested falling between 50% and 150%. The actual amount of improvement will depend on the environment (monoplex or Parallel Sysplex) and the type of file processing being done.

Taking z/OS Storage Volumes to the Extreme

- **Extended Address Volumes (EAVs) help address storage constraints**
- **Can help simplify storage management by enabling you to manage fewer, larger volumes, as opposed to many small volumes**
  - **Also IDEAL for large datasets, may improve storage utilization!**
- DS8000® exploitation rolled out over time, starting with 223 GB volumes:
  - With z/OS R10, support for VSAM
  - With z/OS R11, support for extended format sequential data sets
  - With z/OS R12, support extended to sequential (both basic and large) data sets, partitioned (PDS/PDSE) data sets, catalogs (ICF now larger than 4 GB), BDAM data sets, JES spool and checkpoint data sets, standalone Dump extended format dump data sets, DFSMSrmm data sets, generation data groups (GDGs) and VSAM volume data sets (VVDSs).
  - With z/OS R13 - Support extended to z/OS Communications Server FTP, SDSF extended format print files, VSAM volume data set (VVDS) scalability, ISPF to display data sets eligible for EAV.
  - **SOD** - support for larger extended address volumes (EAVs), up to 1 TB per volume, on IBM System Storage® DS8700 and DS8800 series, with new DS8000 licensed machine code.*



*All statements regarding IBM's plans, directions, and intent are subject to change or withdrawal without notice.

z/OS and IPv6

- **IPv4 address pool is exhausted** February 3, 2011
  - http://www.ipv6news.info/2011/02/04/ipv4-address-pool-is-exhausted/
  - Now the IPv4 Internet only has the stock of IPv4 addresses held by the regional registrars and Internet Service Provides (ISPs) to keep it going.

- **z/OS is IPv6 certified!** (http://jitc.fhu.disa.mil/adv_ip/register/certs/ibmzosv110_dec08.pdf)
- **z/OS Communications Server is adding function for IPv6 networks:**
  - **For z/OS R11**
  - Support RFC4941 and RFC5095; and the AES-based AES-XCBC-MAC-96 and AES-XCBC-PRF-128 algorithms - intended to meet new government IPv6 standards
  - **For z/OS R12**
  - Health checks for IPv4 and IPv6 routing
  - Support for DFSMSrmm, IKEv2, ability to Send DNS Queries over IPv6, support for security-related RFC3484 and RFC5014
  - **For z/OS R13**
  - Support for IPv6 intrusion detection security equivalent to that provided for IPv4, integrated with the Configuration Assistant (in z/OSMF)
  - Support for IPv6 checksum and segmentation offload enhancements and for LPAR-to-LPAR checksum offload for both IPv4 and IPv6 packets available with OSA-Express4S QDIO (announced July 12 2011)
    - TCP/IP segmentation and checksum processing on OSA card and not on CP

NEW suite of GDPS solutions

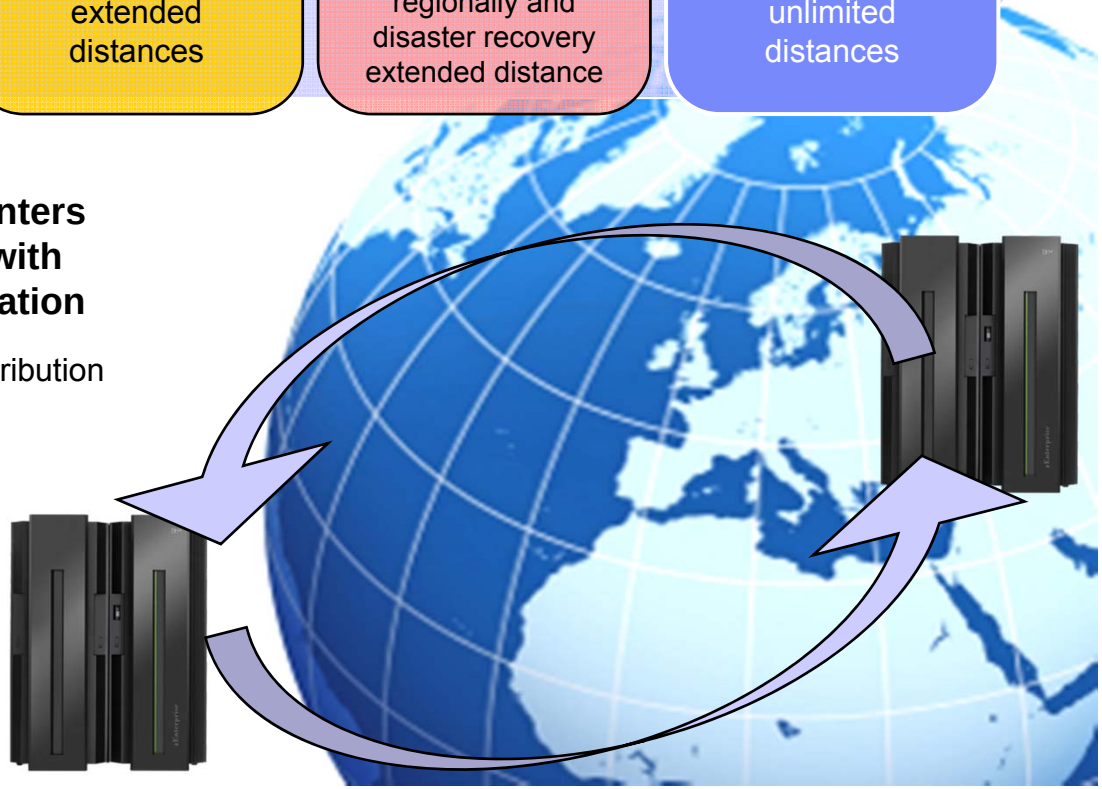
IBM GDPS active/active continuous availability family of solutions is the next generation of GDPS

IBM Geographically Dispersed Parallel Sysplex (GDPS)

GDPS/HyperSwap™ Manager	GDPS/PPRC	GDPS/GM GDPS/XRC	GDPS/MGM GDPS/MzGM	GDPS Active/Active
Continuous availability of data within a data center	Continuous availability or disaster recovery within a metropolitan region	Disaster recovery at extended distances	Continuous availability regionally and disaster recovery extended distance	Near-continuous availability across unlimited distances

GDPS/ A-A concept: two or more data centers running the same applications and data with cross-site workload balancing and replication

- z/OS workload monitoring, management, and distribution
- z/OS data and transaction replication
- GDPS automation
- First configuration is ‘Active Standby’



Agenda

- Announcements
- Operating Systems status
- Washington Systems Center Flashes
- Parallel Sysplex™

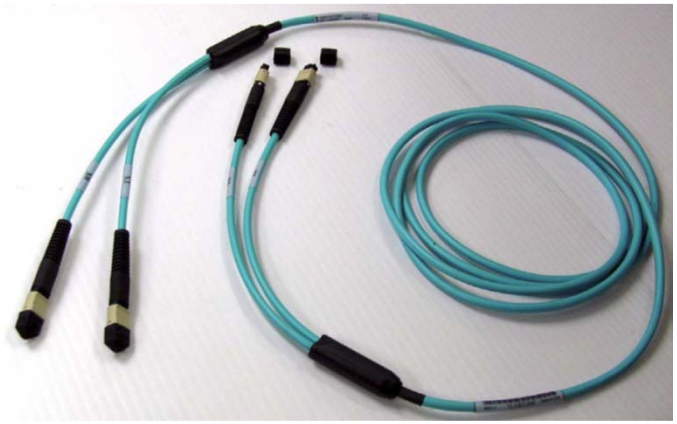
Server Participation in a Parallel Sysplex

- **z196/z114 does not support active participation in the same Parallel Sysplex with:**
  - IBM eServer zSeries 900 (z900), IBM eServer zSeries 800 (z800),
  - IBM eServer zSeries 990 (z990), IBM eServer zSeries 890 (z890),
  - and older System/390® Parallel Enterprise Server systems

  This means:
  - Configurations with z/OS on one of these servers can't add a z196/z114 to their sysplex for either a z/OS image or a CF image
  - Configurations with a CF on one of these servers can't add a z196/z114 to their sysplex for either a z/OS image or a CF image
- **z196/z114 does not support connection to an ETR**
  - Customers should migrate to STP *prior* to z196/z114
- **z196/z114 does not support ICB-4 Coupling Links**
  - Customers should plan their coupling link technology

Parallel Sysplex using InfiniBand (PSIFB)
ready for even the most demanding data sharing workloads

- **Simplify Parallel Sysplex connectivity**
  Do more with less
  - Can share physical links by defining multiple logical links (CHPIDs)
  - Can consolidate multiple legacy links (ISC and/or ICB)
  - Can more easily address link constraints
    - Define another CHPID to increase available subchannels instead of having to add physical links



- **More flexible placement of systems in a data center**
  - 12x InfiniBand coupling links (FC 0171 HCA3-O and FC 163 HCA2-O)
    - Support optical cables up to 150 meters. No longer restricted to 7 meters between System z CPCs
  - 1x InfiniBand coupling links (FC 0170 HCA3-O LR and FC FC 0168 HCA2-O LR)
    - Use the same single mode fiber optic cables as ISC-3 and FICON/FCP for unrepeated distances of up to 10 km, and metropolitan distances with qualified DWDM solutions

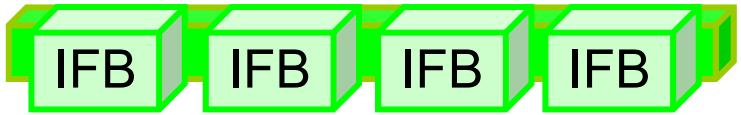
HCA3 for Coupling Links

New 12x InfiniBand & 1x InfiniBand Fanout Cards – Exclusive to z196 & z114

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*

– **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

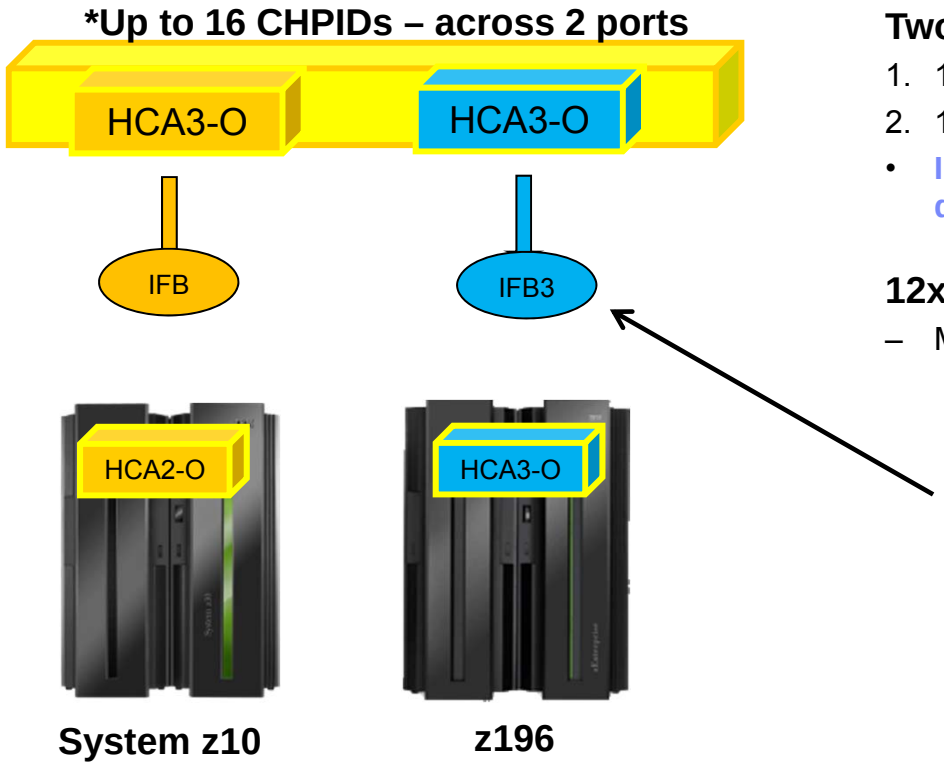
– **HCA3-O LR fanout for 1x InfiniBand coupling links**
  - CHPID type – CIB
    - **Four ports per feature**
    - Fiber optic cabling
      - 10 km unrepeated, 100 km repeated
    - Supports connectivity to HCA2-O LR
    - Link data rate server-to-server 5 Gbps
    - Link data rate with DWDM; 2.5 or 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.

HCA3-O 12x Details

New 12x InfiniBand fanout cards, exclusive to z196 and z114



Attachment to System z9 HCA1 not supported

Two protocols (IFB & IFB3)

1. 12x IFB = HCA3-O to HCA2-O
2. 12x IFB3 = HCA3-O to HCA3-O (see below)

- **Improved service times, 12x IFB3 service times are designed to be 40% faster than 12x IFB**

12x IFB3 protocol activation requirements

– Maximum of **four** CHPIDs per HCA3-O port

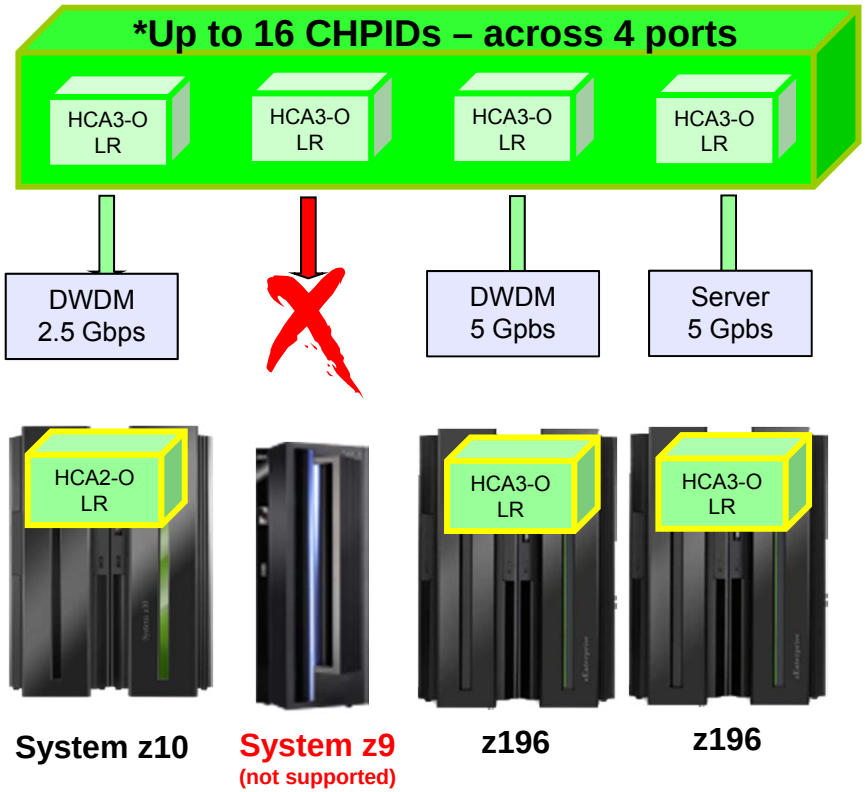
- **If more than four CHIPDs are defined per port, links will run at normal 12x IFB service times**
- **IFB3 protocol activated as long as 4 CHPIDs or less are defined. No configuration settings required.**

- 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.

HCA3-O LR 1x Details

New 1x InfiniBand fanout cards, exclusive to z196 and z114



HCA3-O LR fanout for 1x InfiniBand coupling links

- CHPID type – CIB
  - Four ports per feature
  - Fiber optic cabling
  - Link sharing between multiple Sysplexes
  - 10 km unrepeated, 100 km repeated
  - Supports connectivity to HCA2-O LR
  - Link data rate server-to-server 5 Gbps
  - Link data rate with DWDM; 2.5 or 5 Gbps

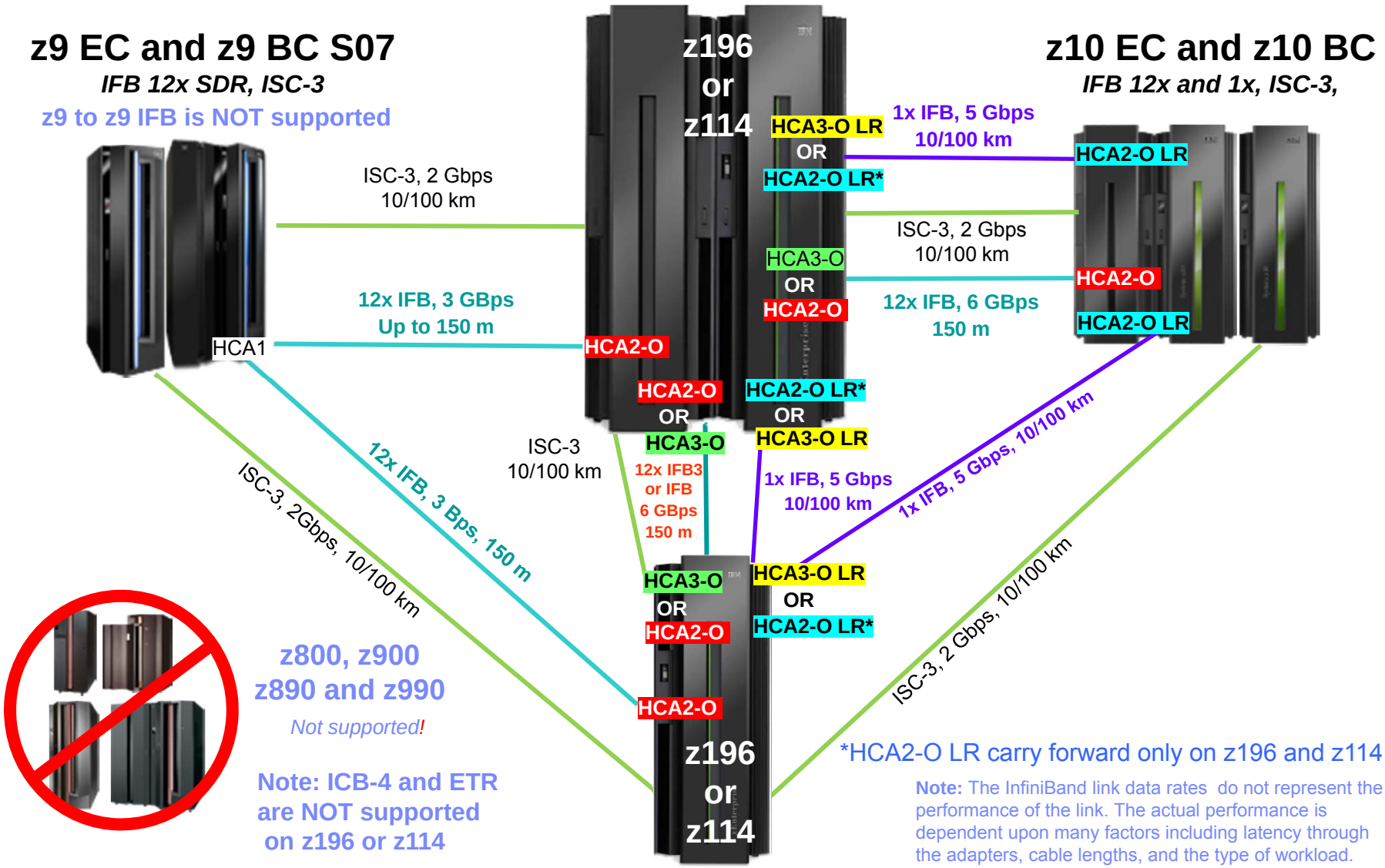
CHPID / Subchannel Options

- 32 subchannels per CHPID (default)
- Option to define 32 or 7 subchannels
  - HCD will default to 32 subchannels. .
- z114 or z196 GA2 to z114 or z196 GA2

* 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.

z114 and z196 GA2 Parallel Sysplex Coupling Connectivity



System z CFCC Level 17

- **CFCC Level 17 allows:**
  - up to 2047 structures per Coupling Facility (CF) image, up from the prior limit of 1023. This allows you to define a larger number of data sharing groups, which can help when a large number of structures must be defined, such as to support SAP configurations or to enable large Parallel Sysplex configurations to be merged. This function requires z/OS v1.12 and the PTF for APAR OA32807; PTFs are also available for z/OS V1.10 and z/OS V1.11.
  - More connectors to list and lock structures. XES and CFCC already support 255 connectors to cache structures. With this new support XES also supports up to 247 connectors to a lock structure, 127 connectors to a serialized list structure, and 255 connectors to an unserialized list structure. This support requires z/OS 1.12 and the PTF for APAR OA32807; PTFs are also available for z/OS V1.10 and z/OS V1.11.
  - Improved CFCC Diagnostics and Link Diagnostics
- **Structure and CF Storage Sizing with CFCC level 17**
  - May increase storage requirements when moving from CFCC Level 16 (or below) to CF Level 17
  - Using the **CFSizer** Tool is recommended
  - http://www.**ibm.com**/systems/z/cfsizer/
- **Greater than 1024 CF Structures requires a new version of the CFRM CDS**
  - All systems in the sysplex must to be at z/OS V1.12 or have the coexistence/preconditioning PTF installed.
  - Falling back to a previous level (without coexistence PTF installed) is NOT supported without sysplex IPL

Supported CFCC Levels for z114 and z196 (GA2)

Coupling with z10

- The minimal code level for z10 coupling to z196 is Driver 79
- CFCC Product Release 16 Service Level 2.25.
- MCLs recommended for coupling: Highest available level

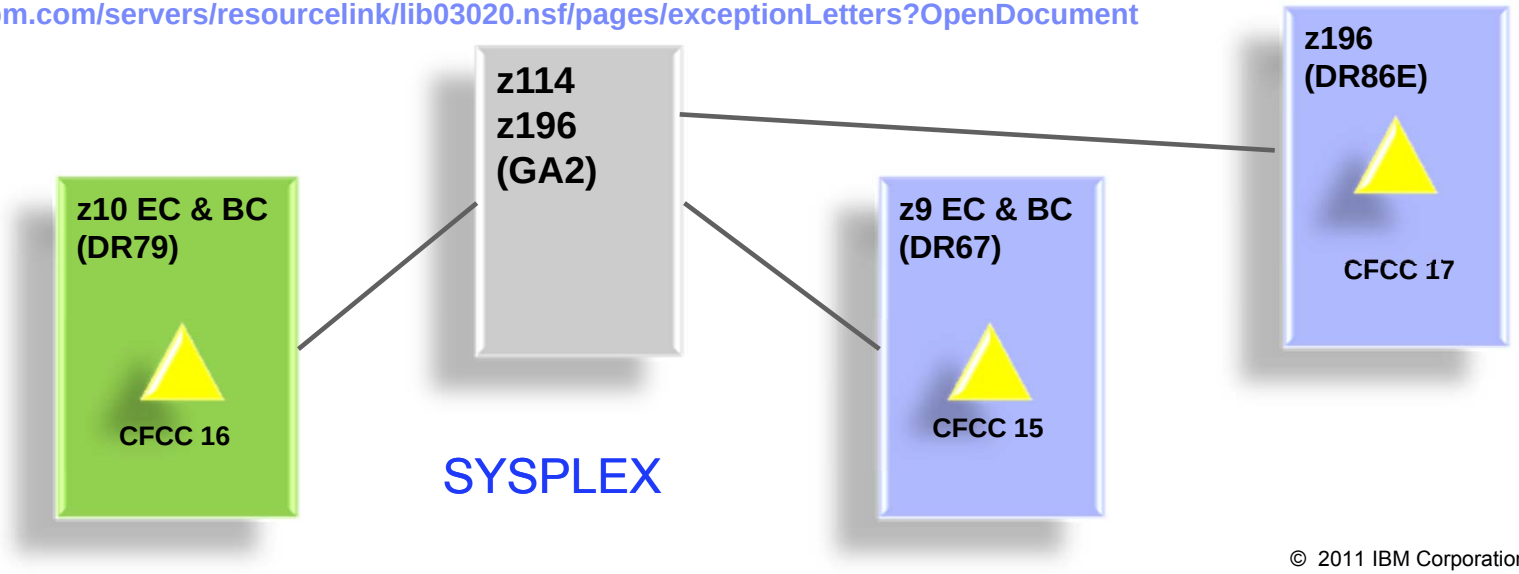
Coupling with z9

- The minimal code level for z9 coupling to z196 is Driver 67
- CFCC Product Release 15 Service Level 2.11.
- MCLs recommended for coupling: Highest available level

Coupling with z196 and z114

- The minimal code level for z196 coupling to z196 is Driver 86E
- CFCC Product Release 17 Service Level 2.24.
- MCLs recommended for coupling: Highest available level
- Latest information: z114 or z196 GA2 Driver Exception Letter on Resource Link

For latest recommended levels see the current exception letter published on Resource Link:
https://www-304.ibm.com/servers/resourcelink/lib03020.nsf/pages/exceptionLetters?OpenDocument



Thank You !