IBM zEnterprise BladeCenter Extension (zBX) Hardware Overview

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IBM

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Session Number 9690
Agenda

- Hardware Overview
  - 2458-002

- Networking

- Disk/Storage Considerations
  - IBM Smart Analytics Optimizer
  - IBM POWER7 Blades
  - IBM System x

- Hardware Management Console

- Reference
Putting zEnterprise System to the task
Use the smarter solution to improve your application design

- System z Hardware Management Console (HMC)
- Select IBM Blades
- Optimizers

- System z196 or z114
- Linux on System z
- Linux on System z
- z/OS
- z/TPF
- z/VSE
- Linux on System z
- z/VM
- System z PR/SM
- z HW Resources
- Support Element
- Blade HW Resources
- zBX
- Blade Virtualization
- Blade Virtualization
- Microsoft Windows and Linux on System x
- AIX on POWER7
- DataPower XI50z
- IBM Smart Analytics Optimizer
- Future Offering
- Future Offering

- Private data network (IEDN)
- Unified Resource Manager
- Private Management Network INMN
- Private High Speed Data Network IEDN
- Customer Network

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

**zBX Infrastructure**
- Rack
- Top-of-Rack Switch
- BladeCenter Chassis
- Ethernet & FC Cables
- BC Switches
- Power Dist. Units
- Opt: Heat Exchanger, Power cord types

**Blades**
zBX Door - options

- Option 1 – Standard door
- Option 2 – Rear Door Heat Exchanger - Feature Code #0540
  - Requires customer conditioned water
  - 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/](http://www.coolcentric.com/)
- Option 3 – Noise Reduction Door - Feature Code #0543
2458-002 Ordering (who does what?)

- zBX is ordered via the zEnterprise eConfig, by specifying the number of blades
  - IBM Smart Analytics Optimizer
  - 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 (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 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 Smart Analytics Optimizer
    - Private DASD (DS5020)
    - All Disk Optical Cables
    - IEDN optical cables
  - 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

- Internal Recipe
  - Represented by various feature codes within the 2458-002
    - Generated by the zEnterprise eConfig tool
  - Internal connections pre built and wired in IBM manufacturing ➔ Huge Benefit
  - External connections performed by IBM during installation
    - Optical cables and labels provided by the customer
    - Disk provided by an alternate means – not supplied with the zBX
    - IBM POWER7 Blades and IBM System x Blades provided by an alternate means – not supplied with the zBX
      - Blade entitlement provided via eConfig
      - Unused slots determine by VPD

- BladeCenters
- Blades
- Internal bits and pieces
  - Redundant network components and paths
  - Redundant power
  - Redundant disk connections and paths
  - Redundant Top of Rack (TOR) switches
    - INMN
    - IEDN
Bits and Pieces
Adding new blades – “enablement”

Perform Model Conversion - P00MNXK4

Use this function to add, remove, or update system hardware and features. The system model identification may change if required. 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 (ISAIO only) and hardware features.
- Upon installing the feature, the zBX is enabled throughout the system.
- This will require an SE reboot.
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 Smart Analytics Optimizer

*Delivering powerful analytics to existing System z customers*

- Creates new opportunities for existing systems by using new technology approaches
- High performance
  - Significantly improve query-intensive workloads on IBM data systems
  - Improved query performance
- Requires no change to existing applications
- Lower administration costs
- Better decisions
- No changes to DB2 query application
2458-002 - IBM Smart Analytics Optimizer

- Pre-packaged and pre-tested
- zBX components are a logical extension to System z as a new System z Machine Type/Model.
  - Machine Type 2458
  - Model 002
- Used for specialized workload processing which can be handled more economically than if those workloads were processed directly in the System z server
- zBX processing components are provided using standard BladeCenter® components.
- Impressive Performance
  - Compressed DB2 data
  - Parallel file system
  - In memory execution
IBM Smart Analytics Optimizer - Sizing

- How do I size the right machine?
  - Watch this space, things may change
  - Initially, go here
- For requests outside of North America and Business Partners
  - dwhz@de.ibm.com
- For requests in North America
  - Forward the sizing request to the BI Swat team under Beth Hamel
  - DW on System z/Silicon Valley/Contr/IBM
- [https://w3.tap.ibm.com/w3ki08/display/isao/Home](https://w3.tap.ibm.com/w3ki08/display/isao/Home)
  - [https://w3.tap.ibm.com/w3ki08/display/isao/Process](https://w3.tap.ibm.com/w3ki08/display/isao/Process)
  - Download an off-line version of the questionnaire ([ISAO_Assessment_Questionnaire.doc](https://w3.tap.ibm.com/w3ki08/display/isao/Process)) from [https://w3.tap.ibm.com/w3ki08/display/isao/Process](https://w3.tap.ibm.com/w3ki08/display/isao/Process)
  - Complete Questionnaire
    - System Environment and Data Warehouse workload (to make sure that the customer meets the requirements)
- Send the completed Questionnaire to the User ID dwhz@de.ibm.com or to BI Swat team under Beth Hamel in North America DW on System z/Silicon Valley/Contr/IBM or use dwonz@us.ibm.com.
  - It is not recommended that you approach the customer until you have had feed back on the ISAO Assessment
  - a quick analysis of real workload should be performed (Quick Workload test)
- Download the [ISAO_Assessment_Description.zip](https://w3.tap.ibm.com/w3ki08/display/isao/Process) from [https://w3.tap.ibm.com/w3ki08/display/isao/Process](https://w3.tap.ibm.com/w3ki08/display/isao/Process)
## zBX - Five Smart Analytics solution sizes for System z

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<th>3 Blades</th>
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2458-002
## zBX ISAOPT Offering Upgrades

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<td>56</td>
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</tbody>
</table>

*Yes* indicates availability of upgrades. Add storage option is also available.
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+

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.

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<table>
<thead>
<tr>
<th>Blade</th>
<th>FC#</th>
<th>Config 1</th>
<th>Config 2</th>
<th>Config 3</th>
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<td>Processor Activations (8)</td>
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<td>Memory kits 8 GB (2 x 4 GB)</td>
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http://www.ibm.com/systems/z/hardware/zenterprise/zbx.html
Sizing POWER7™ blades

• Size the z196 portion or z114 portion
  • 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 will be able to 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 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://w3-03.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://w3-03.ibm.com/support/techline/sizing/tg_im_sizing.html
Sizing POWER7™ blades

- Sizing when the customer has an existing set of IBM servers they would like to migrate to POWER7™ blades (go ahead and collect the data now)
  - Identify which machines and which time periods the customer would like to consider in the proposal
  - 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://w3-03.ibm.com/support/techdocs/atsmastr.nsf/WebIndex/PRS4034](http://w3-03.ibm.com/support/techdocs/atsmastr.nsf/WebIndex/PRS4034)

- We're working with the WLE (Workload Estimator) team for support
  - Targeted to be available at announce
  - Techline will deliver World Wide education when the support is available

- IBM Business Partners
  - PWCS (PartnerWorld Contact Services)
IBM WebSphere DataPower Integration Appliance XI50 for zEnterprise helps extend the value of zEnterprise

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 Orderings

- Use The IBM Standalone Solutions Configuration Tool (SSCT)

- Will release four hardware configurations with Operating System choices.
  - Only two configurations are available on the zBX initially.

- The supported System x blades (new model numbers) will be available using the IBM SSCT configuration tool on August 30, 2011.
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**: Americas
**Country**: United States

**Solution Type**: General Purpose
**Language**: English

Standalone Solutions Configuration Tool Version: 1.42
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 zEnterprise™ BladeCenter® Extension (zBX)
IBM System x® Blades

MT 7873 (HX5)
July 12th Announce
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

After August 30th, new models will be preconfigured for you in SSCT. This table is useful for pricing today.

<table>
<thead>
<tr>
<th>Description</th>
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<th>Option Part Number</th>
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<tr>
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<td></td>
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<td></td>
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<td>1</td>
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<tr>
<td>CFFh 10 GbE</td>
<td>46M6170</td>
<td>46M6168</td>
<td>0099</td>
<td>1</td>
<td>1</td>
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<tr>
<td>CIOv 8Gb FC</td>
<td>44X1946</td>
<td>44X1945</td>
<td>1462</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

http://www.ibm.com/systems/z/hardware/zenterprise/zbx.html
For HX5 7873 blades in the zBX, Linux must be 64 bit support only

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.

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 11 SP1 you should select ‘SUSE Linux Enterprise Server’ with 1-32 sockets.

Please 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/
zBX
Microsoft Windows

• NOTE that this information is a statement of direction only.

• 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.

All statements regarding IBM’s future direction and intent are subject to change or withdrawal without notice, and represent goals and objectives only.
Networking

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 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 connections in the zBX TOR Switch
   - For CPC’s or switches not in the ensemble
OSA-Express CHPID Types

- Two new OSA CHPID types are created to support the new zBX networks.
- There are now up to 6 types of NETWORK OSA CHPID’s.

- Existing data networks - defined as OSC, **OSD**, OSE, and OSN CHPID’s
  - Existing customer provided and managed OSA ports used for access to the current customer external networks. (no changes)

1. **Intra-Node Management Network** – defined as OSM CHPID’s
   - OSA-Express3 1000base-T
     - Configured as an OSM CHPID port for Node Management Network to be connect to zEnterprise Ensemble CPC via a new ethernet switch A/B J07.

2. **Intra-Ensemble Data Networks** – defined as OSX CHPID’s
   - OSA-Express3 10 GbE (LR or SR) configured as an OSX CHPID, fiber port for IEDN.
   - OSA-Express4S 10 GbE (LR or SR) configured as an OSX CHPID, fiber port for IEDN.
CHPID Types OSX and OSM

1. **OSM (INMN)**

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

   ![OSM Diagram]

   - OSA Express3
     - 1GbE
     - 2 CHPIDS
     - 2 PORTS/CHPID
   
   - FC3367
     - CHPID PORT 0
       - RJ-45 Connector
       - CAT 6 ETH CABLE
     - CHPID PORT 0
       - RJ-45 Connector
     - CHPID PORT 1
       - RJ-45 Connector

   - MUST USE CHPID PORT 0

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

   **CHPARM=01 indicates that the channel path is managed by Dynamic Channel Path Mgmt (DCM).**

2. **OSX (IEDN)**

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

   ![OSX Diagram]

   - 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

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

2458-002
CHPID Types OSX and OSM

1. OSM (INMN)

OSM IOCDS EXAMPLE:
- CHPID PCHID=191,PATH=(CSS(0,1,2,3),23),TYPE=OSM,CHPARM=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)

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

NEW:
OSA-Express4S 10 GbE
One port per feature.
2458-002 Networks

IBM will supply 3.2m cables.

Required if IBM Unified Resource Manager (FC0025), even if no zBX.
2458-002 IEDN, no zBX

Customer supplied directly connected LC DUPLEX cable (IEDN) between the 2 OSX CHPID pair. Use ‘ONE’ OSX CHPID per card, located on different physical H/W cards/ports.
2458-002 IEDN, no zBX

Concerned about IEDN LAN performance?

Separate VLAN groups are assigned to each PATH CHPID PAIR and to separate Virtual Server groups.

A “zero zBX” solution may have no more than two OSX IEDN ports for a unique group of Virtual Servers attached to a unique set of VLAN IDs (and IP Subnets).   Example:

VLANs ‘A’ and ‘B’ on CHPIDs #1 and #2 for Virtual Servers ‘A’ and ‘B’ (‘VSa’ and ‘VSb’)
VLANs ‘C’ and ‘D’ on CHPIDs #3 and #4 for Virtual Servers ‘C’ and ‘D’ (‘VSc’ and ‘VSD’)

2458-002 IEDN, no zBX

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2458-002 IEDN, no zBX

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VLANs ‘C’ and ‘D’ on CHPIDs #3 and #4 for Virtual Servers ‘C’ and ‘D’ (‘VSc’ and ‘VSD’)
2458-002 Top of Rack (TOR) Switches

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

INMN TOR SWITCH

IEDN TOR SWITCH
2458-002 IEDN Redundant Top of Rack (TOR) Switch Connections

- SFP+ = 10GbE Optical SR or LR
- DAC = 10GbE Direct Attach Cables.

**Switch Jack Plugging Rules:**
- J00 - J07 are SFP+ reserved for Host OSX IEDN connections.
- J08 - J23 are DAC reserved for BC IEDN, SM07/SM09 connections.
- J22 / J23 are 1 Meter DAC for Switch to Switch
- J24 - J30 are SFP+ reserved for zBX to zBX IEDN connections.
- J31 - J39 are SFP+ reserved for customer (PINK) IEDN connections.
- J40 Console Port
- J41 IEDN Switch Management Port

**Optic p/n:**
- 45W4743 - 10GE sfp+ SR - has a black handle
- 45W4744 - 10GE sfp+ LR - has a blue handle

**Customer Network LR or SR?**

**Up to eight CPCs LR or SR?**

**Up to seven zBX to zBX Connections. LR or SR?**
### Optics Ordering - FC0632 (LR) or FC0633 (SR)

- **Up to 8x2 = 16**
- **Up to 7x2 = 14**
- **Up to 9x2 = 18**

#### Intra-Node Management Network
1. z196 to zBX
2. zBX to zBX
3. zBX to existing

#### Intra-Ensemble Data Network
4. Existing Customer Network

#### Existing Customer Network

<table>
<thead>
<tr>
<th>Customer Optics</th>
<th>Proposed</th>
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<tbody>
<tr>
<td>0632 - To OSA OSX 10Gb LR (0 - 16 By 2)</td>
<td>2</td>
</tr>
<tr>
<td>0633 - To OSA OSX 10Gb SR (0 - 16 By 2)</td>
<td>2</td>
</tr>
<tr>
<td>0632 - Intra-Ensemble Data Network 10Gb LR (0 - 14 By 2)</td>
<td>2</td>
</tr>
<tr>
<td>0633 - Intra-Ensemble Data Network 10Gb SR (0 - 14 By 2)</td>
<td>2</td>
</tr>
<tr>
<td>0632 - External Data Network 10Gb LR (0 - 18 By 2)</td>
<td>3</td>
</tr>
<tr>
<td>0633 - External Data Network 10Gb SR (0 - 18 By 2)</td>
<td>3</td>
</tr>
</tbody>
</table>
OSA Ordering

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

OSA to BPH
OSA to TOR

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.
zEnterprise and zBX Model 002 – Communications

IBM Service Updates
Virtual Server to Virtual Server Communications
Smart Analytic Optimizer Database Updates
Power Monitoring / Management

z196 or z114

IBM Confidential
zEnterprise/2458-002 MAX CPC/NODE ENSEMBLE

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

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

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

Additional Content
- HMC (2 per Ensemble)
  - Ethernet Cables
- INMN (2 per Controlling CEC)
  - 26 meter 1000BaseT cables (BPH to Switch)
- 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
- 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
- External data network (2 per connection)
  - Optic modules, SR or LR
  - Customer provided 10 GbE cables, SR or LR

intra-node management network
intra-ensemble data network
existing customer network
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)
- 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
- 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
- External data network (2 per connection)
  - Optic modules, SR or LR
  - Customer provided 10 GbE cables, SR or LR

Note: TOR switches could be required for OSX to OSX communications
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)
- 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
- 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
- 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)
- **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
- **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
- **External data network** (2 per connection)
  - Optic modules, SR or LR
  - Customer provided 10 GbE cables, SR or LR
Big Picture 2458-002 Configuration

- **HMC z196 CPC1 OWNS 2458**
- **HMC 1 Primary, 1 Alternate HMC**
- **Data Network Redundancy**
- Can be SR or LR to TOR.

**Legend**
- **Customer HMC to SE/BPH A/B Network**
- **2458 INMN**
- **2458 10GbE OSX IEDN (SR) NOTE: z10 ARE OSD**
- **2458 10GbE OSX IEDN (LR) NOTE: z10 ARE OSD**
- **2458 8Gb FC Disk Storage**
- **PSM / INMN 1000BaseT OSA (OSM) PCHIDS to Z29BPS11/PS31-J07**

**Customer HMC Blade SAN**

**IBM Smart Analytics Optimizer**

**Fibre Channel Disk Storage**

**CUSTOMER blade SAN**

**PSM / INMN 1000BaseT OSA (OSM) PCHIDS to Z29BPS11/PS31-J07**
Storage for IBM Smart Analytics Optimizer
IBM Smart Analytics Optimizer, IBM POWER7 and System x Disk Storage

SUPPORTED DISK LIST for POWER7

SMART ANALYTICS OPTIMIZER DISK

POWER7 & SYSTEM x Disk

CUSTOMER SAN Fibre Channel Disk Storage

DS5020 CUSTOMER Direct Connect Fibre Channel Disk Storage

ServerProven for SYSTEM x

SUPPORTED DISK LIST for POWER7
IBM Smart Analytics Optimizer Disk Attachment Details

- Includes two 20 port – 8 Gb FC switches in each BladeCenter to allow connectivity to disk
  - Must be directly attached
  - Supports 8 Gbps, 4 Gbps, 2 Gbps
    - 1 Gbps is NOT supported
  - Allows for connectivity to:
    - DS5020 with 1 TB HDD

- Disk is not part of the integrated Smart Analytics Optimizer offering
  - Customer is responsible for:
    - supplying disk (separate order)
    - disk cabling
    - disk configuring

<table>
<thead>
<tr>
<th>Intended to handle up to x TBs of DB2 data</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5 TB</td>
</tr>
<tr>
<td>16 Drives</td>
</tr>
<tr>
<td>8 ports</td>
</tr>
</tbody>
</table>

Cables and Storage provided by customer
**IBM Smart Analytics Optimizer Disk e-Config output**

<table>
<thead>
<tr>
<th>Part#</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1814-20A</td>
<td>DS5020 Midrange Disk (Dual Controllers)</td>
</tr>
<tr>
<td>FC2080</td>
<td>2-Dual 8Gbps Host Pt Cards</td>
</tr>
<tr>
<td>FC4001</td>
<td>DS5020 1 TB/7.2 SATA DDM</td>
</tr>
<tr>
<td>FC5605</td>
<td>5m Fiber Optic Cable LC-LC</td>
</tr>
<tr>
<td>FC7802</td>
<td>DS5020 Linux/Intel Host Kit</td>
</tr>
<tr>
<td>FC8700</td>
<td>DS5020 2 Stg Partiti. IPO</td>
</tr>
<tr>
<td>FC9202</td>
<td>Field Integrated</td>
</tr>
<tr>
<td>FC9800</td>
<td>Power Cord 125V/10A, Group 1</td>
</tr>
</tbody>
</table>

**7, 14, 28 Blades**

<table>
<thead>
<tr>
<th>Part#</th>
<th>Description</th>
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<tbody>
<tr>
<td>1814-52A</td>
<td>EXP520</td>
</tr>
<tr>
<td>FC4001</td>
<td>DS5020 1 TB/7.2K SATA DDM</td>
</tr>
<tr>
<td>FC5605</td>
<td>5m Fiber Optic Cable FC-FC</td>
</tr>
<tr>
<td>FC9021</td>
<td>Attach to DS5020</td>
</tr>
<tr>
<td>FC9202</td>
<td>Field Integrate</td>
</tr>
<tr>
<td>FC9800</td>
<td>Power Cord 125V/10A 2.8m, (Group 1)</td>
</tr>
</tbody>
</table>

**42, 56 Blades**

<table>
<thead>
<tr>
<th>Part#</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Notes:</td>
<td></td>
</tr>
<tr>
<td>1. Four attachment ports are standard and no charge. FC2080 adds an additional four ports (charged). Order FC2080 in every order because it cannot be MES'ed later.</td>
<td></td>
</tr>
<tr>
<td>2. 5m Fiber Optic Cable LC-LC (can order 1m or 25m also for attachment to a patch panel).</td>
<td></td>
</tr>
</tbody>
</table>
zBX 4 BLADECENTER FC CONNECTIONS

4 BLADECENTER, Smart Analytics Optimizer ONLY FC DISK STORAGE CASCADE CONNECTIONS

CUSTOMER SUPPLIED
*CBL HBA0J00 to B10BSM03J00
*CBL HBA1J00 to B10BSM04J00
*CBL HBA0J01 to B01BSM03J00
*CBL HBA1J01 to B01BSM04J00

SM03/04 JACK LOCATIONS

PORTS 1 - 14
INTERNAL PORTS RESERVED FOR BLADE SERVERS

USING TOP/DOWN - LEFT/RIGHT RULES
1ST AVAILABLE J18/J19 TO NEXT BC AVAILABLE J16/J17.

2458-002

FC INTERCONNECT CABLES
5M LC DUPLEX SR ONLY (FC 0621)
Storage for zBX and POWER7
FC DISK STORAGE CONNECTIONS FOR Power7 blades

Separately provided disk and cables. No BladeCenter interconnect. Blade chassis DOES NOT cable to the same Disk Storage as Smart Analytics Optimizer chassis.
List of Storage Devices Supported by PS701 IBM BladeCenter Express in IBM zEnterprise System*

**IBM**
- DS3400, DS3500, DS3950
- DS4100, DS4200, DS4700, DS4800
- DS5020, DS5100, DS5300
- DS6000™
- DS8100, DS8300, DS8700, DS8800
- SVC 2145
- XIV®
- 2105, 2107
- Storwize® v7000
- N-series²

**EMC**
- Symmetrix 3300, 5000, 8000
- Symmetrix V-MAX
- DMX 800, 1000, 1000P, 2000, 2000P, 3000
- DMX -3, DMX-4
- Clariion CX3 all models, CX4 all models, CX300, CX400, CX500, CX600, CX700, AX4-5
- Clariion CX3 all models, CX4 all models, AX4-5

**Hitachi**
- Lightning 9910, 9960, 9970, 9980
- USP 100, 600, 1100
- NSC55
- USP, USP-V
- VSP

**HP**
- EVA 3, 4X, 5, 6X, 8X
- XP 10K, 12K, 24K, 48, 128, 512, 1024
- HP P9500

**NetApp**
- FAS2050³

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1 Default MPIO Path Control Module support only
2 Need specific model for verification of qualification
3 Other NetApp models may also be qualified

The customer Fibre Channel (FC) switches that connect to the zBX BladeCenter FC switches must support NPIV and must use shortwave (multimode) ports that support either 2, 4 or 8 Gbps link speeds. Each BladeCenter requires four connections to the customer SAN. LUNS can be shared.

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

Select Support Storage Devices
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 –

- For information on support from other industry leaders you can use the IBM Server Proven web site –

- 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
Third Party Maintained zEnterprise

A dedicated HMC for pulling zBX related MCLs/PTFs is required when the controlling CEC for the zBX is no longer under warranty but the zBX still is. The HMC connected to the zBX can not be used for ensemble management or for basic system management tasks on the CEC.
How is the Role of the HMC Changing?

- Prior to the ensemble management functions in z196, 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 z196 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 ....)
Lab Services zEnterprise Offerings Roadmap

**Customized Services**
- zEnterprise Ensemble Enablement for zBX Blades (Starter Kit) ~9 weeks
- zEnterprise Ensemble Enablement Jumpstart Assistance for zBX Blades 3-4 weeks
- IBM Smart Analytics Optimizer Enablement Services 4 weeks
- zEnterprise Ensemble Disablement Jumpstart Assistance for DataPower XI50z Blades 2 weeks

**Ensemble Acceptance Services**
- zEnterprise Ensemble Enablement Jumpstart Assistance for z/VM 3-4 weeks

**Pre-Sales**
- Rapid Workload Optimization Assessment and TCO for IBM zEnterprise System 4 weeks
http://www.ibm.com/systems/services/labservices/
Reference

• zBX Publications
  • zBX Service Guide GC28-6884-01
  • zBX Installation Manual (2458-002) GC27-2610-00
  • zBX IMPP (2458-002) GC27-2611-00
  • zBX Service Education SE245800
  • zBX Safety Inspection GC28-6889-00
  • IBM License Agreement for Machine Code SC28-6872-00
  • Systems Environmental Notices and User Guide Z125-5823-02
  • Systems Safety Notices G229-9054-02

• Redbooks
  • IBM zEnterprise 196 Technical Guide, SG24-7833
  • IBM zEnterprise 114 Technical Guide, SG24-9754
  • IBM zEnterprise System Technical Introduction, SG24-7832-01
  • IBM System z Connectivity Handbook, SG24-5444-12
  • IBM zEnterprise Configuration Setup, SG24-7834
  • IBM zEnterprise Unified Resource Manager, SG24-7921

• zBX SAPR Guide
  • SA10-006
    • 2458 TDA Confirmation Form
  • SA10-018
    • zEnterprise Unified Resource Manager Pre-Sales Checklist
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Notes:

Performance is in Internal Throughput Rate (ITR) ratio based on measurements and projections using standard IBM benchmarks in a controlled environment. The actual throughput that any user will experience will vary depending upon considerations such as the amount of multiprogramming in the user's job stream, the I/O configuration, the storage configuration, and the workload processed. Therefore, no assurance can be given that an individual user will achieve throughput improvements equivalent to the performance ratios stated here.

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