



IBM zEnterprise BladeCenter Extension (zBX) Hardware Overview and Update

Session 10607

Gregory Hutchison
IBM

Agenda



- **2458-002 Hardware Overview**
 - Recent Enhancements
- **Networking/Connectivity**
- **Disk/Storage Considerations**
 - IBM POWER7 Blades
 - IBM System x Blades
- **Hardware Management Console**
- **Services**
- **Reference**

New announcement – March 06, 2012

- Available now
 - **HiperSockets Completion Queue**
 - **Improved network monitoring and metrics**
 - **HiperSockets integration with the IntraEnsemble Data Network (IEDN) [Layer 2]**
 - **Server/Application State Protocol (SASP) support for zBX (load balancing)**
 - **Unified Resource Manager – Performance management with external routers**
 - **SAP support for zBX – Linux and Microsoft Windows**
 - **Support for HX5 blades with 192 and 256 GB memory**

- March 30, 2012
 - **Support for 56 System x blades (order & ship)**

- April 13, 2012
 - **z/VM network monitoring metrics and HiperSockets Vswitch bridge**
 - **z/VM guest exploitation support for High Performance FICON System z (zHPF)**
 - **z/VM dedicated connection support for HiperSockets integration with the IEDN**

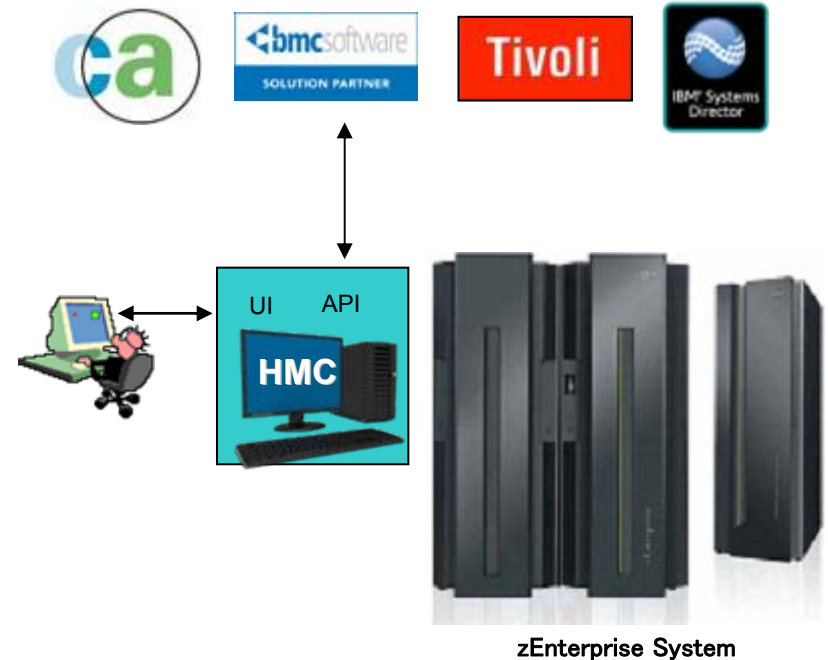
- April 24, 2012
 - **RPQ for additional Fibre Channel optics for BladeCenter chassis**
 - **RPQ if chassis shipped prior to December 2011**
 - **Must be at Driver 93**

Unified Resource Manager APIs

Enabling external management tools

- API support allows programmatic access to the same underlying functions exploited by the HMC user interface (UI)
 - Same resource types, instances and policies
 - HMC UI steps are accomplished using panels in a wizard-style task while API steps are accomplished by calling API management primitives
 - Therefore the API functions correspond to views and tasks in the UI such as:
 - Listing resource instances
 - Creating, changing, deleting resource instances
 - Operational control of resource instances
- Access to these functions will enable tools external to the HMC to manage the Unified Resource Manager
- Initially the priority scenarios will be the discovery, monitoring, and provisioning use cases

Announced October 2011
Available December 2011

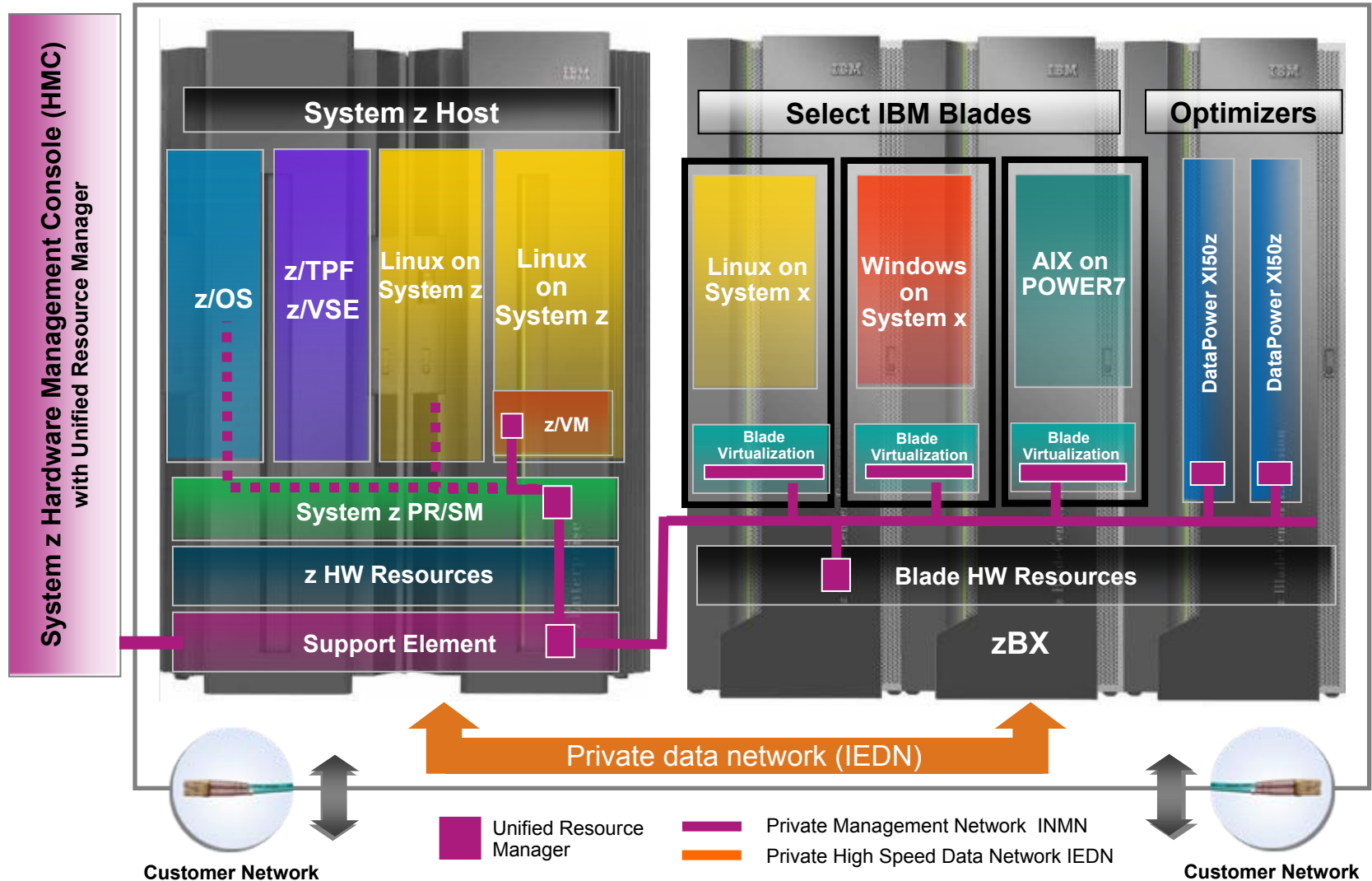


Exploiting the zEnterprise Unified Resource Manager Web Services APIs with Python and the zBXStorTool

- www.ibm.com/support/techdocs/atsmastr.nsf/WebIndex/PRS4856
- **Written by John Goodyear**
 - Washington System Center
 - johngood@us.ibm.com
- **The attached document describes a user written tool named zBXStorTool. The attached tool is a python program utilizing the WS APIs to provide administrators with command line capability to:**
 1. Export zBX storage definitions
 2. Query zBX storage usage by virtual servers running in the zEnterprise ensemble.

Putting zEnterprise System to the Task

Use the smarter solution to improve your application design



zBX Hardware Components

zBX Infrastructure

Blades



Rack

Top-of-Rack Switch

BladeCenter Chassis

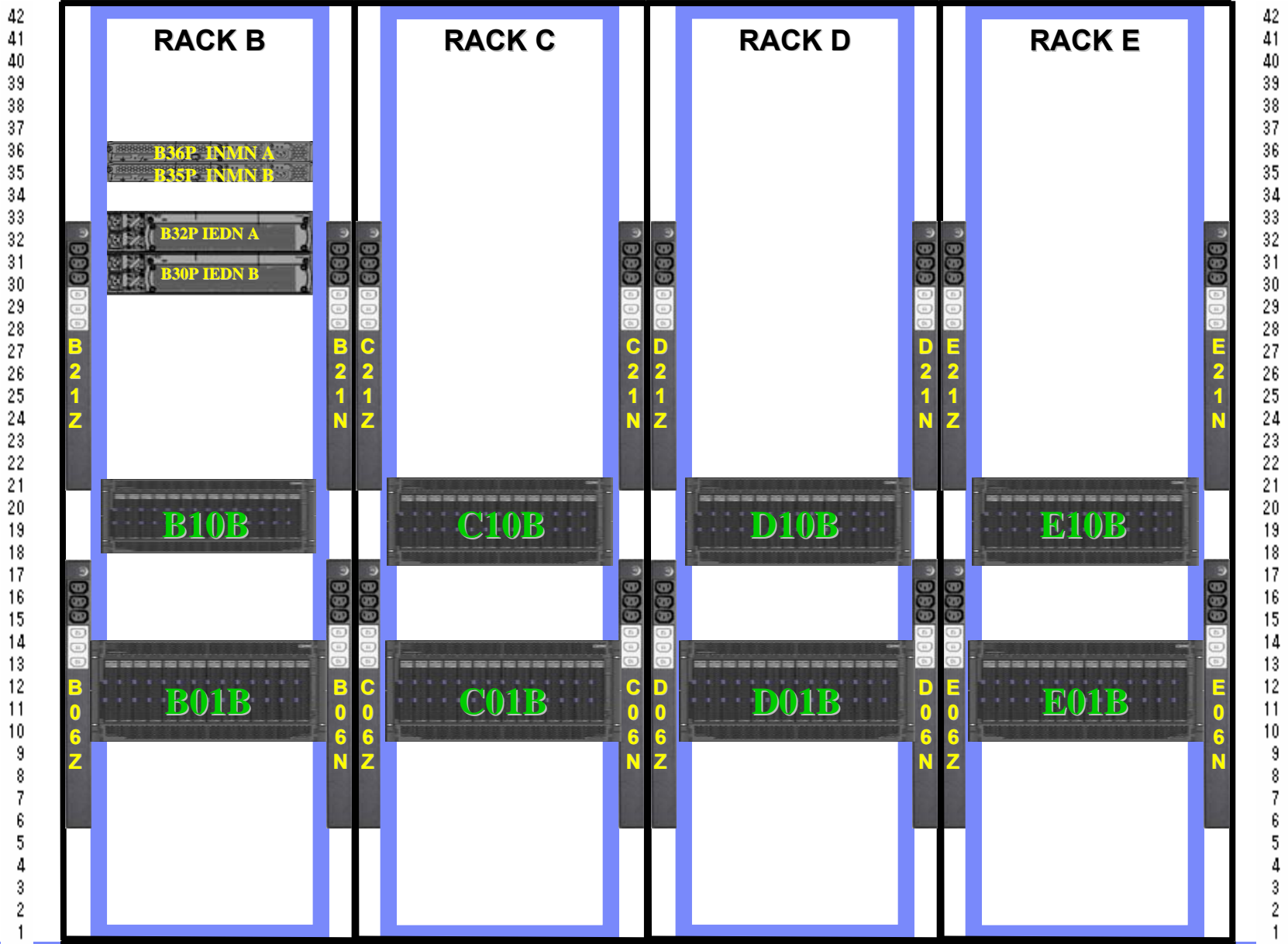
Ethernet & FC Cables

BC Switches

Power Dist. Units

Opt: Heat Exchanger,
Power cord types





zBX Door - options

- **Option 1 – Standard door**
- **Option 2 – Rear Door Heat Exchanger - Feature Code #0540**

- Requires customer conditioned water
- Refer to the Heat Exchanger Rear Door Planning Guide to ensure that the heat is properly dissipated.

http://publib.boulder.ibm.com/infocenter/systems/scope/hw/index.jsp?topic=/iphad_p5/iphadexchangeroverview.htm.

- When at that link, just search on 7014-T42

- **There are two circumstances which can be considered for the Rear Door Heat eXchanger (RDHX).**
 1. Order the RDHX as part of the initial order for the zBX.
 2. If not sure if an RDHX is needed, contact IBM Systems & Technology Group (STG) Lab Services.

<http://www.coolcentric.com/>

- **Option 3 – Noise Reduction Door - Feature Code #0543**

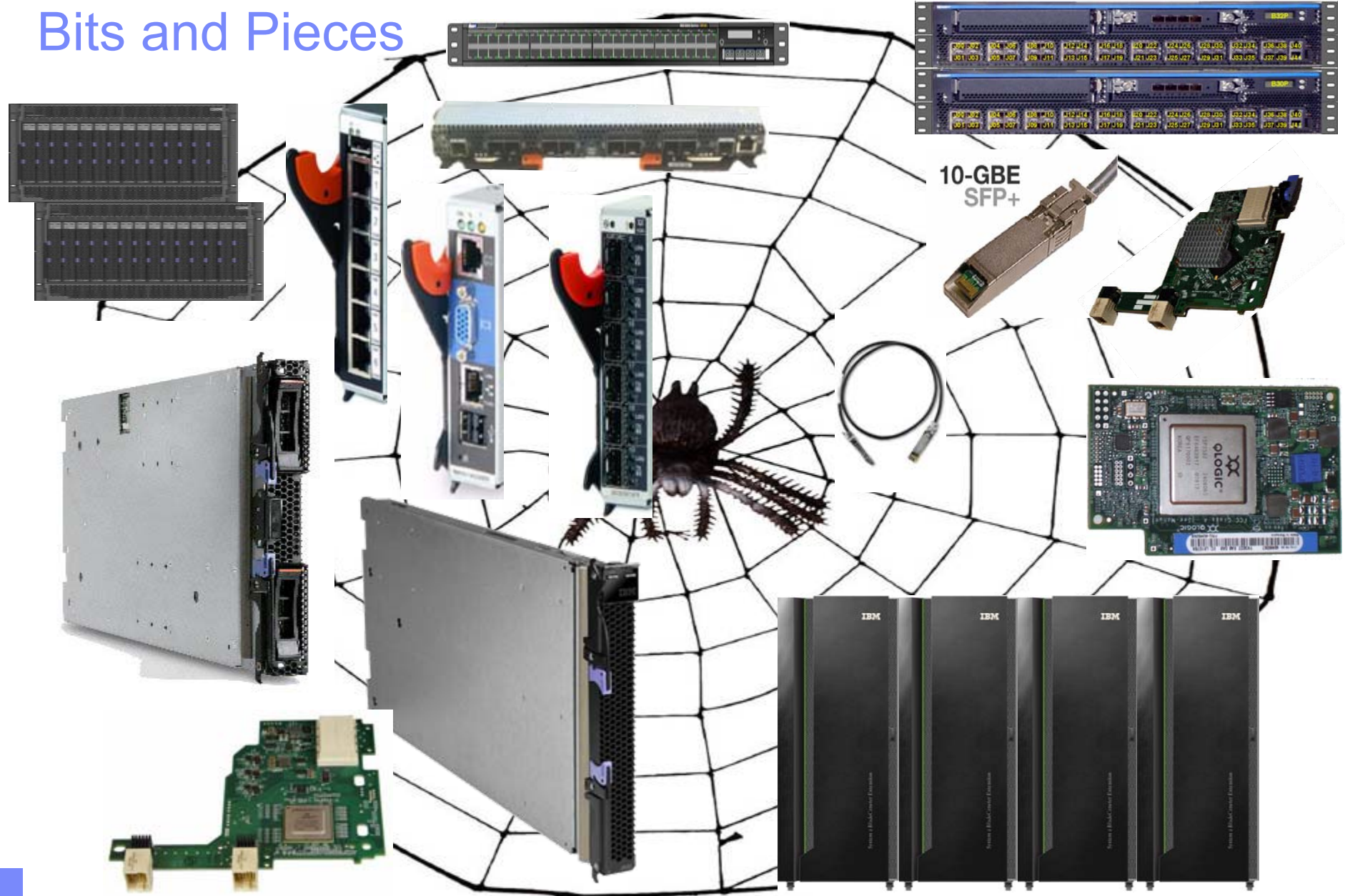
Rear Door Heat eXchanger (option)



2458-002 Ordering (who does what?)

- **zBX is ordered via the zEnterprise eConfig, by specifying the number of blades**
 - IBM POWER7 blades
 - DataPower XI50z
 - IBM System x blades
- **System z e-Config drives out all required infrastructure (BladeCenters, switches, racks, etc)**
 - System z representative is responsible for getting the connectivity order (OSA's and optics) right
- **Only one zBX per controlling CPC**
 - Controlling CPC must be a zEnterprise 196 or zEnterprise 114
 - z10 can attach with OSA-Express3 (OSD) 10 GbE or 1 GbE connections, and can access the solutions/workloads
- **zBX must be adjacent to the controlling CPC**
 - within what a 26 meter (85 feet) cable allows
- **Customer provides**
 - All 10 Gb Ethernet Optical Cables
 - OSA to zBX
 - zBX to zBX
 - zBX to existing customer network
 - IBM System x Blades
 - All blades (from supported list)
 - DASD
 - All Disk Optical Cables
 - IEDN Optical Cables
 - IBM POWER7 Blades
 - All blades (from supported list)
 - DASD (from supported list)
 - All Disk Optical Cables
 - IEDN optical cables
 - IBM DataPower XI50z
 - IEDN optical cables

Bits and Pieces



Adding new blades – “enablement”

Perform Model Conversion - P00MNXXK4

Use this function to add, remove, or update system hardware and features. The system model identification may change if require a Book related selection. Select an option:

- ⊕ Hardware upgrades
- ⊕ Permanent upgrades
- ⊕ Temporary upgrades
- ⊖ Features
 - Add Flexible Memory Option feature
 - Remove Flexible Memory Option feature
 - Add STP feature
 - Add or Update RPQ 8P2333
 - Remove RPQ 8P2333 feature
 - Add or Update OSA 3215
 - Remove OSA 3215 feature
 - Add or Update zBX feature
 - Remove zBX feature
 - Add Alternate CP Assignment feature
 - Remove Alternate CP Assignment feature

- zBX is an MES
- Media is used to add the feature to the VPD configuration
- The zBX media feature contains information regarding MTMS of the zBX, maximum entitlements (ISAO only) and hardware features.
- Upon installing the feature, the zBX is enabled throughout the system.
- This will require an SE reboot.

2458-002 Blades

~~Up to 28~~

Up to 56 after
March 30, 2012

Up to 112

Up to 28



IBM Smart Analytics Optimizer
Pre-packaged

IBM Power7 Blade
Separately ordered

DataPower XI50z
Pre-packaged
Double Wide

IBM System x Blade
Separately ordered

IBM DB2 Analytics Accelerator for z/OS (IDAA)

US announcement letter 211-454

Marries the best Netezza technologies with the DB2 for z/OS transaction and query abilities to provide extreme performance for a variety of workloads.

IBM Blade based on Power7

- **MT 8406-71Y (PS701)**
 - Power7 8 Core Processor
 - 8 Processor Cores activated
 - 1 Processor socket
 - Single wide Blade only
 - 3.0GHz
 - 16 dimm slots (4, 8, & 16 GB/core)
 - 300GB HDD Internal Disk
- 3 Configurations are supported.
- IBM POWER7 supports the 10GbE IEDN.
- IBM Blade Chassis attach to the INMN TOR via 1 GbE.

- Blades acquired by the customer through existing channels or through IBM (not from System z).
- A PowerVM Enterprise Edition licence and Software Maintenance Agreement is required for all 8 Cores, and must be maintained for the duration of use.
- AIX 5.3+, 6.1+, 7.1
 - Express, Standard or Enterprise Edition

Customer procured

With AIX and PowerVM EE Licenses!

Hardware Warranty and Maintenance

24x7 on-site support for parts and service during the 1 year System z warranty and subsequent post warranty maintenance terms. Do not purchase a separate blade warranty. Provided as part of the zBX warranty and terms.

Blade	FC#	Config 1	Config 2	Config 3
Processor 3.0GHz@150W		1	1	1
Processor Activations (8)	8411 8412	4 4	4 4	4 4
Memory kits8 GB (2 x 4 GB) 16 GB (2 x 8 GB)	8208 8209	32 GB 4 0	64 GB 8 0	128 GB 0 8
HDD 300GB	8274	1	1	1
CFFh 10GbE	8275	1	1	1
CIOv 8Gb FC	8242	1	1	1
PowerVM Enterprise Edition	5228	8	8	8

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

Sizing POWER7™ blades

- **Size the z196 or z114**

- Engage a Techline specialist to help you collect the data and do the sizing via Deal Hub Connect
- Use zPCR or zCP3000
 - Use CP2KEXTR and CP3KVMXT to create an EDF file for z/OS and z/VM
 - Complete data collection guides located here:

<http://w3.ibm.com/techdocs/PRS2664> - for z/OS

<http://w3.ibm.com/techdocs/PRS2875> - for z/VM

- IBM Business Partners can obtain the tools directly from Partner World.

- **Size the POWER7™ portion – allow at least one week.**

- Currently a manual process
- 20-50 LPARS should take a week
- More complex environments would take longer
- Working towards a more automated process

Sizing POWER7™ blades

- **Sizing when migrating from competitive machines to POWER7™ blades**
 - Engage a Techline specialist via Deal Hub Connect to help you collect the data and do the sizing
 - Identify which machines and which time periods the customer would like to consider
 - Collect data from the competitive machines covering the time frames
 - Server consolidation data collection guidance located here:
 - <http://w3.ibm.com/support/techdocs/atsmastr.nsf/WebIndex/PRS1423>

- **Sizing new applications running on POWER7™ blades**
 - Engage Global Techline Solutions Sizing Support via Deal Hub Connect
 - Software sizing questionnaires located here:
 - http://w3.ibm.com/support/techline/sizing/tg_im_sizing.html

- **Sizing when the customer has an existing set of IBM servers they would like to migrate to POWER7™ blades**
 - Identify which machines and which time periods
 - Collect data from AIX covering the time frames
 - Work hand in hand with a POWER7 Specialist to collect the data and do the sizing
 - OR
 - Engage a Techline specialist via Deal Hub Connect to help you collect the data and do the sizing
 - Sizing questionnaires located here:
 - <http://w3.ibm.com/support/techdocs/atsmastr.nsf/WebIndex/PRS4034>

IBM WebSphere DataPower Integration Appliance XI50 for zEnterprise helps extend the value of zEnterprise (XI50z)

Purpose-built hardware for simplified deployment and hardened security helps businesses quickly react to change and reduce time to market

What is it?

The IBM WebSphere DataPower Integration Appliance XI50 for zEnterprise can help simplify, govern, secure and integrate XML and IT services by providing connectivity, gateway functions, data transformation, protocol bridging, and intelligent load distribution.



How is it different?

- Security: **VLAN support provides enforced isolation of network traffic with secure private networks.**
- Improved support: **Monitoring of hardware with “call home” for current/expected problems and support by System z Service Support Representative.**
- System z packaging: **Increased quality with pre-testing of blade and zBX. Upgrade history available to ease growth.**
- Operational controls: **Monitoring rolled into System z environment from single console. Consistent change management with Unified Resource Manager.**

System x Blade Orders

- **Use The IBM Standalone Solutions Configuration Tool (SSCT)**

– <https://www-947.ibm.com/support/entry/myportal/docdisplay?brand=5000008&Indocid=MIGR-62168>

- **Four hardware configurations with Operating System choices.**

The IBM Standalone Solutions Configuration Tool (SSCT)


Standalone Configuration - Preferences

Welcome to the Standalone Solutions Configuration Tool (SSCT)


Please, select the desired start option



Wizard: A novice user will have the ability to easily create a valid server configuration via a guided step-by-step process.



Configuration Mode: An intermediate or expert user is supplied a server centric view of the SSCT enabling them to configure servers and manipulate prices. The generated reports are aimed at pre-sales quotes.



Solution Mode: An intermediate or expert user is supplied a rack centric view of the SSCT enabling them to configure both racks and servers in complex solutions. The generated reports are aimed at rack content, layouts, resources, and cabling.


Region: Country:

Americas United States

Solution Type: Language:

General Purpose English

Continue
Cancel
Help



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Standalone Solutions Configuration Tool Version: 1.42

Data Update File Version: 2.07.1103 - 11/07/2011

cfgtools@us.ibm.com

This tool is designed as an aid only and is distributed on a periodic basis. Please verify all configurations with trained Technical Personnel. The data contained in this tool is distributed AS IS without certification. The use of the data is for information and planning purposes only, and does not constitute a representation or warranty by IBM regarding the verification results.

IBM System x blades: IBM BladeCenter HX5 7873

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

- **Four Supported Configurations: Client acquired, not configured or shipped by System z manufacturing**
- **Processor Chips**
 - Intel® Xeon® E7-2830 processors
 - Nehalem microarchitecture
 - Westmere-EX core (32 nm)
- **Memory DIMMs**
 - DDR3, 1333 Mhz capable
 - Operating frequency 1066 MHz
 - 6.4 GT per second
- **Speed Burst Card**
- **SSD Expansion Card**
- **SSD Internal Disks (Two 50 GB)**
 - Hypervisor storage controlled by Unified Resource Manager
- **10 GbE 2-port Expansion Card**
 - CFFh PCIe 2.0 x16 slot
- **QLogic 8Gb FC Expansion Card**
 - CIOv PCIe 2.0 x4 slot
 - 2 ports

Blade *	SBB Part Number	Option Part Number (for SSCT)	Feature Code	Config 0 (7873-A4x)	Config 1 (7873-A5x)	Config 2 (7873-A6x)	Config 3 (7873-A7x)
Blade base - HX5 (7873)				1	1	1	1
Initial Processor				1	1	1	1
2.13 GHz 105W (E7-2830 BC)	69Y3071	69Y3074	A16S				
Additional Processor						1	1
2.13 GHz 105W (E7-2830 BC)	69Y3072	69Y3074	A179	1	1		
# Intel Processors (Sockets)				2	2	2	2
Blade width				Single	Single	Single	Single
Total Cores				16	16	16	16
Memory 8 GB 1333 MHz	46C0558	46C0570	A17Q	8	16	8	0
Memory 16 GB 1333 MHz	49Y1527	46C0599	2422	0	0	8	16
GB/Core				4	8	12	16
Speed Burst Card	46M6843	59Y5889	1741	1	1	1	1
SSD Exp Card	46M6906	46M6908	5765	1	1	1	1
50 GB MLC SSD	43W7727	43W7726	5428	2	2	2	2
No Internal Raid			9012	1	1	1	1
Broadcom 10 GB virtual fabric CFFh	46M6170	46M6168	0099	1	1	1	1
Qlogic 8 Gb Fibre Channel Expansion Card CIOv	44X1946	44X1945	1462	1	1	1	1

* The 7873 model numbers are country-specific. For example, the U.S. orderable model numbers end in "U". To order with SSCT for the U.S., the 7873-A4x is 7873-A4U. For other countries, see the country product-specific official IBM announcement letter for orderable model numbers.

The link to the IBM Standalone Solutions Configuration Tool (SSCT) V1.43 or later and updates is:

<http://www-947.ibm.com/support/entry/portal/docdisplay?brand=5000008&indocid=MIGR-62168>

zBX - Linux on System x Operating Systems

- **For HX5 7873 blades in the zBX, Linux must be 64 bit support only**
 - Single wide two socket blade.
- **Red Hat**
With RHEL 5.5, 5.6, 6.0, 6.2 - order the feature for 2 sockets.

Please select the years of support that matches your company's Linux support direction. Our recommendation is to order the selection that supports unlimited guests but you can order the feature that best meets your planned requirements.

See the Red Hat website for more information – www.redhat.com.

- **Novell**
For Novell SLES 10 (SP4), SLES 11 SP1, SLES 11 SP2 you should select 'SUSE Linux Enterprise Server' with 1-32 sockets.

Select the years of support (1 or 3) that matches your company's Linux software support direction. You may choose the Add on for Standard or Priority Novell Support if you want.

See the Novell website for more information - <http://www.novell.com/products/server/>

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

zBX

Microsoft Windows

- **Microsoft Windows Server 2008 (SP2)**
 - Datacenter Edition recommended
- **Microsoft Windows Server 2008 R2**
 - Datacenter Edition recommended
- **64 bit version only**





Networking/Connectivity



- 1 intra-node management network
- 2 intra-ensemble data network
- 3 existing customer network



Ensemble networking

- 1 **▪ IntraNode Management Network (OSM)**
 - 2 ports from 2 different OSA Express-3 1000BaseT Ethernet adapters, for redundancy.
 - Note: There is no OSA-Express4S 1000Base-T feature today.
 - Allows the HMC/SE to manage components within the ensemble.

- 2 **▪ IntraEnsemble Data Network (OSX)**
 - A pair of OSA-Express3 10 GbE and/or OSA-Express4S 10 GbE adapters, for redundancy.
 - To allow the zEnterprise applications to communicate between OS images to share data.
 - To allow the zEnterprise applications to communicate to the zBX
 - Ensemble zBX to zBX communications.

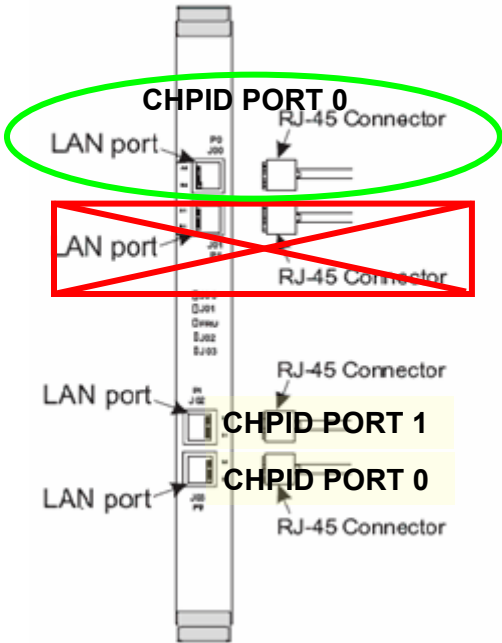
- 3 **▪ Existing customer network**
 - 10 GbE or 1 GbE (fiber) connections in the zBX TOR Switch
 - For CPC's or switches not in the ensemble

- | | |
|---|------------------------------|
| 1 | intranode management network |
| 2 | intraensemble data network |
| 3 | existing customer network |

CHPID Types OSX and OSM

1 OSM (INMN)

FC 3367
OSA-Express3 1000BASE-T Ethernet



OSA Express3
1GbE
2 CHPIDS
2 PORTS/CHPID

FC3367



CAT 6 ETH CABLE

**MUST USE
CHPID PORT 0**

Supports IOCP CHPID types:
OSC, OSD, OSE, OSN, and **OSM (ONLY 1000BASE-T).**

OSM IOCDs EXAMPLE:

- CHPID PCHID=191,PATH=(CSS(0,1,2,3),23),TYPE=OSM,CHPARAM=01,SHARED, ...
- CNTLUNIT CUNUMBR=0910,PATH=((CSS(0),23)),UNIT=OSM
- IODEVICE ADDRESS=(0910,15),CUNUMBR=(0910),UNIT=OSA,UNITADD=00, *
MODEL=M,DYNAMIC=YES,LOCANY=YES

2 OSX (IEDN)



OSA Express3
10 GbE
2 CHPIDS
1 PORT/CHPID

FC3370 (LR)
Single Mode 9 micron LC duplex



FC3371 (SR)
Multi Mode 50/62.5 micron LC duplex



Supports IOCP CHPID types:
OSD and **OSX (ONLY 10 GbE).**

IEDN Distances

- SM (Long Reach Optics) 10 km (6.2 miles)
- MM (Short Reach Optics)
50 micron at 2000 MHz-km: 300 meters (984')
50 micron at 500 MHz-km: 82 meters (269')
62.5 micron at 200 MHz-km: 33 meters (108')

OSX IOCDs EXAMPLE:

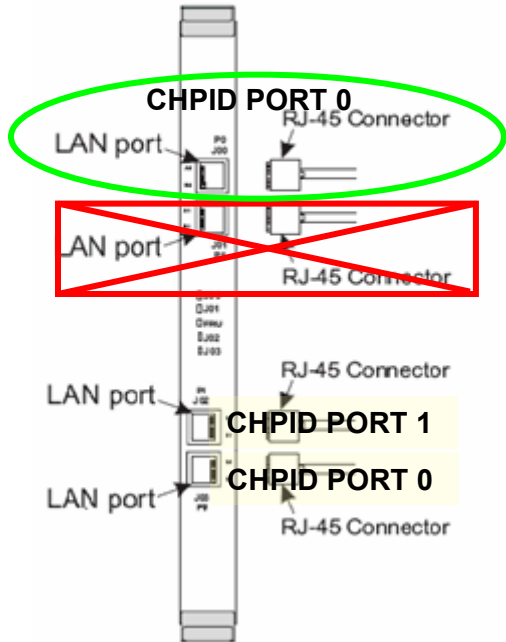
- CHPID PCHID=5E1,PATH=(CSS(0,1,2,3),2F),TYPE=OSX,SHARED, ...
- CNTLUNIT CUNUMBR=09F0,PATH=((CSS(0),2F)),UNIT=OSX
- IODEVICE ADDRESS=(09F0,15),CUNUMBR=(09F0),UNIT=OSA,UNITADD=00, *
MODEL=X,DYNAMIC=YES,LOCANY=YES

CHPID Types OSX and OSM

1 OSM (INMN)

2 OSX (IEDN)

FC 3367
OSA-Express3 1000BASE-T Ethernet



OSA Express3
1GbE
2 CHPIDS
2 PORTS/CHPID

FC3367



CAT 6 ETH CABLE

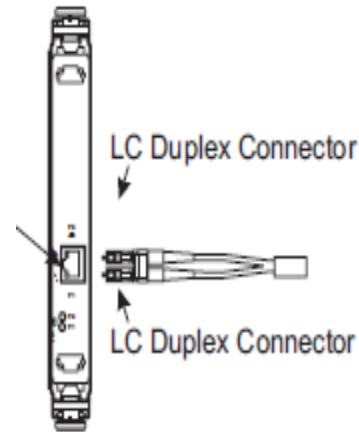
MUST USE
CHPID PORT 0

Supports IOCP CHPID types:
OSC, OSD, OSE, OSN, and **OSM (ONLY 1000BASE-T).**

OSM IOCDs EXAMPLE:

- CHPID PCHID=191,PATH=(CSS(0,1,2,3),23),TYPE=OSM,CHPARAM=01,SHARED, ...
- CNTLUNIT CUNUMBR=0910,PATH=((CSS(0),23)),UNIT=OSM
- IODEVICE ADDRESS=(0910,15),CUNUMBR=(0910),UNIT=OSA,UNITADD=00, *
MODEL=M,DYNAMIC=YES,LOCANY=YES

FCs 0406/0407
OSA Express4S 10 Gigabit Ethernet LR/SR

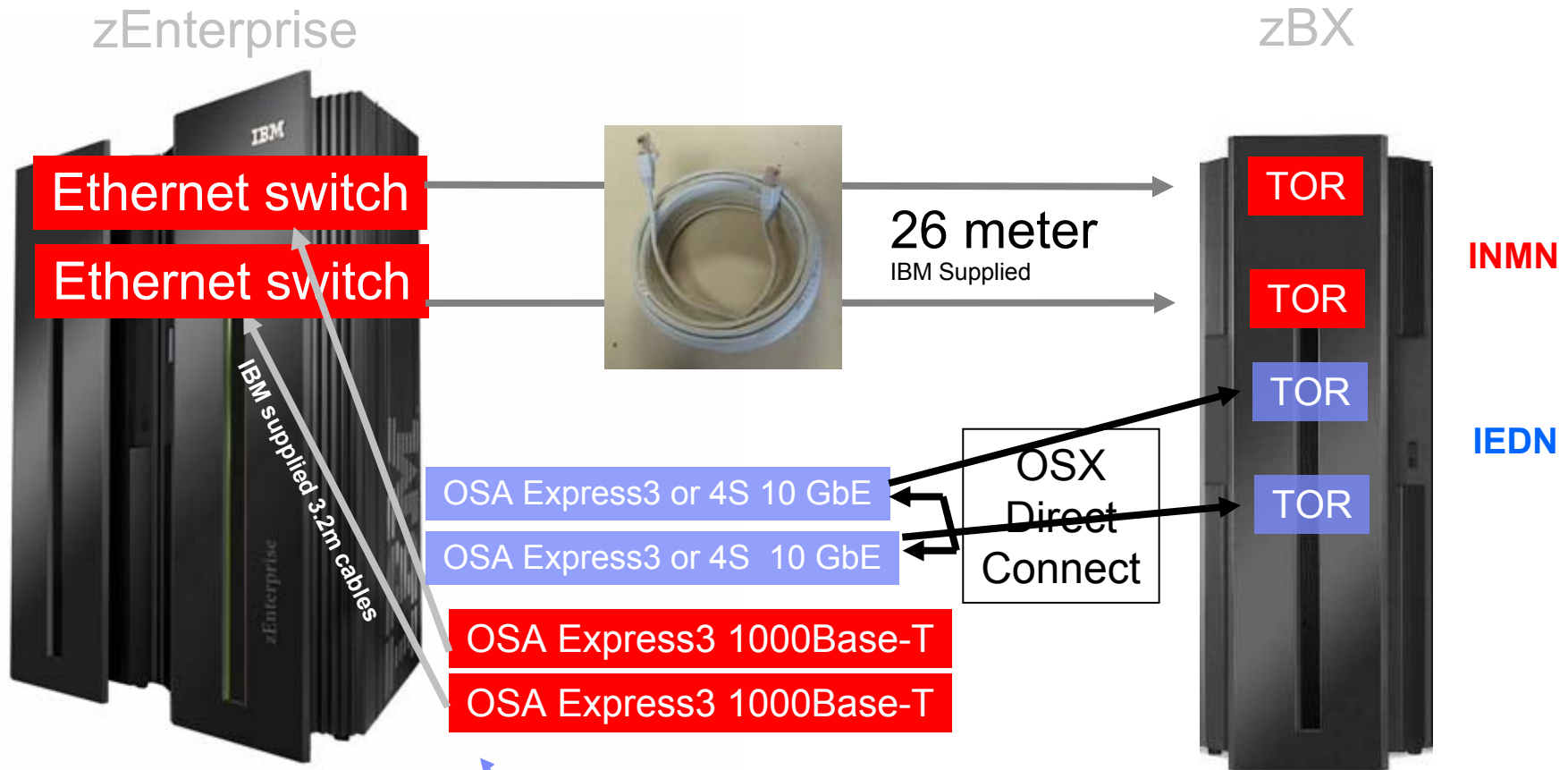


NEW:
OSA-Express4S 10 GbE
One port per feature.

OSX IOCDs EXAMPLE:

- CHPID PCHID=5E1,PATH=(CSS(0,1,2,3),2F),TYPE=OSX,SHARED, ...
- CNTLUNIT CUNUMBR=09F0,PATH=((CSS(0),2F)),UNIT=OSX
- IODEVICE ADDRESS=(09F0,15),CUNUMBR=(09F0),UNIT=OSA,UNITADD=00, *
MODEL=X,DYNAMIC=YES,LOCANY=YES

2458-002 Networks



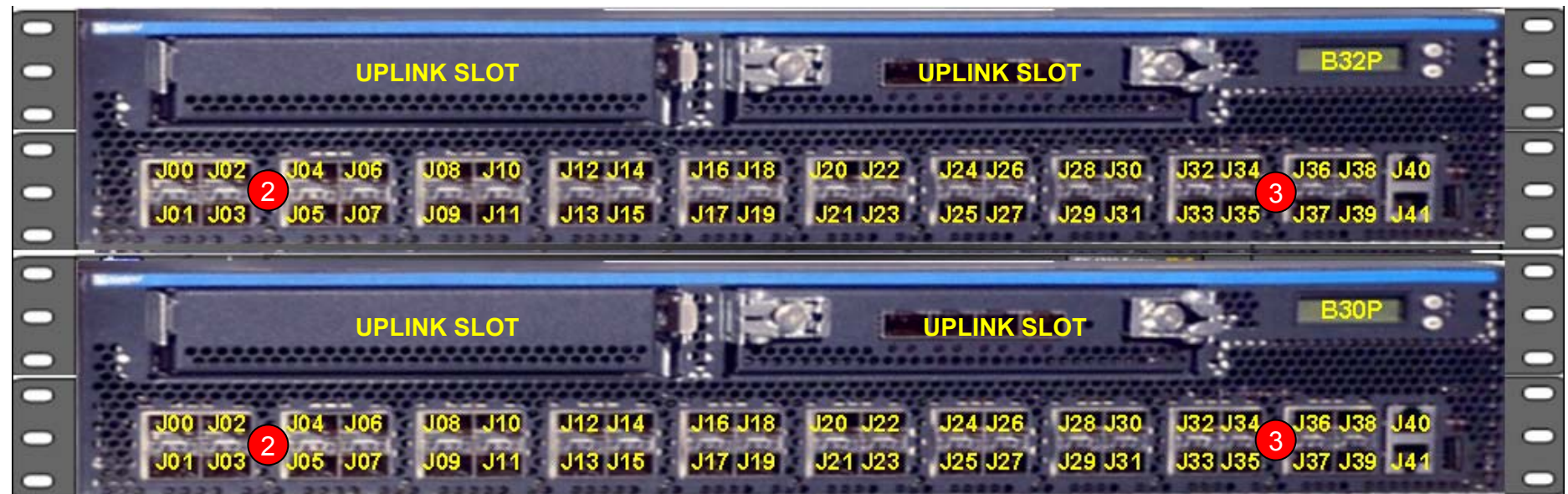
Required if IBM Unified Resource Manager (FC0025), even if no zBX

2458-002 Top of Rack (TOR) Switches



INMN TOR SWITCH

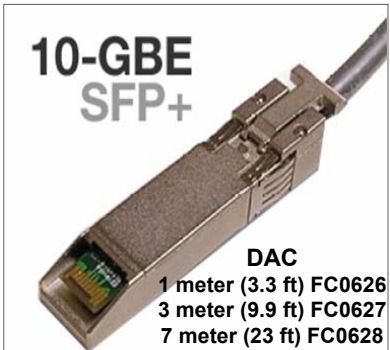
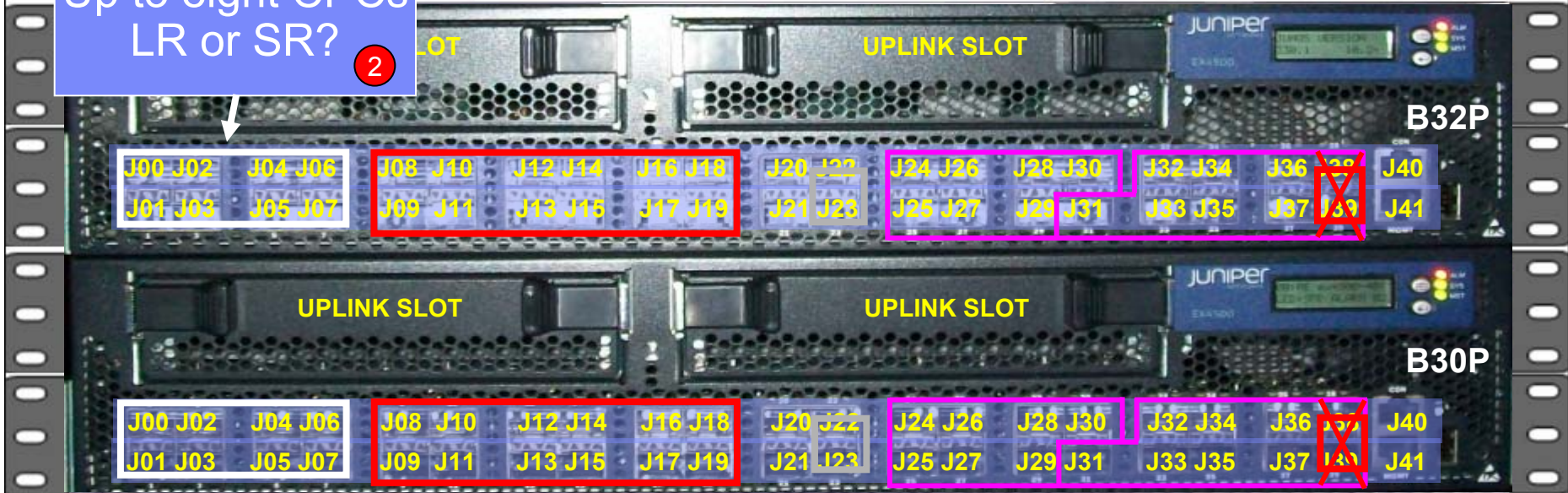
1. Intra-Node Management Network
2. Intra-Ensemble Data Network
3. Existing Customer Network



IEDN TOR SWITCH

BLADE CENTER 2458-002 IEDN TOR FRONT SWITCH CONNECTIONS

Up to eight CPCs
LR or SR? 2



Up to seven
zBX to zBX
Connections.
LR or SR? 2

Customer Network
LR or SR? 3

10 GbE
or
1 GbE.

Reduced from 9 to 7.
J38/J39 future use.

NOTE:
FC0633 SR HAS A BLACK LATCH HANDLE
FC0632 LR HAS A BLUE LATCH HANDLE
FC0634 LX HAS A BLACK LATCH HANDLE
FC0635 SX HAS A BLUE LATCH HANDLE

10 Gigabit Ethernet cabling options

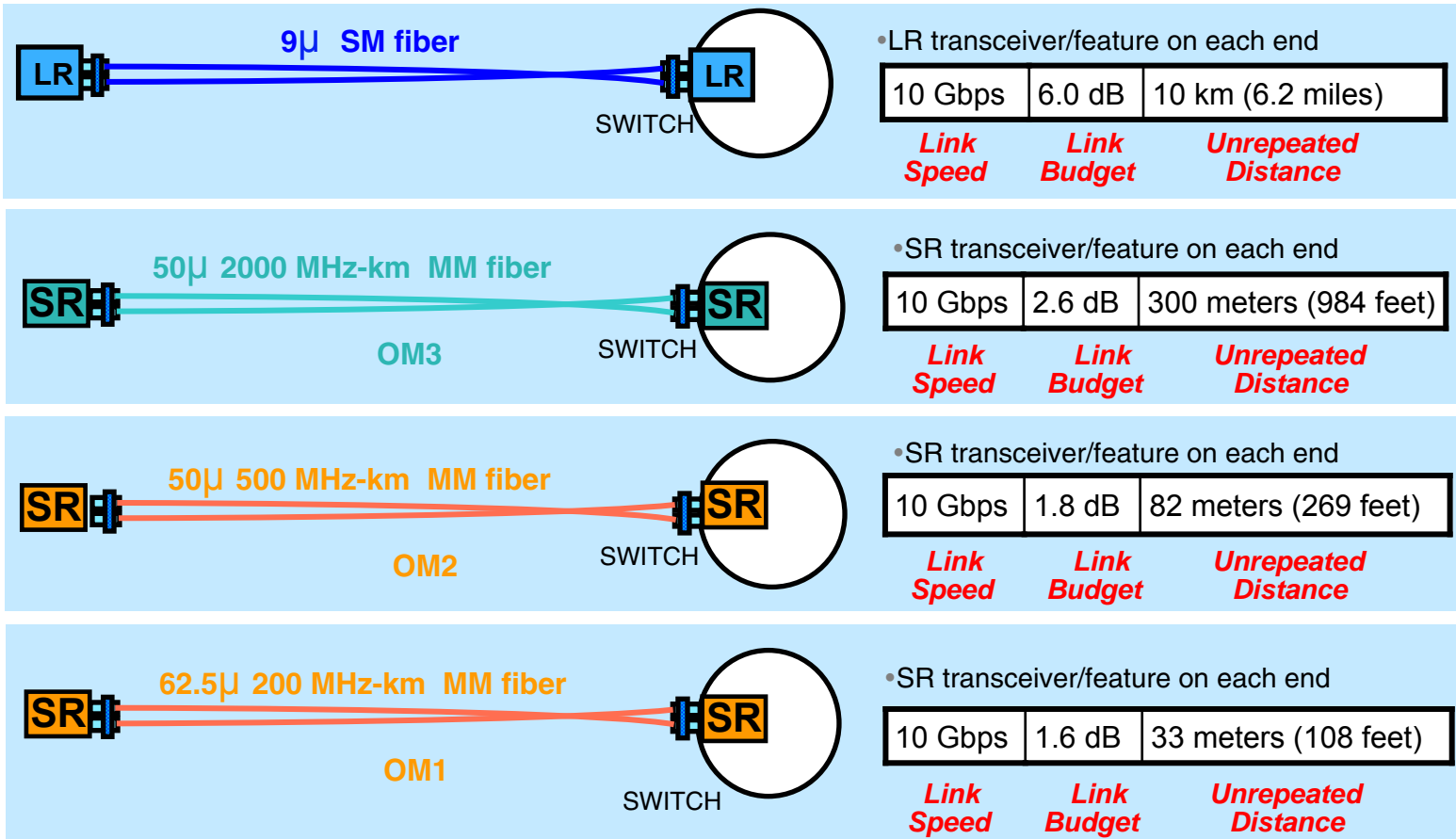
- z196, z114, z10 EC, z10 BC
- 10GBASE-LR, 10GBASE-SR

Channel insertion loss + additional insertion loss allowed as defined by the IEEE 802.3 standard



LR = Long reach 1310 nm transceiver

SR - Short reach 850 nm transceiver



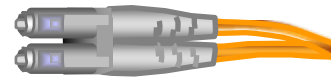
micron = μ

Gigabit Ethernet cabling options

1000BASE-LX, 1000BASE-SX



LX = Long wavelength 1310 nm transceiver



(OM2, OM1)

SX - Short wavelength 850 nm transceiver

9 μ SM fiber

LX SWITCH LX

- LX transceiver/feature on each end

1 Gbps	4.6 dB	5 km (3.1 miles)
<i>Link Speed</i>	<i>Link Budget</i>	<i>Unrepeated Distance</i>

50 μ 500 MHz-km MM fiber

SX SWITCH SX

OM2

- SX transceiver/feature on each end

1 Gbps	3.6 dB	550 meters (1804 feet)
<i>Link Speed</i>	<i>Link Budget</i>	<i>Unrepeated Distance</i>

62.5 μ 200 MHz-km MM fiber

SX SWITCH SX

OM1

- SX transceiver/feature on each end

1 Gbps	2.6 dB	275 meters (902 feet)
<i>Link Speed</i>	<i>Link Budget</i>	<i>Unrepeated Distance</i>

OM3 (2000 MHz-km): No changes have been made to the standard (1000BASE-SX) and no new variants. The distance remains at 550 meters for 50 μ fiber; independent of whether it is OM2 or OM3.

micron = μ

Identifying Small Form Factor Pluggable (SFP) Optics

FC0632 LR HAS A **BLUE** LATCH HANDLE
 FC0633 SR HAS A **BEIGE** LATCH HANDLE

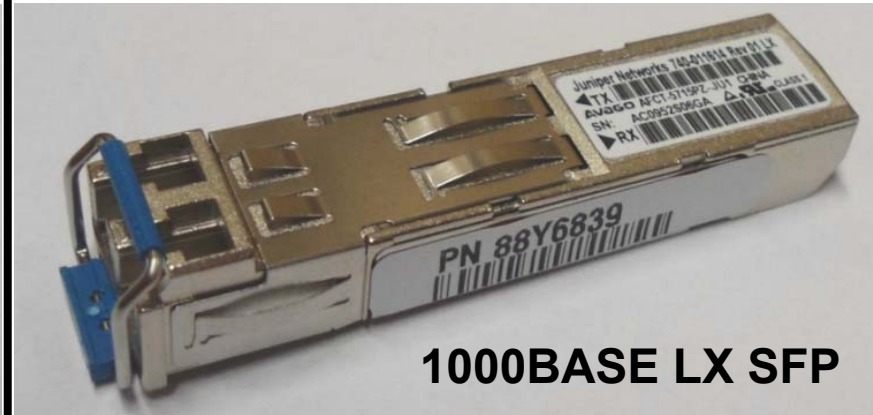
FC0634 LX HAS A **BLUE** LATCH HANDLE
 FC0635 SX HAS A **BLACK** LATCH HANDLE

10 Gb Ethernet

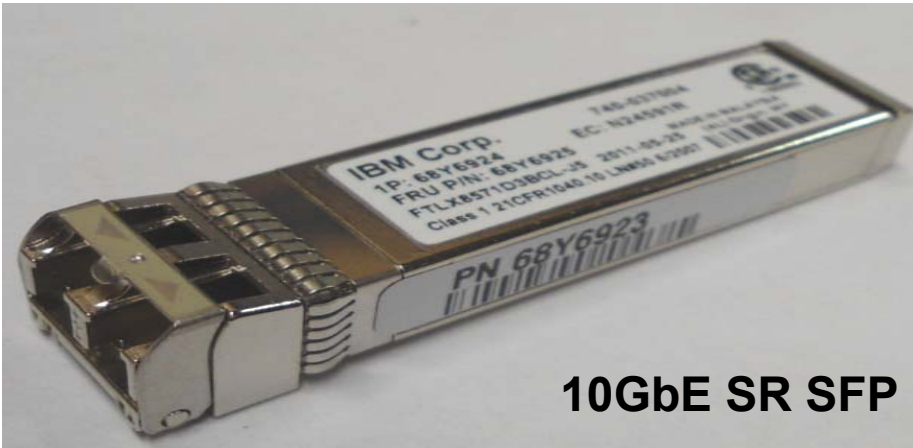
1 Gb Ethernet



10GbE LR SFP



1000BASE LX SFP



10GbE SR SFP



1000BASE SX SFP

SFP Optics Ordering



Up to 8x2=16

Up to 7x2=14

!!!
Up to 7x2=14

- FC0632 10 GbE (LR)
- FC0633 10 GbE (SR)
- FC0634 1 GbE (LR)
- FC0635 1 GbE (SR)

2458-002 ZBX1 - Pwr Blade Enablement(8) - Options

Enablement | Blades | **Options** | Power | HMC | Language

Options

- 0033 - Service Docs Optional Print
- 0540 - Rear Door Heat Exchanger
- 0542 - Standard Rear Door
- 0543 - Acoustic Rear Door
- 0570 - Rack height reduction
- 8P2541 - 2458 RFID Tag

1. Intra-Node Management Network
2. Intra-Ensemble Data Network
3. Existing Customer Network

Customer Optics	Proposed	
0632 - zBX to OSX (IEDN) 10GbE LR 10km SFP (0 - 16 By 2)	0	2
0633 - zBX to OSX (IEDN) 10GbE SR SFP (0 - 16 By 2)	0	
0632 - zBX to zBX 10GbE LR 10km SFP (0 - 14 By 2)	0	2
0633 - zBX to zBX 10GbE SR SFP (0 - 14 By 2)	0	
0632 - zBX to Ext. Data Net 10GbE LR 10km SFP (0 - 18 By 2)	0	3
0633 - zBX to Ext. Data Net 10GbE SR SFP (0 - 18 By 2)	0	
0634 - zBX to Ext. Data Net 1GbE LR (0 - 18 By 2)	0	
0635 - zBX to Ext. Data Net 1GbE SR (0 - 18 By 2)	0	

z196 to zBX

zBX to zBX

zBX to existing

Hardcopy Service Library Documents & Delta Pages will be shipped with this order unless FC 0033 is de-selected. Every new box order ships a master documentation CD from which all documents can be printed. The Service Library Documents & Delta Pages are included in the master CD. Do not de-select FC 0033 if this is the first machine at this location (same address, building, floor) or this order is for a dark account (no outside laptop or media).

< Previous Next > OK Cancel Reset Page

OSA Ordering

Note: At GA2, OSA-Express4S 10 GbE SR/LR available, one port per feature.

CEC 1 of 2817-M32 NEW1 - OSA Express

CP	Processor Usage	ODC	Memory	IFB	ISC	FICON	OSA Express	Channels	Crypto	TKE	STP
							OSA Express	Proposed			
							0406 - OSA Express4S 10GbE (0 - 46 By 1 Ports)	0	OSA to TOR OSX		
							0407 - OSA Express4S 10GbE SR (0 - 48 By 1 Ports)	2			
							0405 - OSA Express4S GbE SX (0 - 92 By 2 Ports)	0			
							0404 - OSA Express4S GbE LX (0 - 92 By 2 Ports)	0			
							3367 - OSA Express3 1000BASET-EN (0 - 96 By 4 Ports)	8	OSA to BPH OSM		

WARNING: Determine the transceiver/feature on the director, server, switch, or router BEFORE ordering the feature. SX and LX features are NOT compatible with one another.

The SX feature supports multimode fiber optic cables only. Choose the SX feature to "talk" to the SX feature on a director, server, switch, or router with the SX feature.

The LX feature uses single mode fiber optic cables, but accommodates data center infrastructures with 50 or 62.5 multimode fiber optic cables. Choose the LX feature to "talk" to the LX feature on a director, server, switch, or router with the LX feature.

If the LX feature is used with a multimode fiber infrastructure, a pair of Mode Conditioning Patch (MCP) cables will be required for each link.

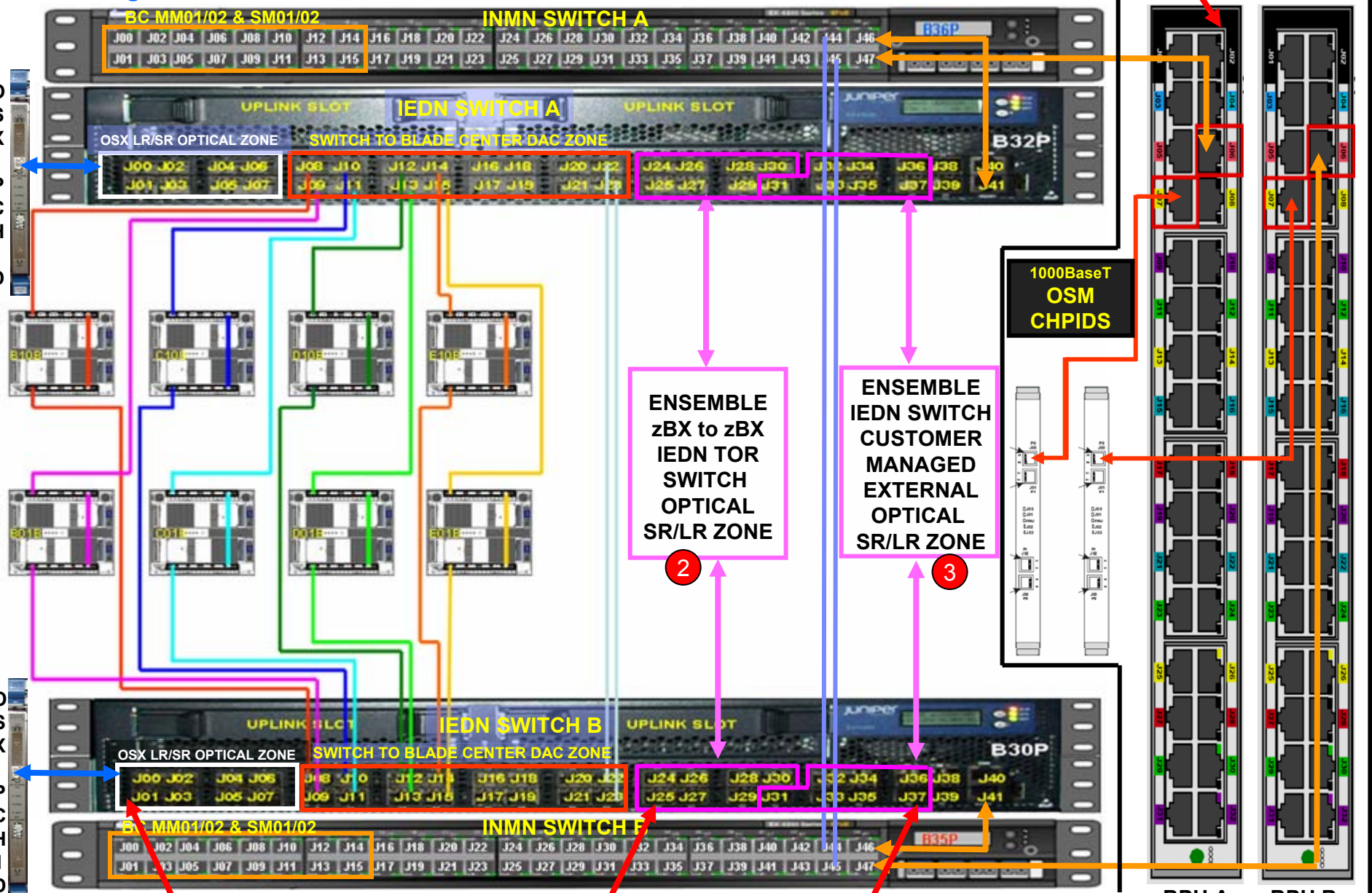
< Previous Next > OK Cancel Reset Page

- 2
- 3
- 1

1 1000Base-T to BPH

The Big Picture - connections

OSX
PCH
ID

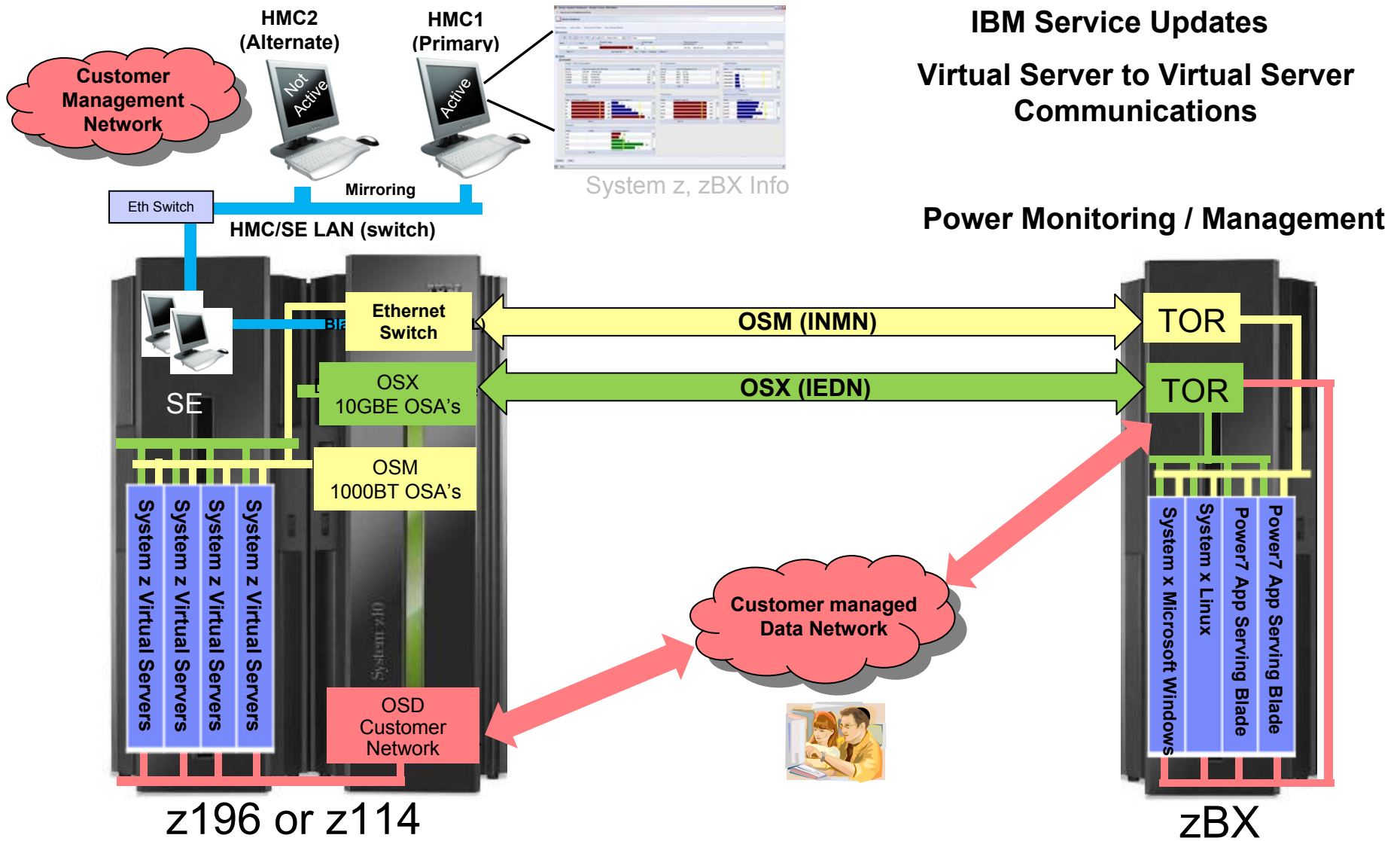


2 Up to 8 CPCs

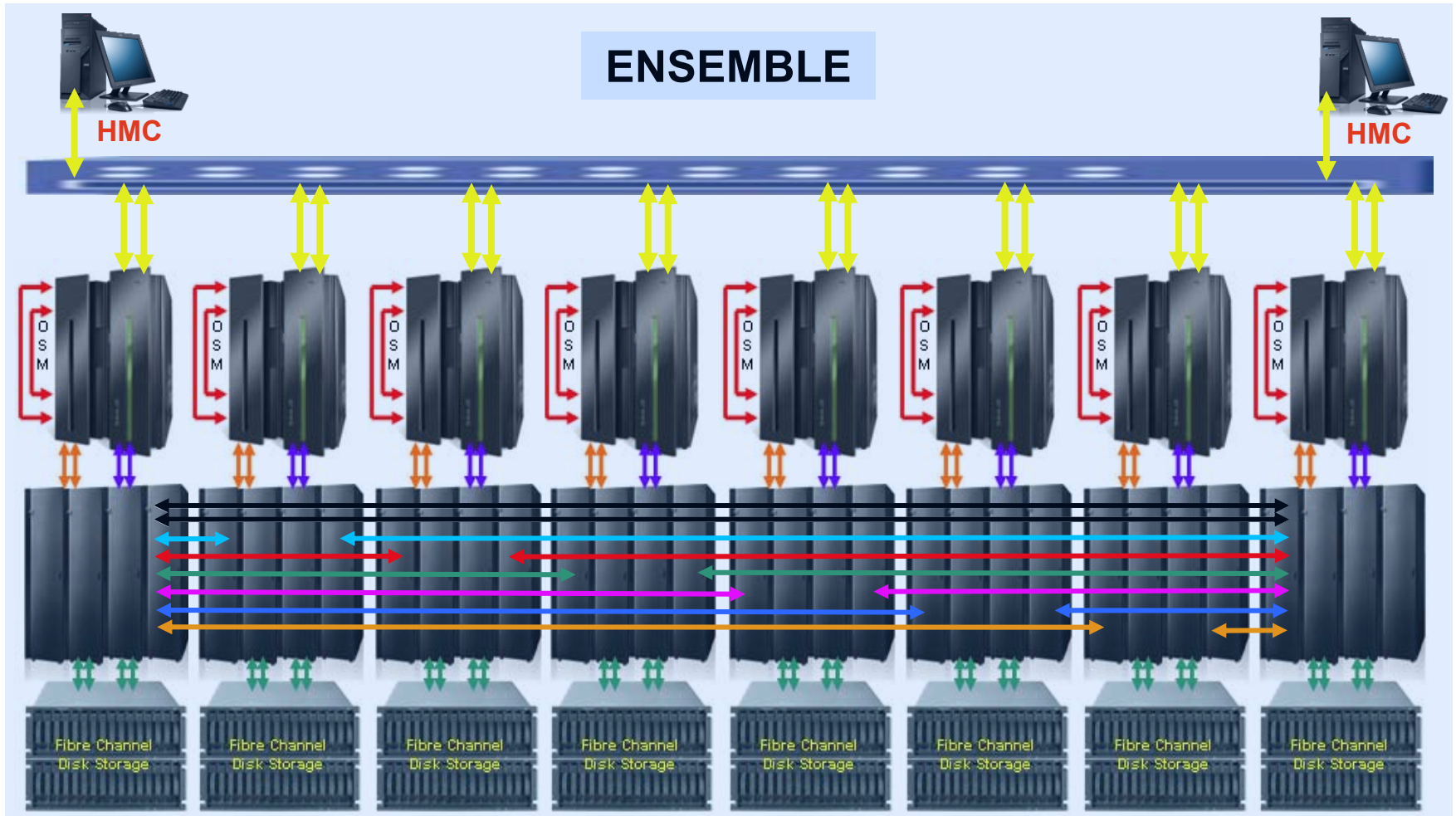
0 if only one zBX

0 if not on existing

zEnterprise and zBX Model 002 – Communications



zEnterprise/2458-002 MAX CPC/NODE ENSEMBLE

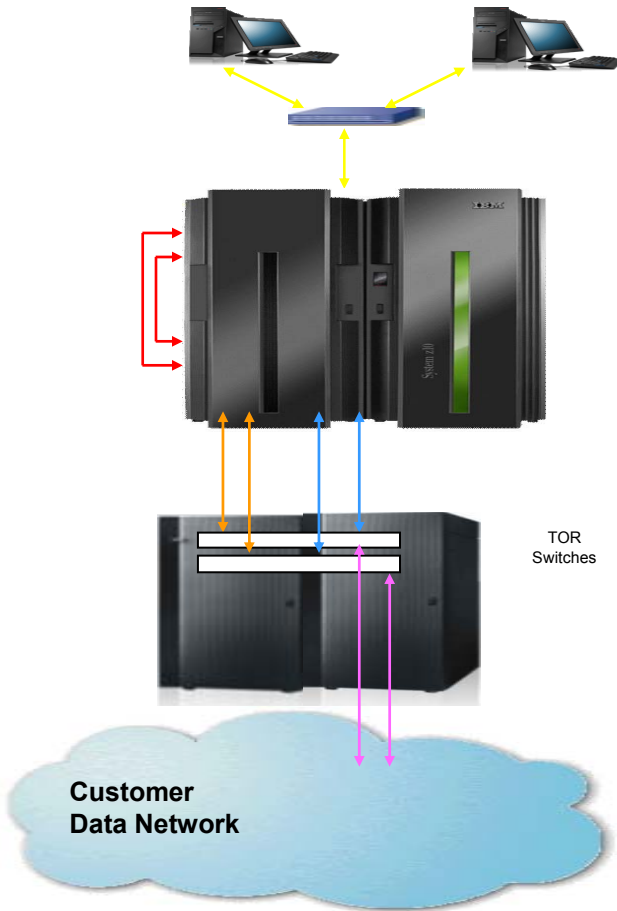


Node1-B32PJ24 to Node2-B32PJ24
Node1-B32PJ25 to Node3-B32PJ25
Node1-B32PJ26 to Node4-B32PJ26
Node1-B32PJ27 to Node5-B32PJ27
Node1-B32PJ28 to Node6-B32PJ28
Node1-B32PJ29 to Node7-B32PJ29
Node1-B32PJ30 to Node8-B32PJ30

zBX to zBX IEDN Connections

Node8-B30PJ24 to Node1-B30PJ24
Node8-B30PJ25 to Node2-B30PJ25
Node8-B30PJ26 to Node3-B30PJ26
Node8-B30PJ27 to Node4-B30PJ27
Node8-B30PJ28 to Node5-B30PJ28
Node8-B30PJ29 to Node6-B30PJ29
Node8-B30PJ30 to Node7-B30PJ30

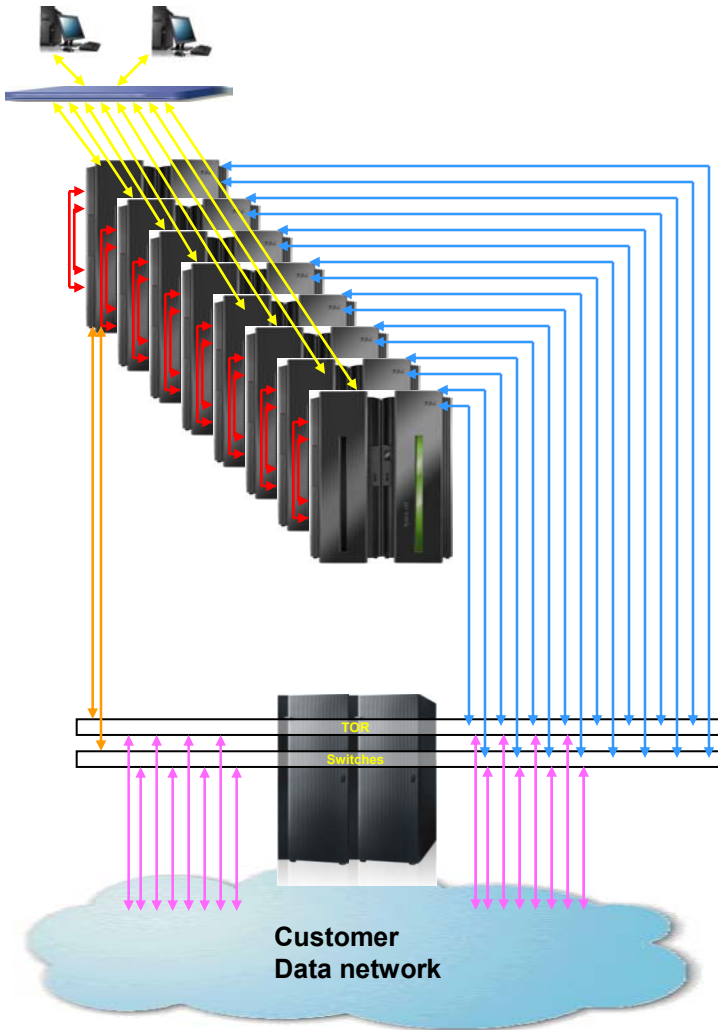
1 CEC, 1 Ensemble, 1 zBX



intra-node management network
 intra-ensemble data network
 existing customer network

- Additional Content
- **HMC (2 per Ensemble)**
 - Ethernet Cables
 - **INMN (2 per Controlling CEC)**
 - 26 meter 1000BaseT cables (BPH to Switch)
 - 1 ▪ **OSM (2 per each CEC in Ensemble)**
 - OSA Express-3 1000BaseT Ethernet to BPH
 - 3.2 meter Ethernet Cables
- Connections
- 1 to 8 redundant connections of each type, per Ensemble
- 2 ▪ **OSX (2 per CEC Connection)**
 - OSA Express3 10GbE, SR or LR
 - OSA Express4S 10GbE, SR or LR
 - Optic modules, SR or LR
 - Customer provided 10GbE cables, SR or LR
- Optional connections, depending on access to Customers network
- 3 ▪ **External data network (2 per connection)**
 - Optic modules, SR or LR
 - Customer provided 10 GbE cables, SR or LR

8 CEC, 1 Ensemble, 1 zBX



Additional Content

- **HMC (2 per Ensemble)**
 - **Ethernet Cables**
- **INMN (2 per Controlling CEC)**
 - **26 meter 1000BaseT cables (BPH to Switch)**
- ① ▪ **OSM (2 per each CEC in Ensemble)**
 - **OSA Express-3 1000BaseT Ethernet to BPH**
 - **3.2 meter Ethernet Cables**

Connections

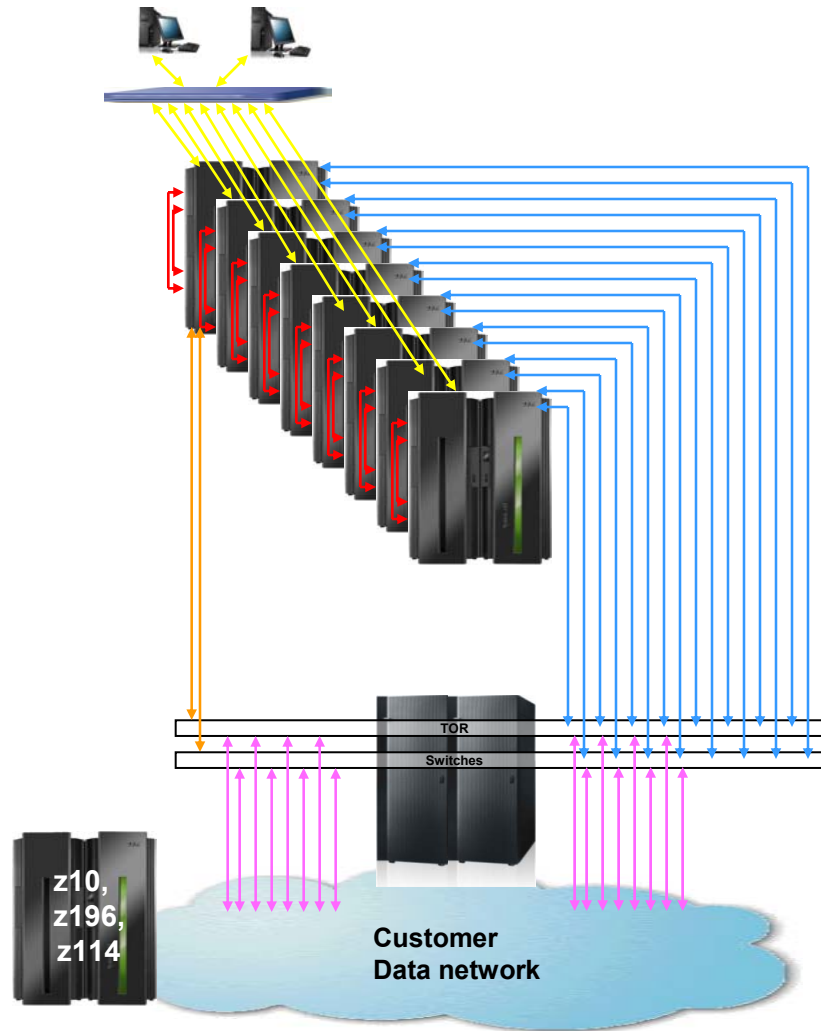
1 to 8 redundant connections of each type, per Ensemble

- ② ▪ **OSX (2 per CEC Connection)**
 - **OSA Express3 10GbE, SR or LR**
 - **OSA Express4S 10GbE, SR or LR**
 - **Optic modules, SR or LR**
 - **Customer provided 10GbE cables, SR or LR**

Optional connections, depending on access to Customers network

- ③ ▪ **External data network (2 per connection)**
 - **Optic modules, SR or LR**
 - **Customer provided 10 GbE cables, SR or LR**

8+ CEC, 1 Ensemble, 1 zBX



Additional Content

- **HMC (2 per Ensemble)**
 - **Ethernet Cables**
- **INMN (2 per Controlling CEC)**
 - **26 meter 1000BaseT cables (BPH to Switch)**
- ① ▪ **OSM (2 per each CEC in Ensemble)**
 - **OSA Express-3 1000BaseT Ethernet to BPH**
 - **3.2 meter Ethernet Cables**

Connections

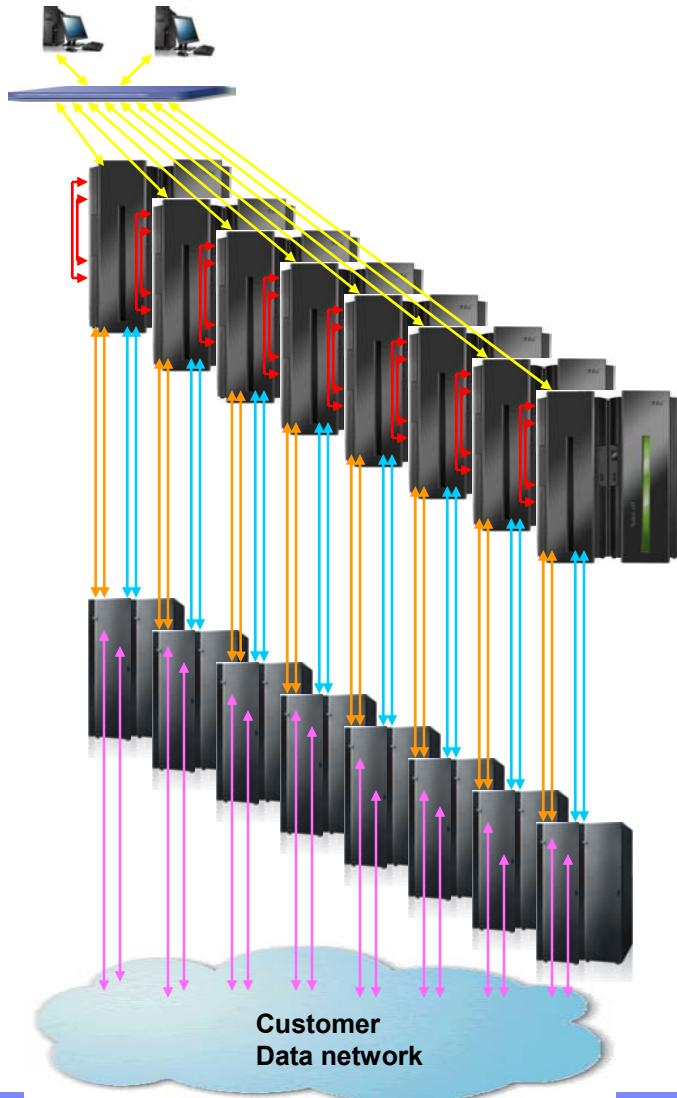
1 to 8 redundant connections of each type, per Ensemble

- ② ▪ **OSX (2 per CEC Connection)**
 - **OSA Express3 10GbE, SR or LR**
 - **OSA Express4S 10GbE, SR or LR**
 - **Optic modules, SR or LR**
 - **Customer provided 10GbE cables, SR or LR**

Optional connections, depending on access to Customers network or from CECs not in the Ensemble

- ③ ▪ **External data network (2 per connection)**
 - **Optic modules, SR or LR**
 - **Customer provided 10 GbE cables, SR or LR**

8 CEC, 1 Ensemble, 8 zBX



Additional Content

- **HMC (2 per Ensemble)**
 - Ethernet Cables
- **INMN (2 per Controlling CEC)**
 - 26 meter 1000BaseT cables (BPH to Switch)
- ① ▪ **OSM (2 per each CEC in Ensemble)**
 - OSA Express-3 1000BaseT Ethernet to BPH
 - 3.2 meter Ethernet Cables

Connections

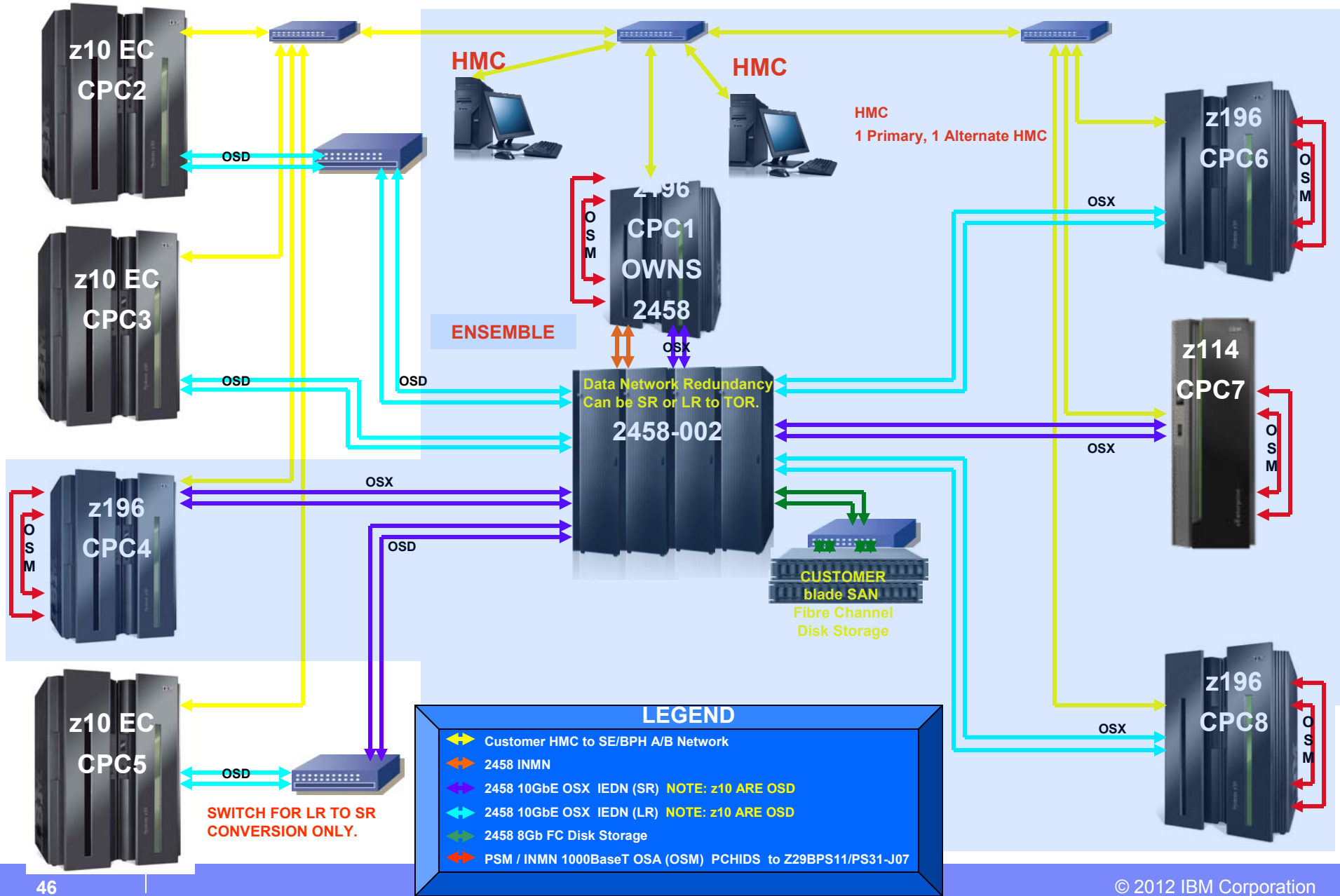
1 to 8 redundant connections of each type, per Ensemble

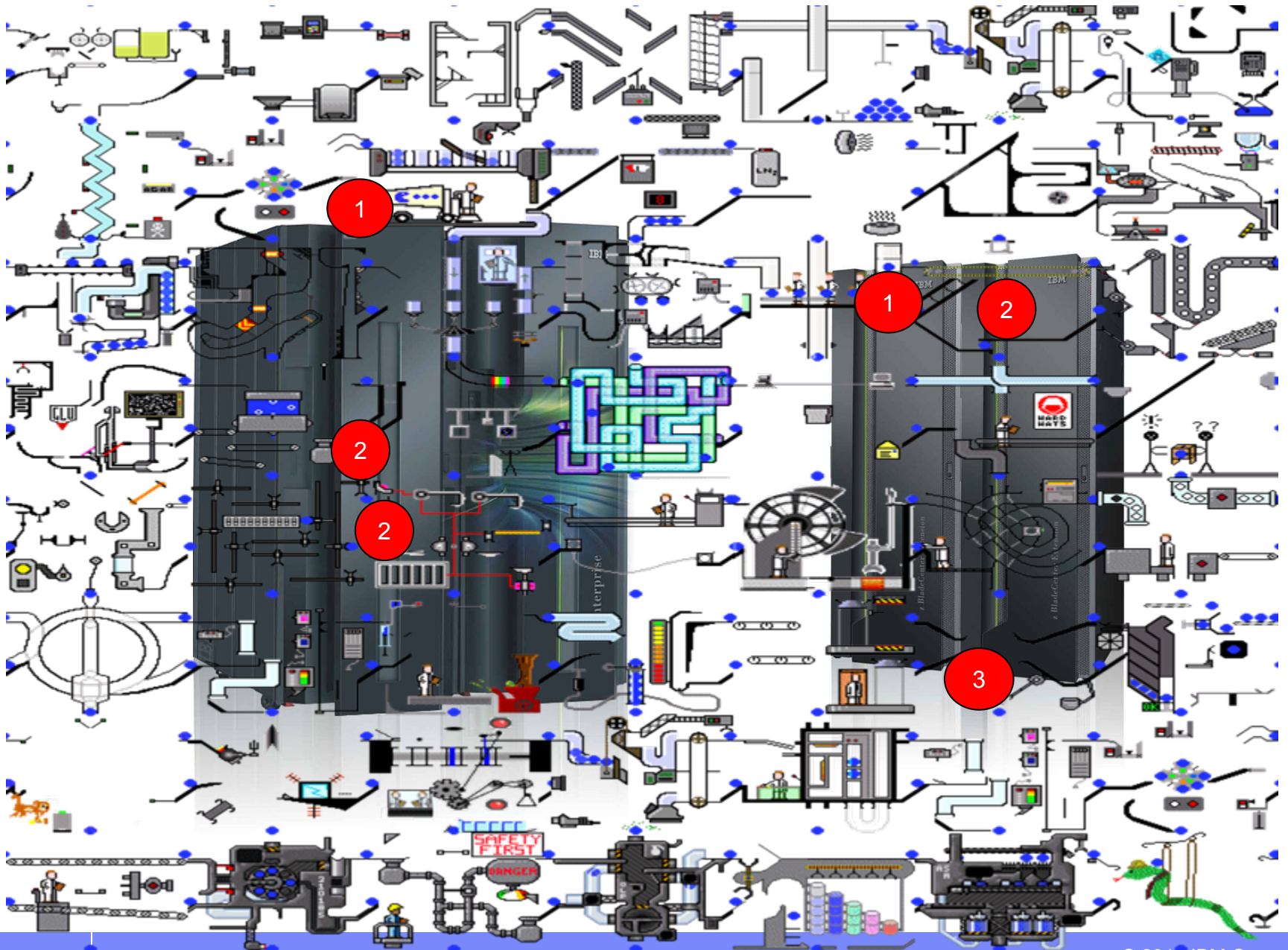
- ② ▪ **OSX (2 per CEC Connection)**
 - OSA Express3 10GbE, SR or LR
 - OSA Express4S 10GbE, SR or LR
 - Optic modules, SR or LR
 - Customer provided 10GbE cables, SR or LR
 - ((4 x zBX) - 2 per Ensemble) (zBX to zBX)
 - Customer provided 10 GbE cables, SR or LR
 - Optic modules, SR or LR

Optional connections, depending on access to Customers network

- ③ ▪ **External data network (2 per connection)**
 - Optic modules, SR or LR
 - Customer provided 10 GbE cables, SR or LR

Big Picture 2458-002 Configuration







Storage for zBX



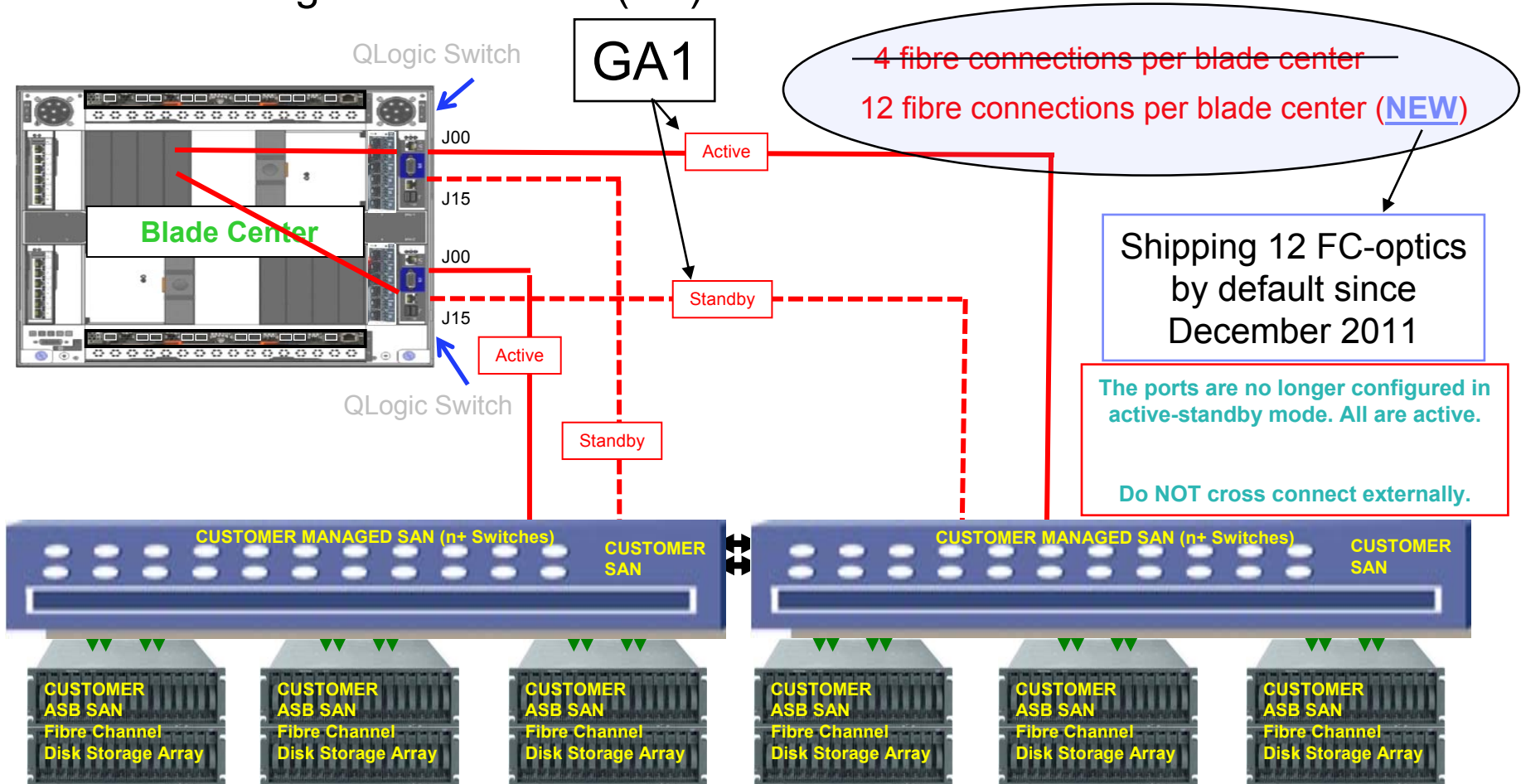
QLogic 20-port SAN Switch Module for Storage Connectivity BladeCenter Bays SM03 and SM04

- **Two in BladeCenters with general purpose blades**
 - each module now has six available SAN connections (was two)
- **Intelligent Pass Through Mode is used to exploit NPIV**
- **Client responsibility**
 - Redundant SAN switches
 - Disk
 - SAN cables (SX)



All zBXs that ship after 12/16/2011 contain the additional optics (FC 0615).
 RPQ 8P2607 support to add optics to installed zBX's.
 Order after April 24, 2012 (one RPQ per chassis)

FC Disk Storage Connections (old)



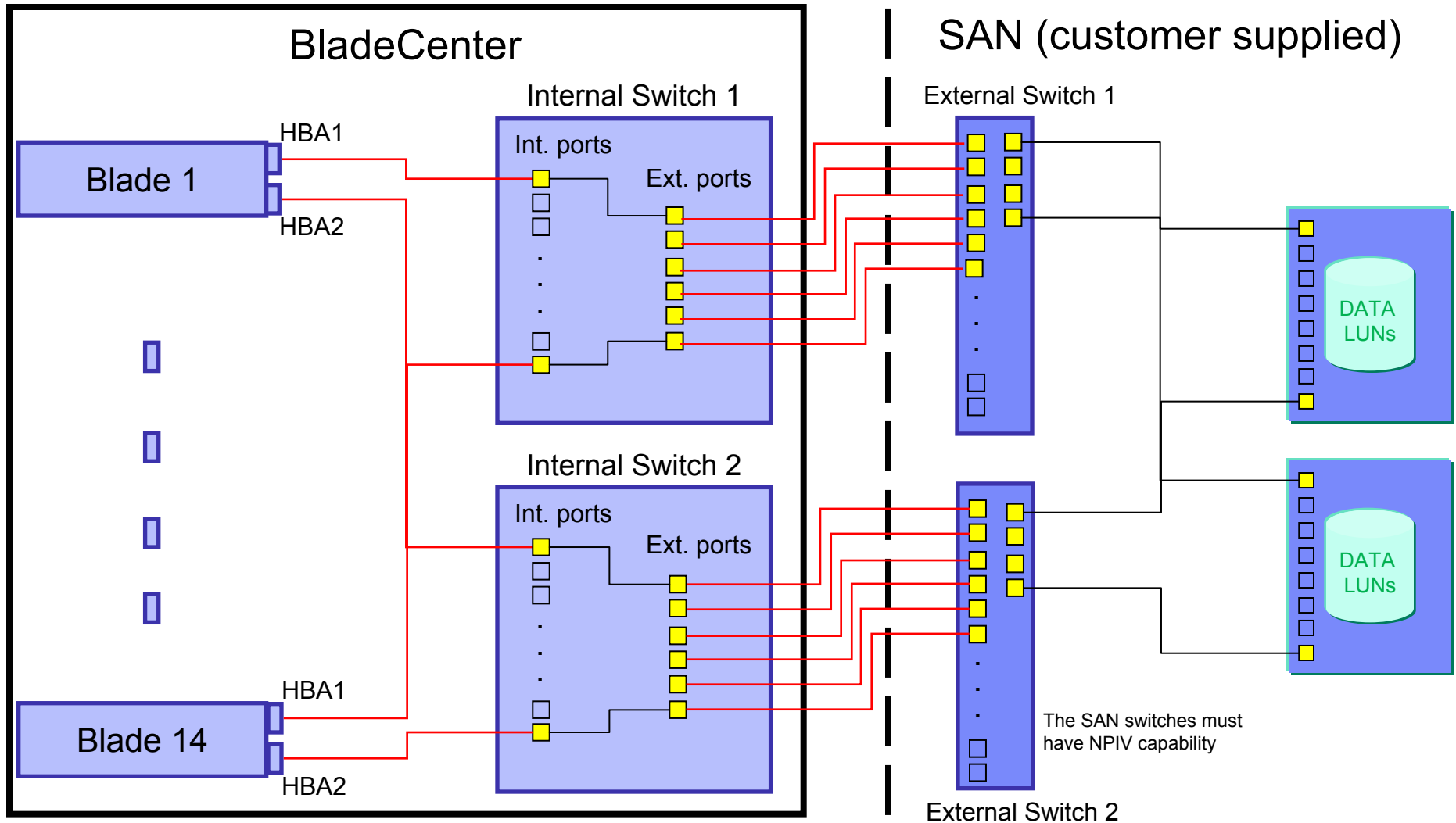
Cross connected for redundancy (OLD)

Active/Standby (OLD)

GA2 (Driver 93) changes to SAN FC-Optics

- **Minimum of 4 and a maximum of 12 SAN connections per BladeCenter chassis.**
- **There is no need to configure the number of enabled SAN ports.**
 - The customer merely plugs the ones they need and that their SAN configuration supports.
- **When a blade attempts to log into the SAN fabric, the zBX internal SAN switches now use load balancing to determine which port to use for that connection.**
 - If 4 ports are plugged, load balancing occurs over the 4 ports.
 - If 6 ports are plugged, load balancing occurs over the 6 ports.
- **Load balances are done at fabric login time.**
 - Additional ports will remain idle until a fabric login occurs.
 - The fabric login occurs when a blade is restarted or a connection fails.
- **Each blade has 2 ports to connect to the SAN so the additional ports provide increased bandwidth to the entire BladeCenter but not to an individual blade.**
- **IBM recommends that the switches in the BladeCenter NOT be cross-wired into the SAN.**
 - This was needed due to the active-standby configuration of the ports prior to GA2.
 - With the additional ports enabled in GA2, we recommend that one switch should be connected entirely to one fabric and the other switch entirely to a second fabric for full redundancy.

Cross connected internally in the zBX

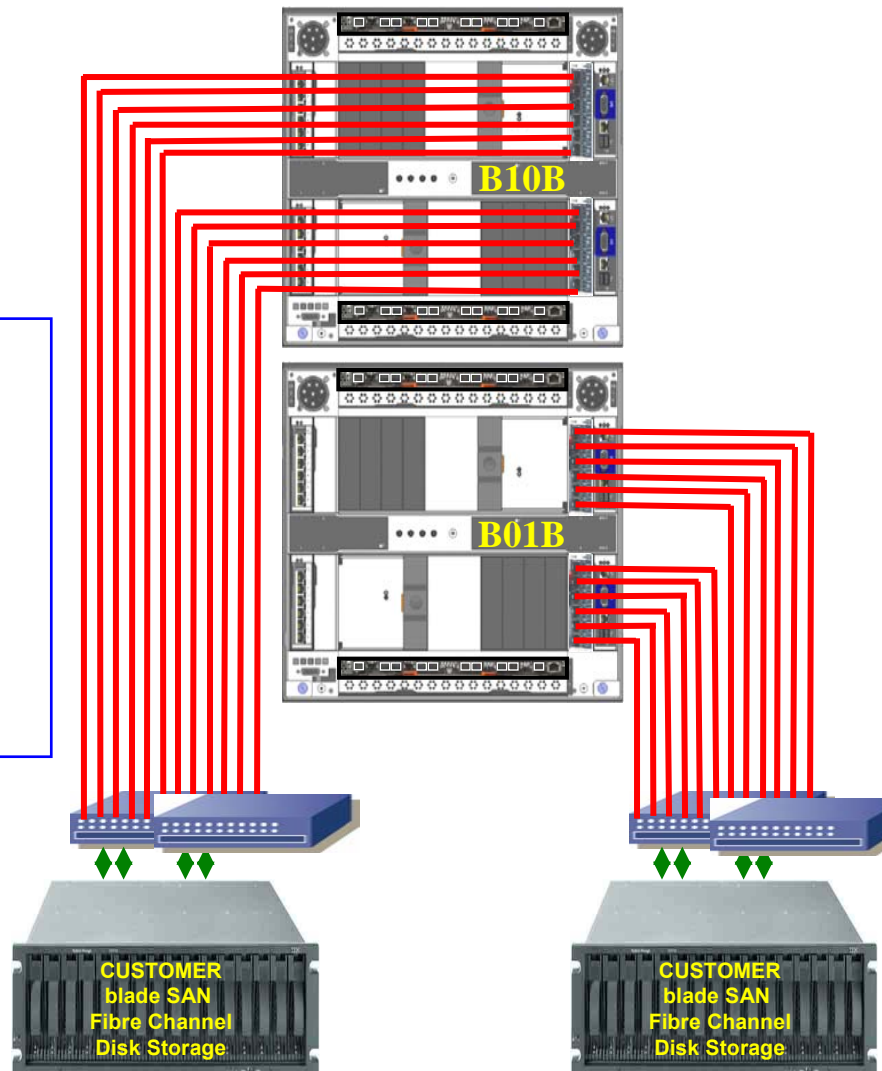


At a minimum, with each internal switch in the BladeCentre, customers can connect between 2-6 ports to SAN switches which must have NPIV capability.

FC DISK STORAGE Power7 & System x blades

Redundant SAN switches recommended.

Customer supplied.



CUSTOMER DESIGNED, OWNED, & MANAGED STORAGE AREA NETWORK for Blades

1. Customer provides cables to zBX and all SAN H/W & SAN ZONING for the Blades.
2. Must connect to a Short Wave (aka SX) SAN switch port.
3. Switch must support N_Port ID Virtualization (NPIV)
4. Depending on the FC switch vendor, "interop" mode may be required as well.

Check with the interoperability matrix for details, at:
<http://www.ibm.com/systems/support/storage/ssic/interoperability.wss>

RPQ 8P2607

- **MES only**
- **Order only one for each BC chassis that needs it.**
- **This example, only 1 BC chassis.**

2458-002 510000351 MES - Entitles,Plugged: ISAO(14,14) - Enablement

Enablement | Blades Add | Blades Plugged | Options | Power | HMC

Enablement	Base	Proposed
ISAOPT Blade Enablement (14 - 14 By 14) Plugged: 14	14	14
DataPower Blade Enablement (0 - 28) Plugged: 0	0	0
Pwr Blade Enablement (0 - 98) Plugged: 0	0	0
System x Blade Enablement (0 - 56) Plugged: 0	0	0

Additional Features	Base	Proposed
8P2607 - FC Optics for BC-H (0 - 1)	0	0

RPQ 8P2607 should NOT be ordered for Blade Centers that already have the full amount of optics. eConfig can not determine the number of optics installed in each of the Blade Centers. Only order RPQ quantity that is needed.

Engine Trace

< Previous Next > OK Cancel Reset Page

Storage for zBX and POWER7

List of Storage Devices Supported by PS701 IBM BladeCenter Express in IBM zEnterprise System²

- IBM
 - DS3400, DS3500, DS3950
 - DS4100, DS4200, DS4700, DS4800
 - DS5020, DS5100, DS5300
 - DS6000[®]
 - DS8100, DS8300, DS8700, DS8800
 - SVC 2145
 - XIV[®]
 - 2105, 2107
 - Storwize[®] v7000
- OEM
 - Contact your IBM, Business Partner, or Other Equipment Manufacturers' (OEM) certified storage representative to discuss considerations for attaching OEM storage in your environment.

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

Select: PS701 Support Storage Devices

¹ Please contact your IBM, BP or OEM certified storage sales representative for the qualified device and microcode levels

² Default MPIO (AIX) Path Control Module support only



Storage for zBX and IBM System x

Storage Devices and System x

- **Open Storage to support the HX5 7873**
- **For IBM open storage information you can use the IBM System Storage® Interoperation Center (SSIC) web site –**
<http://www.ibm.com/systems/support/storage/ssic/interoperability.wss>.

-
- **For information on support from other industry leaders you can use the IBM Server Proven web site –**
<http://www.ibm.com/systems/info/x86servers/serverproven/compat/us/>.
 - **Your IBM storage specialist (FTSS – Field Technical Support Specialist) or BP storage specialist can also assist you in finding an open storage product to support the IBM BladeCenter HX5 7873.**





Hardware Management Consoles

How has the Role of the HMC Changed?



- **Prior to the ensemble management functions in zEnterprise, HMC availability was not a critical concern**
 - HMC was not the authoritative holder of any configuration or state information other than configuration info for the HMC itself
 - HMC was not involved in any flows supporting ongoing operation other than call-home, for which redundancy was provided
 - You could turn the HMC off and there would be no effect on operations of the managed systems
- **Addition of ensemble-related function in zEnterprise changes this:**
 - The HMC will now be authoritative holder of some ensemble-scoped configuration not held by any of the Nodes in the ensemble
 - Some configuration actions will be available ONLY from the HMC managing the ensemble, not the SE
 - HMC will have a role in monitoring of Workload performance
- **This change in role drives a need to provide some additional redundancy in the HMC configuration to improve availability**

HMC (Primary and Alternate Requirements)

- **Both Hardware Management Consoles must be....**

- Feature Code 0091/0091 pair
or
- Feature Code 0090/0090 pair
- Same PC machine type/model.
- Same LIC level
- Same Ethernet configuration
 - identical attachment adapters & same subnet
- ~~Same modem settings~~
 - If a zBX is to be installed, USE BROADBAND connections to IBM Retain.

Primary and Alternate Hardware Management Consoles

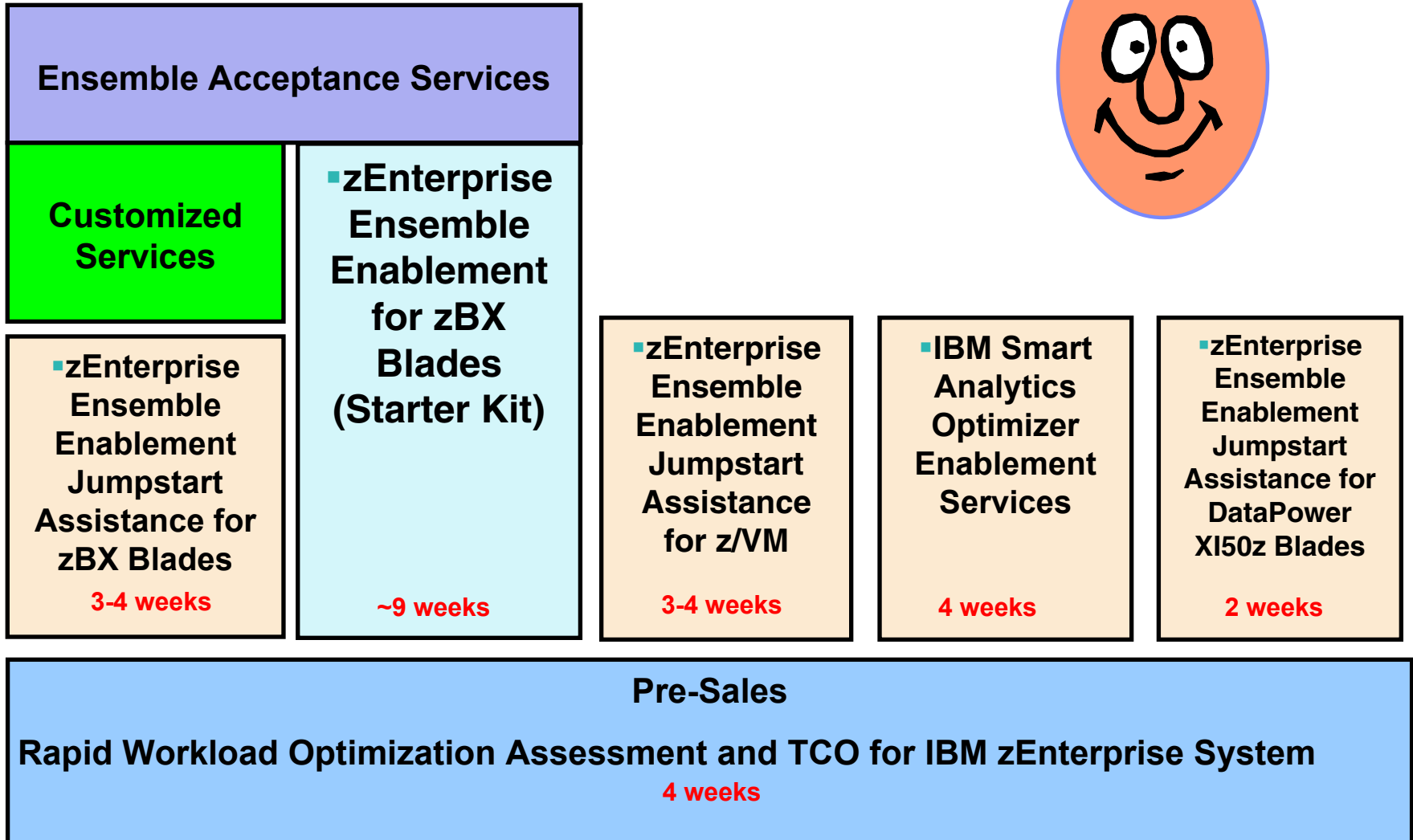
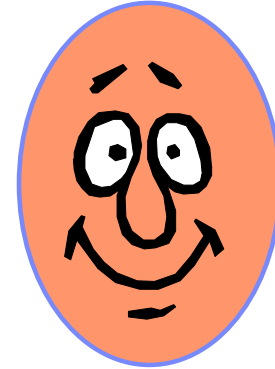


- **Any V2.11.0/V2.11.1 HMC can become the Primary HMC that controls the ensemble.**
 - The Primary HMC can perform all non-ensemble HMC functions on CPCs that aren't members of the ensemble.
- **The HMC that creates an ensemble (the HMC that performed the "Create Ensemble" wizard) becomes the Primary HMC.**
- **The Alternate HMC is specified when executing the "Create Ensemble" wizard.**
 - Any V2.11.0/V2.11.1 HMC is eligible to be an Alternate HMC after running the "Manage Alternate Hardware Management Console task".
- **The title of Primary Hardware Management Console and Alternate Hardware Management Console will appear on the Login HMC panel and the title line once you are logged in.**
 - The default HMC titles will change to these titles when the ensemble is created.
 - The titles will revert back to the default if the ensemble is deleted.
- **A Primary HMC is the only HMC that can perform ensemble related management tasks (create virtual server, manage virtual networks, create workload)**



Services

Lab Services zEnterprise Offerings Roadmap



IBM Implementation Services for System z – zBX and Unified Resource Manager (zManager) (6948-L66)

IBM

enhanced

ex5

IBM will implement your zBX quickly with proven expertise for Windows on IBM® BladeCenter HX5 blades for zBX

Product New Features:

- In addition to current support of Power blades and Linux on System z for zBX, implementation services is now available for Windows on select HX5 blades installed on the zEnterprise BladeCenter Extension (zBX)
- Deliver processes, tools, skills and best practices that enable a fast and accurate implementation and deployment



Product Benefits:

- Freedom of choice of architecture and operating system for multi-tiered application deployment
- Accelerate the advantage of Unified Resource Manager which can provide single point of control for hybrid systems architecture by quick, smooth adaption
- Accelerate the adoption of IBM zEnterprise technology and realize the value sooner
- Reduce risk during the zManager and zBX implementation
- Lower TCO in terms of labor (systems management), energy cost and space costs



Product URL: <http://www-935.ibm.com/services/us/en/it-services/implementation-services-for-zbx-and-zmanager.html>

IBM Implementation Services for System z network virtualization for zBX



IBM will implement network virtualization for zBX with proven expertise



Product New Features:

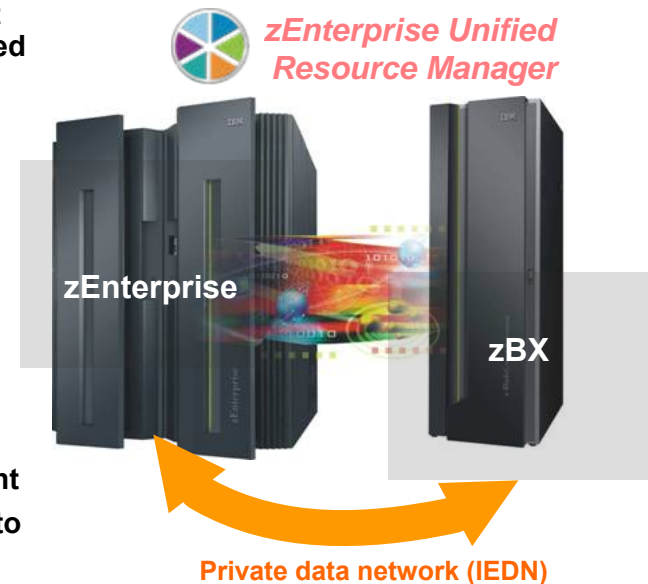
- ▶ The first services from GTS to assist clients to assess, design and implement the zEnterprise intra-ensemble data network (IEDN) and the zEnterprise Unified Resource Manager to provide network virtualization, protection and management features across heterogeneous platforms within the Ensemble.

Features / Business Value:

- ▶ Provide assessment, planning, education and implementation of network virtualization for zBX.
- ▶ Deliver processes, tools, skills and best practices that enable a fast and accurate implementation.

Product Benefits:

- ▶ Reduces cost on the additional network parts (e.g. switches, cables and adapters) that clients need to maintain in a distributed computing environment
- ▶ Reduces the network latency by bringing the distributed environment closer to the mainframe, improving overall transaction response and security
- ▶ Helps to Integrate client's existing intranet and Internet networks seamlessly with the zEnterprise internal networks (including security aspects, access controls, firewall requirement and migration transparency) to provide the level of availability and performance the business requires



Learn More: <http://www-935.ibm.com/services/us/en/it-services/implementation-services-for-zbx-network-virtualization.html>

http://www.ibm.com/systems/services/labservices/

The screenshot shows a Mozilla Firefox browser window displaying the IBM Systems Lab Services and Training website. The browser's address bar shows the URL <http://www-03.ibm.com/systems/services/labservices/>. The website header includes the IBM logo, a search bar, and navigation links for Home, Solutions, Services, Products, Support & downloads, and My IBM. A user is logged in as Mr. Gregory Hutchison. The main content area features a large banner with the text "Why get smarter now? Because we want to." and an image of a globe. Below the banner, there is a section titled "Why IBM Systems Lab Services and Training" with a paragraph explaining IBM's vision. To the left, a sidebar lists various services and training options. To the right, there are sections for "We're here to help" with links to contact, download flyers, and get Adobe Reader, and "IBM Systems Technical Universities and more" with a link to explore options. At the bottom, there are sections for "IBM Systems Technical Conference Series" and "IBM Systems Lab Services and Consulting" with lists of services.

References

Reference

▪ zBX Publications

- zEnterprise System Introduction to Ensembles GC27-2609
- zEnterprise System Ensemble Planning and Configuring Guide SC27-2608
- zBX Service Guide GC28-6884
- zBX Installation Manual (2458-002) GC27-2610
- zBX IMPP (2458-002) GC27-2611
- zBX Service Education SE245800
- zBX Safety Inspection GC28-6889
- IBM License Agreement for Machine Code SC28-6872
- Systems Environmental Notices and User Guide Z125-5823
- Systems Safety Notices G229-9054
- System z Hardware Management Console Web Services SC27-2616 API (Version 2.11.1)

▪ Redbooks

- IBM zEnterprise 196 Technical Guide, SG24-7833
- IBM zEnterprise 114 Technical Guide, SG24-9754
- IBM zEnterprise System Technical Introduction, SG24-7832
- IBM System z Connectivity Handbook, SG24-5444
- IBM zEnterprise Configuration Setup, SG24-7834
- IBM zEnterprise Unified Resource Manager, SG24-7921

▪ zBX SAPR Guide

- SA10-006
 - 2458-002 TDA Confirmation Form
- SA10-018
 - zEnterprise Unified Resource Manager Pre-Sales Checklist

Dank u

Dutch

Merci

French

С п а с и б

0

Gracias

Spanish

شكراً

Arabic

감사합니다

Korean

Tack så mycket

Swedish

धन्यवाद

Hindi

תודה רבה

Hebrew

ObrigadoBrazilian
Portuguese

谢谢

Chinese

Dankon

Esperanto

Thank You

ありがとうございます

Japanese

Trugarez

Breton

Danke

German

Tak

Danish

Grazie

Italian

நன்றி

Tamil

děkuji

Czech

ขอบคุณ

Thai

go raibh maith agat

Gaelic

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