HMC (Hardware Management Console) & SE (Support Element) 2.13.0 available with IBM z13 GA1

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SHARE in Orlando

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Topics

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Topics

- **Backup**

  - ▶ **Additional IBM z13 HMC/SE Features**

    - ● **SMT (Simultaneous MultiThreading)**   Page: 78
    - ● **Crypto Enhancements**   Page: 81
    - ● **I/O Enhancements**   Page: 94
    - ● **Alternative to USB Flash Drive Details**   Page: 104
    - ● **Security Log UUID Details**   Page: 113
    - ● **RSF Infrastructure Changes Requirements Details**   Page: 116
  - ▶ **zBX Mod 004**   Page: 121

IBM z13

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HMC 2.13.0 System support

- **The new HMC Version 2.13.0 will support the systems/SE (Support Element) versions shown in the table**

  ▶ **This HMC 2.13.0 Release will support z13, zBX Node, & Legacy systems**

  ▶ **z900/z800 (Driver 3G, SE version 1.7.3) & z990/z890 (Driver 55, SE version 1.8.2) systems are no longer supported.**

Machine Family	Machine Type	Firmware Driver	SE Version	Ensemble Node Potential
z13	2964	22	2.13.0	Yes
zBX Node	2458 Mod 004	22	2.13.0	Required
zBC12	2828	15	2.12.1	Yes
zEC12	2827	15	2.12.1	Yes
z114	2818	93	2.11.1	Yes
z196	2817	93	2.11.1	Yes
z10 BC	2098	79	2.10.2	No
z10 EC	2097	79	2.10.2	No
z9 BC	2096	67	2.9.2	No
z9 EC	2094	67	2.9.2	No

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General HMC/SE Support for IBM z13

► **More partitions:**

- **Max 85 Partitions**
- **85 partitions possible with more CSSes (from 4 to 6) supported**

► **More Physical Memory: 10 TB**

- **The partition memory limit**
  - **10 TB – no Feature Code 4008 I/O drawers**
    - ♦ **using FC 4012 PCIe I/O drawers and/or Coupling I/O wo FC 4008**
  - **1 TB – if FC 4008 I/O drawer exists**
- **Partition memory granularity updated for up to 10 TB**
  - **see next chart**

► **More Processors: 168 PUs; up to 141 CPs**

► **zAAP processor type is no longer supported**

- **zIIP processor assumes workload usage for zAAP**

IBM z13 Storage Granularity

- If a **user specified origin** is defined for a logical partition's **central storage**,

  ► the **origin**, **initial**, and optional **reserved** (additional) central storage values for the logical partition must all use at least **2 GB (2048 MB) granularity.** It may be larger, refer to the table below.

- If a user specified origin is **not** defined for a logical partition's central storage (system determined),

  ► following **table defines the granularity requirement** for the logical partition's initial and optional reserved central storage values. This is driven off the larger of the initial and reserved values: (LCSA in the table):

- Note: **Expanded Storage granularity always 512 MB**

Largest Central Storage Amount Specified (Initial and Reserved)	Storage Granularity Required
LCSA ≤ 256 GB	512 MB
256 GB < LCSA ≤ 512 GB	1,024 MB (1 GB)
512 GB < LCSA ≤ 1,024 GB	2,048 MB (2 GB)
1,024 GB < LCSA ≤ 2,048 GB	4,096 MB (4 GB)
2,048 GB < LCSA ≤ 4,096 GB	8,192 MB (8 GB)
4,096 GB < LCSA ≤ 8,192 GB	16,384 MB (16 GB)
8,192 GB < LCSA ≤ 10,240 GB	32,768 MB (32 GB)

1U HMC

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HMC 1U Server Hardware Option for IBM z¹

► Approach

- Use same 1U server hardware as IBM z13 SE
- Additional hardware
  - 1U Slideout Keyboard/Display
  - Customer supplied rack and power solution

► Rack Mounted HW – additional option

► MiniTower Hardware continue to be provided as default z Systems HMC HW

► Availability

- Order 1U HMC & keyboard/display through z Systems
- Order 1U HMC as a feature of zBX Node or IBM z13
  - Cannot be ordered as a feature code of any legacy system
    - ♦ Ie, unavailable as feature of a zEC12

IBM z13 GA1 HMC Supported Hardware

Feature Code	System Name	Machine Type/Model Number	Form Factor
0091	x3200 M3	7327-PAA	MiniTower
0092	x3300 M4	7382-PBC	MiniTower
0094	x3550 M4	7914-PKG	1U Server

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Alternative to USB Flash Drive

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Introducing an Alternative to USB Flash Memory

- **USB Flash Memory Drives used on HMC/SE**

  ▶ **Backup Critical Data**

  ▶ **Import/Export Data**

  ▶ **Offload Security and Audit Data**

  ▶ **etc.**

- **Most customers will continue to allow USB usage**

- **Some customers have policies of no R/W media**

  ▶ **Introducing Alternatives to USB for those customers**

  ▶ **USB no longer needed once Code 20 complete for IBM z13**

  ▶ **Feature Code: 0845   'Read-Only Media Option'**

    ● **Will be option on certain eConfig selections**
    ● **Will Drive R/O media to be shipped rather than USB**

  ▶ **Alternative Options such as FTP Servers, Using Remote Browser from Workstation for Import/Export, etc.**

    ● **Customer Publications will include table with all USB Alternatives per task**

- **Legacy systems will still have USB requirement**

  ▶ **ie., Backup Critical Data**

HMC Data Replication Versioning

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Overview

- **Data replication...**
  - ▶ **Is an HMC task and underlying communication framework**
  - ▶ **Allows the exchange of configuration data between linked machines**
    - 'customer information'
    - 'user profile data'
    - etc
  - ▶ **Can be disabled preventing this exchange**
  - ▶ **Exchanges of data (inbound and outbound) are logged**

Configure Data Replication task

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IBM z13 GA1 => Versioning Implications

- **Data Replication versioning introduced for different data types**

- **If Data Replication used:**
  - **All HMCs to be included in DataRep must be upgraded to HMC 2.13.0 level (IBM z13 HMC level)!!!**
    - **No data will be replicated if not at 2.13.0**
    - **z13 HMC Upgrade order:**
      - **Recommend doing an existing HMC MES first**
      - **See next chart**
  - **Prior to 2.13.0, can have mixed HMC levels**
  - **Future 2.13.0 plus levels can also have mixed levels**
    - **Only if versioning changed, would need to update to certain HMC levels**
      - **Expect this to be somewhat an exception**

- **General recommendation to upgrade HMCs to newest**
  - **With understanding of potential change to HMC hardware in some cases**

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IBM z13 GA1 => Versioning Implications

- **HMC 2.13.0 Upgrade Considerations:**
  - ▶ **Assuming Redundant Master HMCs on 2.12.1 or earlier**
    - 1) **MES Upgrade one existing HMC Master to 2.13.0**
      - − **Will carry forward User Information, Grouping Data, etc.**
    - 2) **Maintain the other 2.12.1/earlier Master at current level**
    - 3) **Install any new 2.13.0 HMCs**
      - − **point them to replicate from 2.13.0 Master**
    - 4) **MES upgrade remaining 2.12.1/earlier HMCs (not the Master) to 2.13.0**
      - − **They will replicate from 2.13.0 Master automatically**
    - 5) **Lastly update 2.12.1/earlier Master to 2.13.0**
    - 6) **Point new footprint HMCs to replicate from second Master (last upgrade)**
  - ▶ **Shouldn't have to change definitions other than for new footprint HMCs**
  - ▶ **Two HMC Groups stay in sync until all are on 2.13.0**
    - **2.13.0**
    - **2.12.1/earlier**
    - **All eventually replicate/get any updated data from 2.13.0 Master**

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An arrow 'points at' a master...

Example

Cooperating, redundant
masters
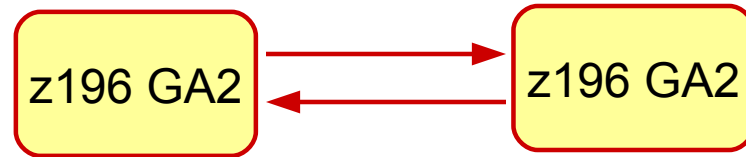
Slaves
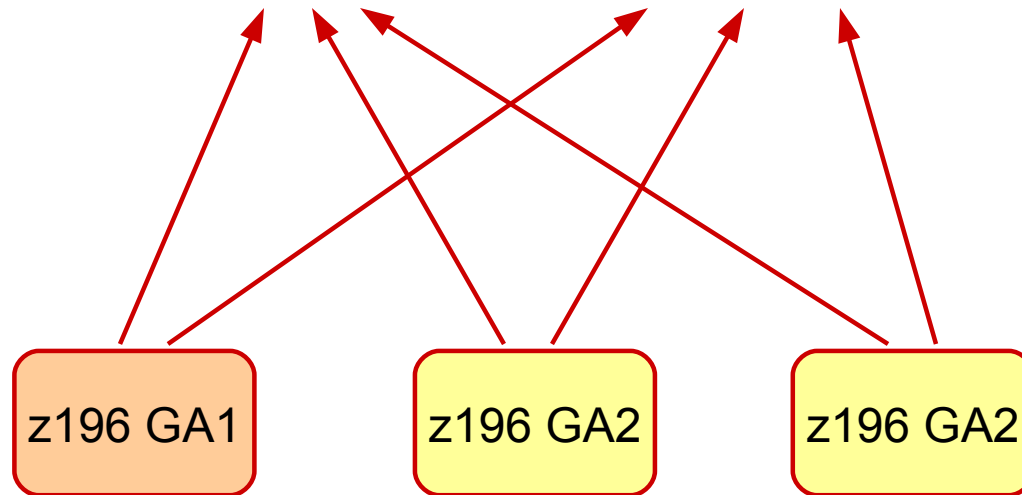
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An arrow 'points at' a master...

Example...

Masters...

Slaves

Not Communicating

```
z196 GA2        z13 GA1

z196 GA1    z196 GA2    z196 GA2
```

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An arrow 'points at' a master...

Example...

Masters...

Slaves

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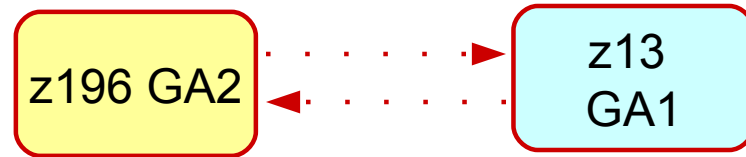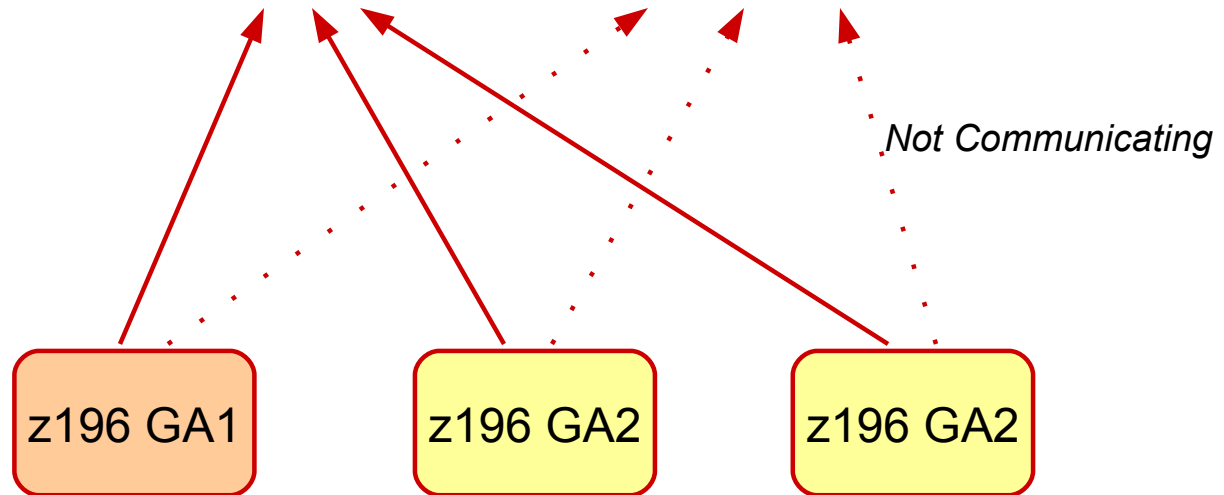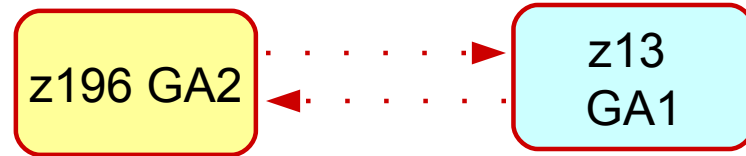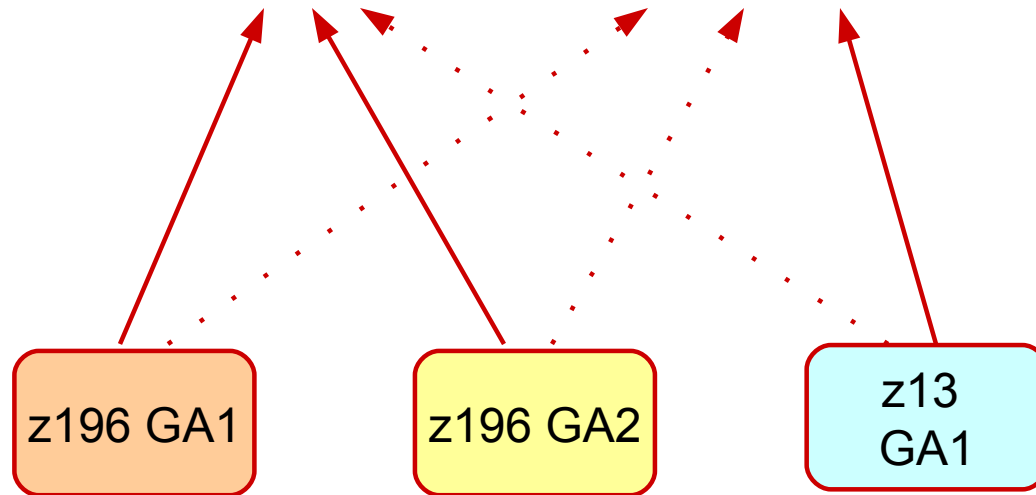
Potential IBM z13 GA2/beyond Simulated Conflict

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HMC Time Synchronization

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Prior HMC time source configuration

- **HMCs had two choices for a time source:**

  ▶ **1) NTP enabled on HMC**

    - **Configured on Customize Date and Time panel**
    - **HMC's clock in synch with NTP time source's clock**
    - **Preferred method of setting HMC time when running STP**

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Prior HMC time source configuration (cont'd)

▶ **2) NTP not enabled on HMC - time retrieval from selected CPCs**

- **Selection of CPC time sources only done when adding or changing CPC objects on the HMC**
- **Verification of CPC time sources through change CPC object panel**
- **HMC time synchronized once per day**
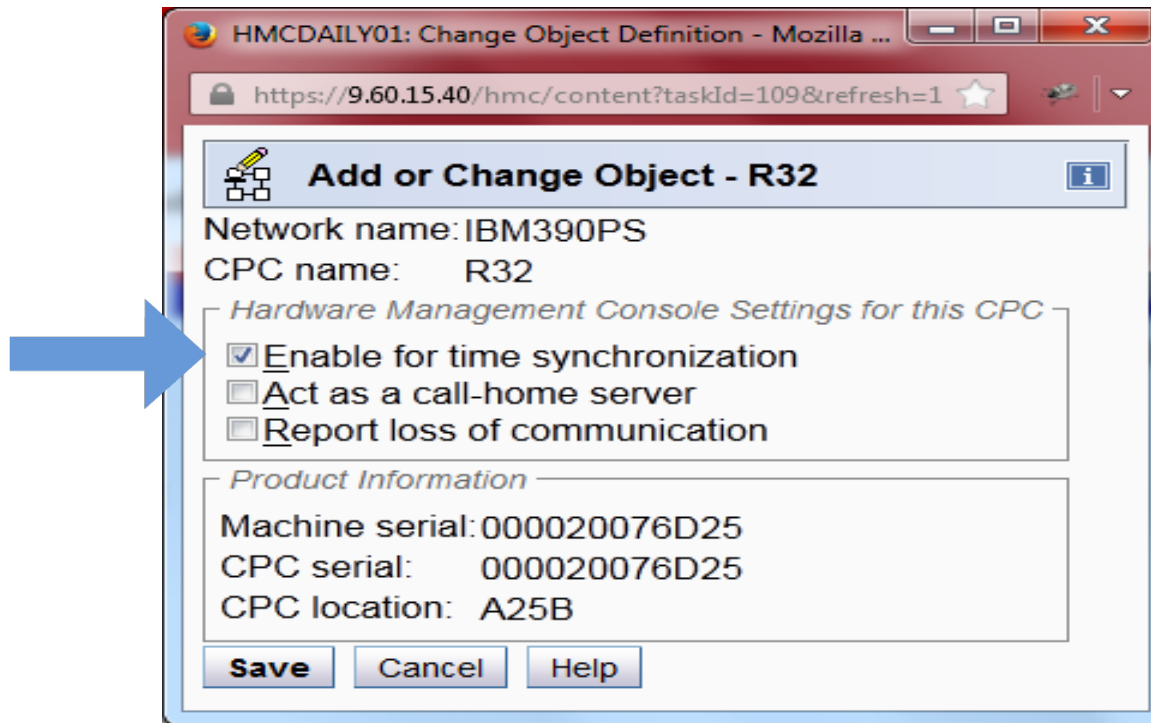
HMC time source configuration for IBM z13

- **HMC Customize Console Date and Time panel redesigned**
  - ▶ **Clear selection of HMC time source**
  - ▶ **Manual setting of date and time only when Time Source set to None**
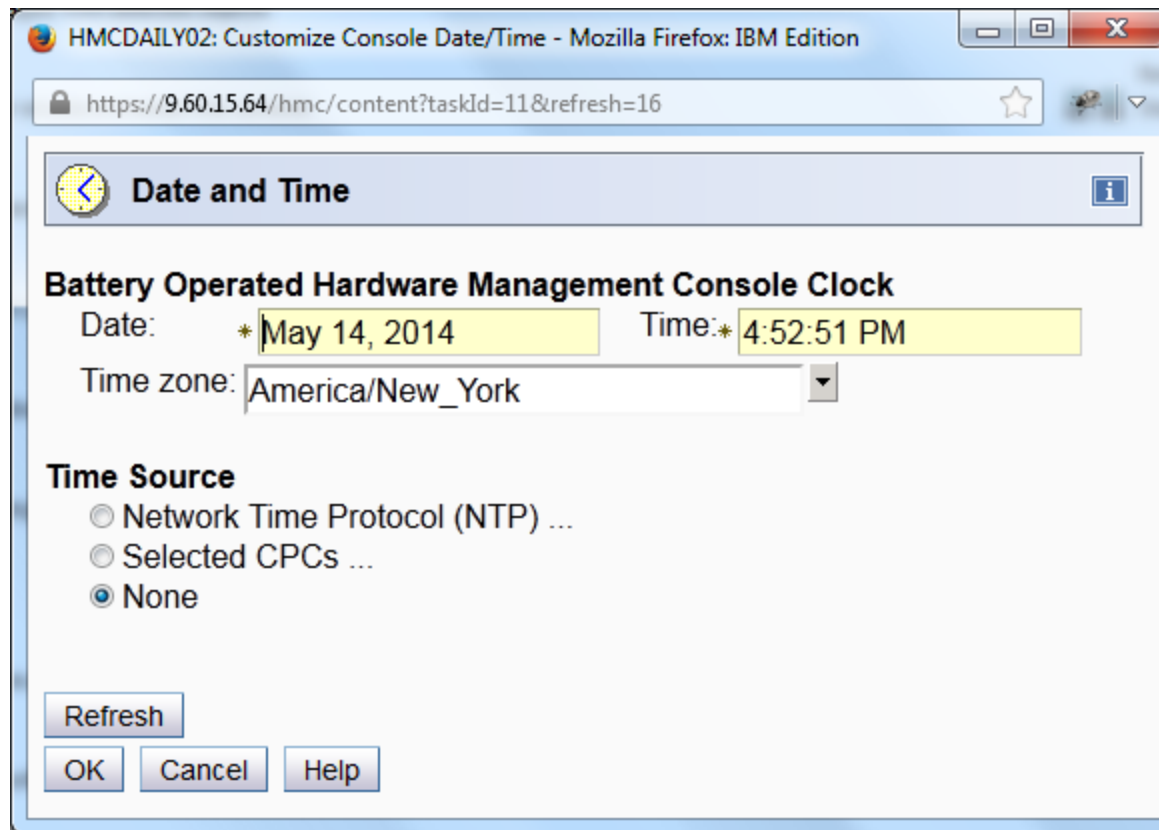
HMC time source configuration for IBM z13 (cont'd)

▶ **NTP still supported**

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HMC time source configuration for IBM z13 (cont'd)

▶ **Added configuration support for time retrieval from selected CPCs**

- **One location for configuration and checking all CPCs used as a time source**
- **Additional checks added to promote homogenous time sources when using multiple CPCs as time sources (same STP CTN)**
  - **Warning if not same CTN (Coordinated Timing Network) sources selected**

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HMC add/change CPC object

- **CPC selected for Add [Change] Object Definition task**
  - ▶ **"Enable for time synchronization" checkbox removed**
    - ● **Selection of CPC as a time source moved to Customize Console Date/Time task**

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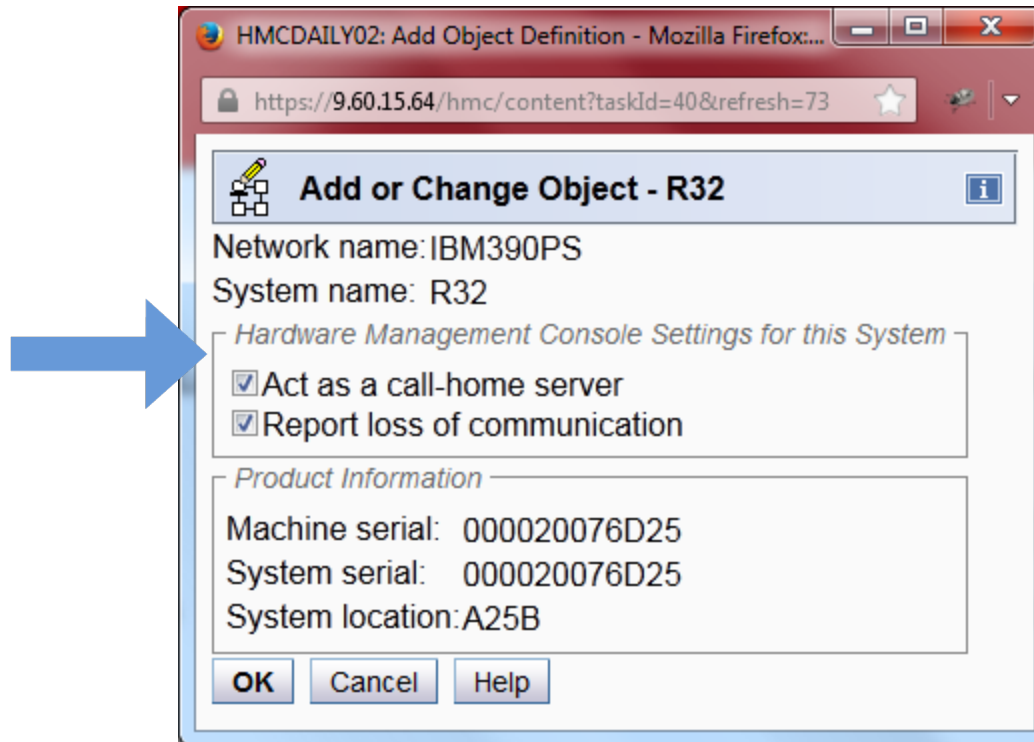
HMC add/remove CPC object

- **CPC selected for Add [Remove] Object Definition task**
  - ▶ **After operation confirmation, panel displayed to allow configuration of CPC as a time source if HMC is not configured for NTP**

Monitors Dashboard

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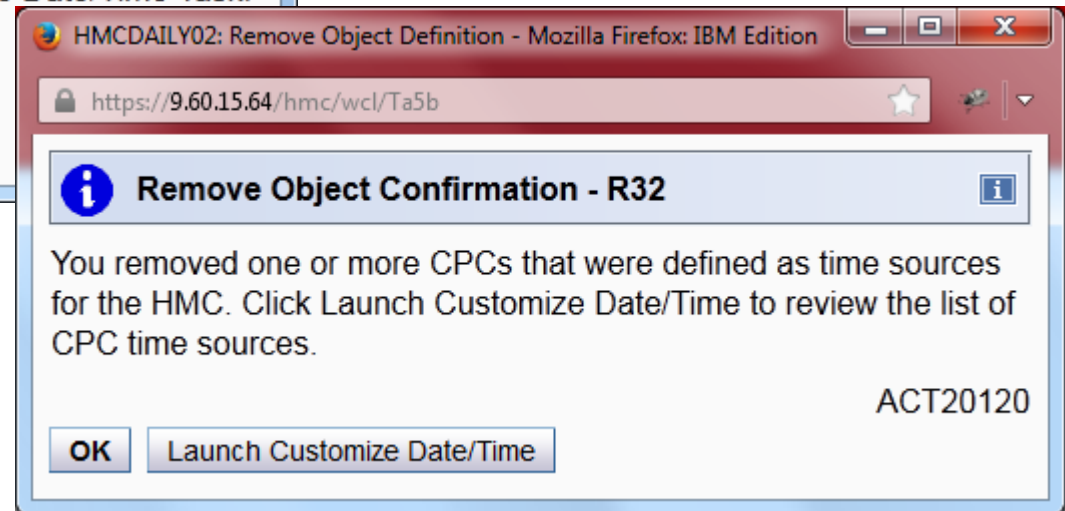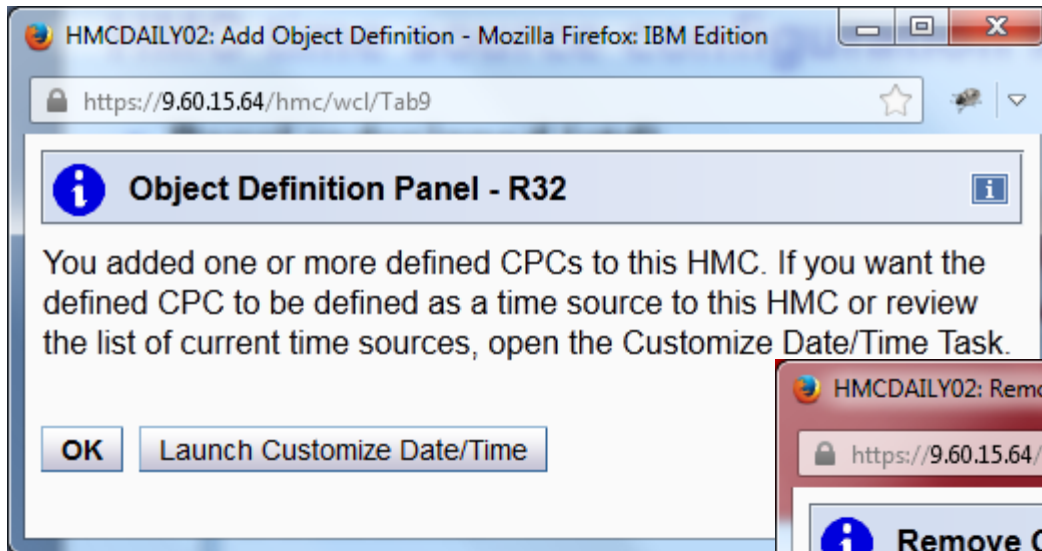
Monitors Dashboard Complete Functionality

- **Monitors Dashboard**

  ▶ **Introduced for z196 as new and improved display of system activity**

- **For z13 drop support for classic SAD and SAD Profiles**

  ▶ **Tasks can still be launched for older systems**

- **Monitors Dashboard enhanced**

  ▶ **Logical partition activity by processor type**

    ● **New fields for z13 system only**

  ▶ **Processor activity by keys**

    ● **Supervisor state and problem state for each key**

    ● **New panel for z13 system only**

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Launching Classic SAD and Profiles

- SAD
- zEC12
- z13
- SAD Profiles
- Detailed Settings for Monitors Dashboard

Logical partition activity by processor type

Logical Partitions

--- Select Action --- ▼   ▼ Filter

Select ∧	Name ∧	All Processor Usage(%)	∧	CP Processor Usage(%)	∧	IFL Processor Usage(%)	∧	ICF Processor Usage(%)	∧	ZIIP Processor Usage(%)	∧
☐	CF01		30		0		0		30		0
☐	LP01		5		0		5		0		0
☐	LP02		26		20		0		0		50

Page 1 of 1   Max Page Size: 100   Total: 3 Filtered: 3 Displayed: 3 Selected: 0

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Processor activity by keys

Iavinjr: Monitors Dashboard - Mozilla Firefox: IBM Edition

9.60.73.65:8080/hmc/content?taskId=6&refresh=14

Processor Usage by Key - S32:IFP48

Key	Total Usage (%)	Supervisor State Usage (%)	Problem State Usage (%)
0	2	1	1
1	0	0	0
2	0	0	0
3	0	0	0
4	0	0	0
5	0	0	0
6	0	0	0
7	0	0	0
8	1	1	0
9	0	0	0
A	0	0	0
B	0	0	0
C	0	0	0
D	0	0	0
E	0	0	0
F	0	0	0

Total: 16

Close   Help

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Trusting Computing Boot from Media Protection

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Trusted Computing – Boot from Media Protection

- **z Systems Firmware protected on delivery – Digital Signatures**

- **Trusted Computing – protection against subsequent tampering**

- **Boot from removable media disabled on the HMC/SE consoles**

  - ▶ **can be changed via uEFI/BIOS configuration change (IBM SSR action)**

    - • **necessary for tasks that require booting from removable media**
      - – **Engineering Change (EC) Upgrade; Restore of Save/Restore data**
      - – **Hard Disk Restore (including Restore Critical Data)**
      - – **Hard Disk Repair during a Repair and Verify procedure**
      - – **Alternate HMC Preload (HMC only)**

    - • **must be changed back to the default when finished**

    - • **documented in "z Systems Service Guide for HMCs and SEs"**

    - • **helps protect against unauthorized booting from an OS on a bootable removable media device**
      - – **for additional protection, customer can set an admin PW for the uEFI/BIOS**
        - ♦ **If done, SSR will need customer input for above service actions where boot from media needs to be enabled**

Remote Browser Support

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Remote Browser Support

Remote Browser	HMC 2.13.0	HMC 2.12.1	HMC 2.12.0
IE (Internet Explorer)	Version 10 & 11	Version 8, 9, & 10	Version 8 & 9
Firefox	Version 24.8 & 33	Version 17.5 & 21	Version 10
Google Chrome	Version 38	Version 26	Version 20

- Remote Browser Workstation with JAVA 7.x or 8.x to HMC 2.13.0

Remote Browser Support (cont.)

- **Using Java 8.x on remote workstation**

  - ▶ **If connecting to HMC 2.13.0,**
    - ● **If using IP addresses in HMC url**
      - – **Remote Browser connection will work**
        - ♦ **no customization required**
    - ● **If using Hostname in HMC url**
      - – **Create Custom Java Policy on workstation**
        - ♦ **See next chart**

  - ▶ **If connection to HMC 2.12.1/earlier,**
    - ● **Create Custom Java Policy on workstation**
      - – **See next chart**

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Remote Browser Support (cont.)

- **Customization for Java 8.x on remote workstation to HMC 2.12.1**

  1) Create a custom java policy file in the users home directory

  - **Windows:** Save as C:\Users\<username>\.java.policy
  - **Linux:** Save as /home/<username>/.java.policy
  - **Replace <address> with the IP address or hostname of each HMC**
  - **Contents**
    - grant codeBase "https://<address>/-" {
    - permission java.awt.AWTPermission "accessClipboard";
    - permission java.net.SocketPermission "<address>:9960", "connect,resolve";
    - };

  2) Add the following line to the Java deployment preferences file

  - **deployment.security.use.user.home.java.policy=true**
  - **Windows:**
    - C:\Users\<username>\AppData\LocalLow\Sun\Java\Deployment\deployment.properties
  - **Linux:** /home/<username>/.java/deployment/deployment.properties

  3) Close/restart the browser

  ▶ **Note: "accessClipboard" line for "Copy" on Operating System Messages**

  - **Regardless of Java level on workstation**

Task User Experience Direction

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User Experience What's New – Design for Details Tasks

- No more tabs. All fields available in a single scrollable window

- Quickly jump from section to section with the navigation area links

- Collapse or expand sections

User Experience What's New – Immediate Validation

- **Where possible, validation will happen immediately as the user moves from field to field**

- **Immediate validation notifications will be non-intrusive**

- **Allows for faster feedback and smoother experience**

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User Management Dashboard

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IBM z13 task example – User Management

- **Re-engineered user related tasks:**
  - ▶ **Consolidated user related tasks into a new User Management dashboard task**
    - ● **Replaces the following tasks:**
      - – **User Profiles**
      - – **Customize User Controls**
      - – **Password Profiles**
      - – **Manage Enterprise Directory Server Definitions**
      - – **User Templates**
      - – **User ID Patterns**
    - ● **New "consolidation" views available**
      - – **E.g. viewing all tasks and objects permitted for a user**
    - ● **Existing permissions to replaced tasks, in custom user roles, are migrated to allow permission to equivalent function within the User Management dashboard**

Security Enhancements – User Management (cont.)

- **Custom User Role Enhancements**

  ▶ **Permission to custom groups of objects allowed**

    - e.g. Put a subset of "partition" resource objects into a group named "production partitions" and add the group to a custom user role
    - In prior releases, permission to each "partition" resource object had to be added to a custom user role

  ▶ **Permission to a class of resources/objects allowed**

    - e.g. All partitions via object type "LPAR Image"

  ▶ **Permission to resources/objects and tasks in the same role allowed**

    - e.g. Putting the "Activate" task and a specific "partition" resource object in a single custom user role

- **Please reference "Getting Started" scenarios**

  ▶ **Sample scenarios for the new User Management controls**

  ▶ **Located**

    - **Online Helps:** User Management task Help, Select link to "Getting Started"
    - **IBM Knowledge Center:** z Systems, z13, HMC tasks, User Mgmt task, "Getting Started" link
    - **See Next Chart for list of scenarios**

User Management – Getting Started Scenarios

- **Create a new user based on a system default user**

- **Create a single customized role containing all desired task and object permissions**

- **Create a user who authenticates using an LDAP server**

- **Authenticate all employees using an LDAP server**

- **Verify who has permission to a task (for example, the Activate task)**

- **Verify who has access to a specific object**

- **Ensure all users are following your security standards for passwords**

- **Separate system resources between users**

- **Assign the view only variant of a task to a user (for example, the Hardware Messages task)**

- **Modify a user to grant remote access to the console**

- **Create a customized managed object role (similar to the approach available in HMC version 2.12.1)**

- **Create a customized task role (similar to the approach available with HMC version 2.12.1)**

Currently selected navigation icon

Selected navigation icon designation

User Management

Users

Action items

Object summary

Summary for ACSADMIN

ACSADMIN
ADVANCED
ENSADMIN
ENSOPERATOR
OPERATOR
SERVICE
SYSPROG

Object list

Navigation icons

General
Description: Access administrator level user
Last logon: Feb 2, 2015 6:06:06 AM EST
Disabled: No

Collapsible summary sections

Authentication
Authentication type: Local
Password rule: Basic

Roles
Access Administrator Tasks
All System Managed Objects

Groups

Tasks
Activity
Add Object Definition
Archive Security Logs
Audit and Log Management
Block Automatic Licensed Internal Code Change Installation
Certificate Management
Change Object Definition
Configure Backup Settings
Configure Data Replication
Console Default User Settings
Console Messenger
Create Welcome Text
Customize Activity Profiles
Customize API Settings
Customize Automatic Logon
Customize Console Date/Time
Customize Console Services
Customize Network Settings
Customize Product Engineering Access
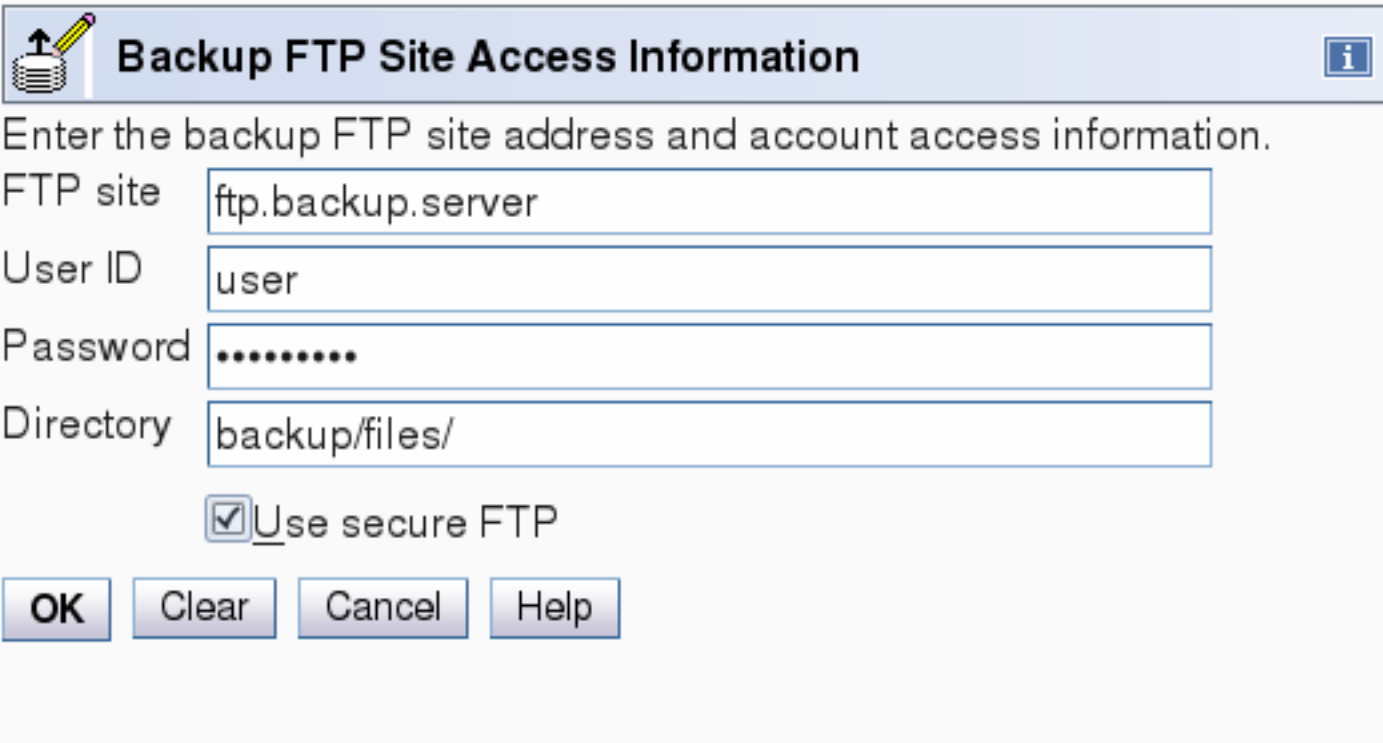
Roles
Patterns
Templates
Passwords
LDAP

Close   Help

User Management – Create New Role: task(s) per object(s)
Activate for LP01

New icon

User Management

Roles — View by: Roles | Objects | Tasks

Summary for Access Administrator Tasks

Users

Roles

Patterns

Templates

Passwords

LDAP

- Access Administrator Tasks
- Advanced Operator Tasks
- All Resources
- All System Managed Objects
- BladeCenter Objects
- CIM Actions
- Defined System Managed Objects
- DPXI50z Blade Objects
- Energy Administrator Tasks
- Ensemble Administrator Tasks
- Ensemble Object
- I/O Adapter Objects
- I/O Administrator Tasks
- IBM Blade Objects
- IBM Blade Virtual Server Objects
- Operator Tasks
- Policy Administrator Tasks

General
Description: Security administrator tasks used to configure and control access to machine resources and tasks
Include all hosted objects: No

Users
ACSADMIN

User Templates

Groups

Tasks
Activity
Add Object Definition
Archive Security Logs
Audit and Log Management
Block Automatic Licensed Internal Code Change Installation
Certificate Management
Change Object Definition
Configure Backup Settings

Close   Help

User Management – New Role wizard

Specify the role name

Select the Activate row in the list of tasks

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User Management – New Role wizard

Select the LP01 row in the list of objects

Click Finish to create the new role

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User Management – dashboard shows the new role

Role summary

Newly created role

User Management

Roles   View by: Roles | Objects | Tasks

Users
Roles
Patterns
Templates
Passwords
LDAP

Access Administrator Tasks
Activate LP01
Advanced Operator Tasks
All Resources
All System Managed Objects
BladeCenter Objects
CIM Actions
Defined System Managed Objects
DPXI50z Blade Objects
Energy Administrator Tasks
Ensemble Administrator Tasks
Ensemble Object
I/O Adapter Objects
I/O Administrator Tasks
IBM Blade Objects
IBM Blade Virtual Server Objects
Operator Tasks
Policy Administrator Tasks
Policy Operator Tasks
Service Representative Tasks
Storage Resource Administrator Tasks
Storage Resource Objects
System Programmer Tasks
Virtual Network Administrator Tasks
Virtual Network Objects
Virtual Server Administrator Tasks
Virtual Server Operator Tasks
Virtual Servers
Workload Administrator Tasks

Summary for Activate LP01

⊟ **General**
Description:
Include all hosted objects: No

⊟ **Users**

⊟ **User Templates**

⊟ **Groups**

⊟ **Tasks**
Activate

⊟ **Object Types**

⊟ **Objects**
D20BUSE:LP01

⊟ **Task Lists**

Close   Help

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User Management – Create New User utilizing new role
Activate for LP01
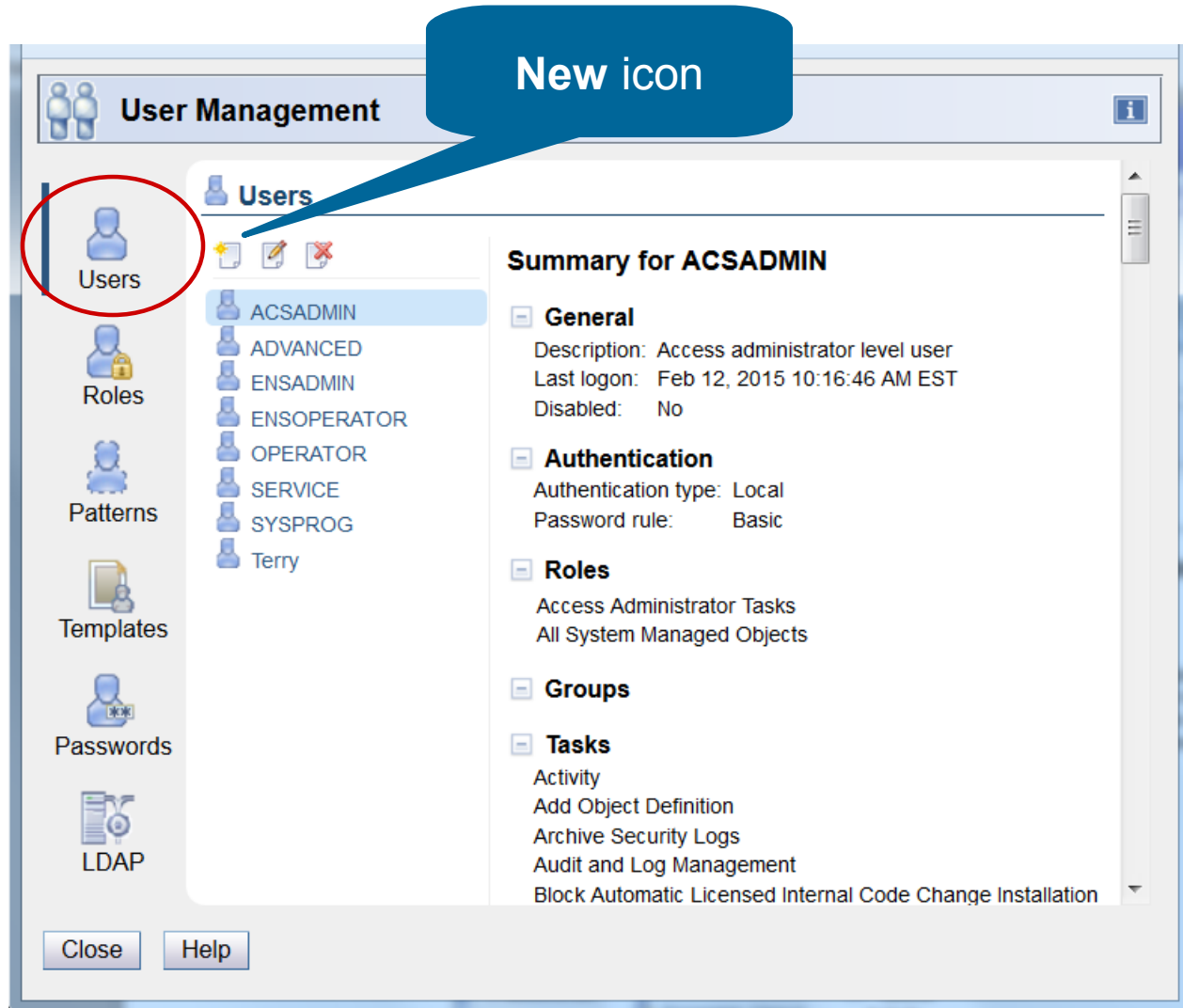
New icon

User Management

Users

Summary for ACSADMIN

ACSADMIN
ADVANCED
ENSADMIN
ENSOPERATOR
OPERATOR
SERVICE
SYSPROG
Terry

General
Description: Access administrator level user
Last logon: Feb 12, 2015 10:16:46 AM EST
Disabled: No

Authentication
Authentication type: Local
Password rule: Basic

Roles
Access Administrator Tasks
All System Managed Objects

Groups

Tasks
Activity
Add Object Definition
Archive Security Logs
Audit and Log Management
Block Automatic Licensed Internal Code Change Installation

Users
Roles
Patterns
Templates
Passwords
LDAP

Close   Help

User Management – New User wizard

Specify the user name

Specify your desired authentication method

User Management – New User wizard

Select the Activate LP01 role

Click Finish to create the new user

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User Management – dashboard shows the new user

Newly created user

Specifies the role assigned to John

Indicates the resultant task and object that John is granted permission by the assigned role

Security Auditing Enhancements

Security Enhancements – Security Auditing

- **Audit, Security and Console Event Log Enhancements**
  - ▶ **Information about the "logged on" user responsible for the entry being added to the audit log, security log or console event log is recorded and displayed**
    - ● **includes:**
      - – **user name**
      - – **unique non-repeatable ID (UUID) for the user**
      - – **what HMC the user logged on**
      - – **the session ID associated with the logon**
      - – **whether the logon was via the UI or via Web Services APIs**
    - ● **Shown on the details of a log entry**
  - ▶ **The text of the entries being logged has not been changed**
    - ● **the "logged on" user information is added to each log entry alongside the text**

Security Enhancements – Security Auditing (cont.)

- **Below is a screen capture of the View Security Logs task with the new "User" column**

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Security Enhancements – Security Auditing (cont.)

- **View when "Authentication Data" button pressed on previous screen shot**

HMCDAILY02: View Security Logs - Mozilla Firefox: IBM Edition

https://9.60.15.64/hmc/wcl/T207

Authentication Data

User: ACSADMIN

UUID: d5f18640-2e4a-11e3-bfaa-e8b2331d5994

Console name: HMCDAILY02

Console type: 7327

Console model: PAA

Console serial: KQ2H710

Session ID: 4

Session type: UI

Security Event
User acsadmin has logged on from location adminib-0jovlr9.endicott.ibm.com [9.60.92.186] to session id 4. The user's maximum role is "Access Administrator Tasks".

OK

Log Consumability

HMC/SE   XML (Log Data)   User Program

- **Console generates XML document (Audit and Log Management)**
  - ▶ **Console Events (including Tasks Performed), Audit, and Security logs**
  - ▶ **Each log message is tagged with a documented identifier**
- **Users create parser programs to monitor for logs in the XML**
  - ▶ **XML Schema defines form**
  - ▶ **Event Message Documentation defines possible logs, their identifiers, and substitution variables descriptions**

Log Consumability – Example Use Case

- **Monitor for user "bob" logging on console**

- **Message #1409 - User *{0}* has *{1}* from session id *{2}* for the reason: *{3}***

Substitution variables are:

· *{0}* **User name**

· *{1}* **'logged off' or 'disconnected'**

· *{2}* **Logon session identifier**

· *{3}* **Reason why the session was logged off or disconnected**

- **Parser searches for event id "1409" with first subvar "bob"**

Log Consumability – Offload Logs for Parsing

- **Audit and Log Management task or scheduled operation**

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Log Consumability – Message Documentation

- **Messages documented in Online Help and Knowledge Center**

  - ▶ **Introduction section of the Help Table of Contents**

- **XML schema file available from IBM Resource Link**

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Other IBM z13 HMC/SE support

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Other HMC/SE Support

▶ **SMT - Simultaneous MultiThreading**

▶ **Crypto Enhancements**

- **New Crypto Card - Crypto Express5S (CEX5S)**
- **Increase of 16 domains to 85 domains**
  - **New panels controls => look/feel**
  - **New conflict analysis support for**
    - ♦ **Crypto/LPAR/Domain Index assignment**

▶ **I/O Enhancements**

- **FCP "SAN Explorer" option under SE Problem Determination task**
- **Sharing support for RoCE**
- **New Hardware support**
  - **FICON Express 16s**
  - **IBM Integrated Coupling Adapter Short Range (ICA SR)**

Additional RSF Infrastructure Changes

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HMC 2.12.1 - RSF Infrastructure Changes

▶ **Introduction of <u>enhanced IBM Support System</u>** for RSF (Remote Support Facility) call-home

- Modernizing IBM support infrastructure for **capacity and reliability**
- Scope of supported functions in HMC 2.12.1 limited to:
  - Problem Management (report, transmit service data, problem close via repair
  - Transmit System Availability Data (scheduled operation)
  - Transmit VPD
  - Functionally equivalent to traditional IBM Service infrastructure

▶ Enhanced IBM support system used when requesting system and HMC are both at 2.12.1

▶ *Traditional IBM support system* used <u>as backup</u> during migration period

▶ Enhanced Infrastructure always attempted first if possible

▶ Currently Enhanced and Traditional support have equivalent functionality for supported functions

▶ Fix and eBoD (eBusiness on Demand) RSF functionality continues to use Traditional IBM support system

HMC 2.13.0 – Additional RSF Infrastructure Changes

▶ **Continuation of <u>enhanced IBM Support System</u>** for RSF (Remote Support Facility)

- Same value proposition as was for HMC 2.12.1
- Scope of supported functions in HMC 2.13.0 limited to:
  - eBoD support
    - Support for all Capacity on Demand records that may be ordered from Resource Link (CIU Permanent, On/Off CoD, CPE, CBU)
  - Fix delivery
    - Full fix deliverable capabilities
    - SE "Clone"
  - PMV (Problem Management Viewable) update support

▶ Enhanced IBM support system used when requesting system and HMC are both at 2.13.0

▶ *Traditional IBM support system* used <u>as backup</u> during migration period

▶ Enhanced Infrastructure always attempted first if possible

▶ Currently Enhanced and Traditional support have equivalent functionality for supported functions

▶ See Backup Section charts => configuration changes for Enhanced RSF infrastructure

- Next chart: New addresses added since zEC12 GA2 time frame
  - applies to z13/zEC12 Enhanced & all systems Traditional RSF

Potential firewall changes required

If using ipv4, outbound connectivity must permitted to port 443 to the following destinations:

129.42.26.224 (traditional)

129.42.34.224 (traditional)

129.42.42.224 (traditional)

129.42.50.224 (traditional) **NEW**

129.42.56.189 (enhanced)

129.42.58.189 (enhanced)

129.42.60.189 (enhanced)

129.42.54.189 (enhanced) **NEW**

If using ipv6, outbound connectivity must permitted to port 443 to the following destinations:

2620:0:6c0:1::1000

2620:0:6c1:1::1000

2620:0:6c2:1::1000

2620:0:6c4:1::1000 **NEW**

2620:0:6c0:200:129:42:56:189 (enhanced)

2620:0:6c1:200:129:42:58:189 (enhanced)

2620:0:6c2:200:129:42:60:189 (enhanced)

2620:0:6c4:200:129:42:54:189 (enhanced) **NEW**

If using an SSL Proxy, and plan for it to resolve host names, it must accept the following host names:

www-945.ibm.com (traditional)

esupport.ibm.com   (enhanced)

Statements of Direction

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IBM z Systems January 14, 2015 Announcement

▶ **HMC Statements of Direction**

● **Removal of support for Classic Style User Interface on the Hardware Management Console and Support Element:**

 – **The IBM z13 will be the last z Systems server to support Classic Style User Interface. In the future, user interface enhancements will be focused on the Tree Style User Interface.**

● **Removal of support for the Hardware Management Console Common Infrastructure Model (CIM) Management Interface:**

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

▶ **Complete January 14, 2015 announcement:**

● **http://www-03.ibm.com/systems/z/announcement.html**

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HMC SE TKE Main UI Timeline
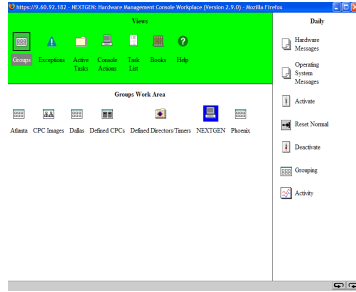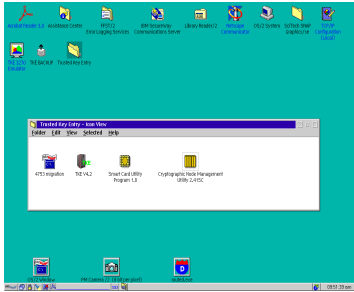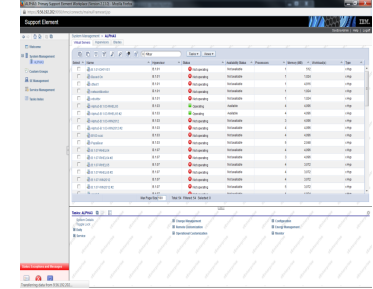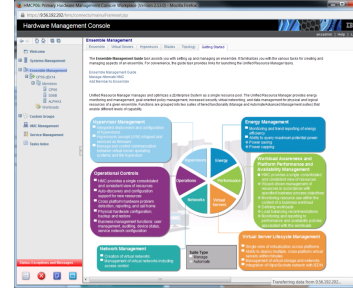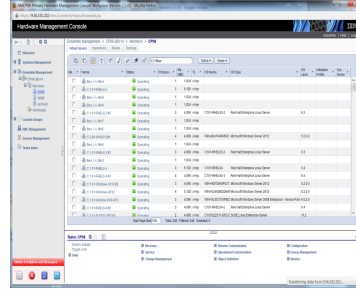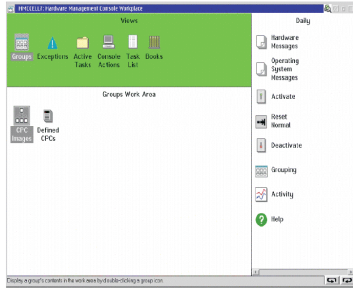
● 1992
Local Console
HMC/SE/TKE

● 2005
Web Based
HMC Tree & Classic
SE Tree & Classic
TKE Tree-Only

● 2010
zManager
Tree
Enhancements

● 2015
zBX SE Tree-Only

Tree UI Advantages

Easier Navigation and Discovery	Objects and tasks are easier to find with fewer views and clicks required.	Hierarchical Tree Style Navigation Topology Views Powerful Sorting and Quick Filtering Context Sensitive Task Menus Tasks Index Bread Crumbs Home Page Selection Back and Forward Navigation Resource Tabs Collapsible Views Easy Selection of Objects
More Information in Primary Views	Object properties and status are displayed in primary views.	Detailed Status Overview Aggregated Status Bar Object Properties, Status, and Metrics Object Hyperlinks to Details Customizable Tasks Pad Task Descriptions and Favorites Links to On-line Libraries and Tutorials Table Data Export

Thank you for your time and consideration….

Brian Valentine

HMC/SE Team

Contact for any Questions:

Brian Valentine, (607) 429-4382, bdvalent@us.ibm.com

Other SHARE Sessions of Related Interest

- August 11th, 11:15 AM – 12:15 PM
  - **17434**: *The New IBM z13 Part 1: Processor Design, Server Structure, z/Architecture Enhancements, and Operating System Support*
- August 11th, 1:45 – 2:45 PM
  - **17435**: *The New IBM z13 Part 2: Crypto, I/O Design, Features, and Functions, Parallel Sysplex and Implementation Planning*
- August 11th, 3:15 – 4:15 PM
  - **17705**: *Connect the Dots: a z13 and z/OS Dispatching Update*
- August 12th, 8:30 – 9:30 AM
  - **17436:** *Top Ten Things You Should be Doing on Your HMC but You're Not*
- August 13th, 3:15 – 4:15 PM
  - **17414**: *How to Make the Most out of BCPii with z/OS 2.2 updates*

Backup
Additional IBM z13 HMC/SE Features

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SMT
(Simultaneous MultiThreading)

Simultaneous MultiThreading

- **All threads on a given core will be of the same processor type**
  - **IBM z13 GA1**
    - **SMT support for IFLs, zIIPs**
      - **ICFs supported for CF running as a zVM Guest2**
    - **Not currently supported:**
      - **CPs, SAPs, ICFs for a CF running in a base LPAR**
- **All LPARs come up single-threaded at IPL**
  - **Operating System must "opt-in" to using threads**
- **HMC/SE controls limited to Core only basis**
  - **Capacity on Demand (On/Off CoD, CBU)**
  - **Image Profiles**
  - **Deconfigure/add of logical processors**
    - **Logical processors added in groups of 2 (one core, 2 LPs)**
  - **Mgmt of processor weights for shared partitions**

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Monitors Dashboard

- **New columns for processors for SMT**
    - **Per-thread usage**
    - **"SMT" usage, showing how often SMT is really exploited**

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Crypto Enhancements

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IBM z13 Crypto Support - General

- **Hardware**

  - ▶ **New Crypto Card - Crypto Express5S (CEX5S)**
    - New Crypto ASIC
      - – Consolidate functions
      - – Latest technology
      - – New / more cryptographic Engines
    - Performance improvements
    - New functions
    - Supports 3 Configuration modes
      - – Accelerator, CCA Coprocessor and EP11 Coprocessor

IBM z13 Crypto Support – General

- **Number of usage and control domains increasing from 16**
  - ▶ **Increasing to 85 for z13**
  - ▶ **HMC/SE task changes**
    - Activation profiles
    - Change LPAR Crypto Controls
    - View LPAR Crypto Controls
      - – Also enhanced to identify conflicting crypto id / domain assignments
    - Usage Domain Zeroize

- **Number of supported crypto adapters remains at 16**

Crypto Express5S as viewed under the CPC

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Crypto Express5S as viewed in the LPAR

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Crypto Express5S on the Crypto Configuration task

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Customize Image profile

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Customize Image profile – edit, remove, add

Change LPAR Crypto controls

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Change LPAR Crypto controls – edit, remove, add

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View LPAR Crypto controls – no conflicts identified

S32: View LPAR Cryptographic Controls

View LPAR Cryptographic Controls - S32

Installed Crypto Express4S: NONE

Installed Crypto Express5S: 04 05

Cryptographic Candidates

Partition	Active	Crypto Numbers	Conflicts
LP08	Yes	0-7	
LP09	Yes	0-7	
LP11	Yes	0-9	
LP14	Yes	0-15	
LP15	No		
LX1	No		

Usage Domain Indexes

Partition	Active	Indexes	Conflicts
LP08	Yes	0	
LP09	Yes	1	
LP11	Yes	3	
LP14	Yes	4	
LP15	No		
LX1	No		

Summary

CF02
LP08
LP09
LP11
LP14

Close   Refresh   Help

View LPAR Crypto controls – with conflicts identified

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View LPAR Crypto controls – with conflicts identified

S32: View LPAR Cryptographic Controls

View LPAR Cryptographic Controls - S32

Installed Crypto Express4S: NONE
Installed Crypto Express5S: 04 05
⚠ Conflicts exist, please see Conflicts below.

Summary

| CF02 |
| LP08 |
| LP11 |
| LP14 |

Cryptographic Candidates

Partition	Active	Crypto Numbers	Conflicts
LP08	Yes	0-7	View
LP09	No	0-7	View
LP11	Yes	0-9	
LP14	Yes	0-15	
LP15	No		
LX1	No		

Usage Domain Indexes

Partition	Active	Indexes
LP08	Yes	0
LP09	No	0-1
LP11	Yes	3
LP14	Yes	4
LP15	No	
LX1	No	

Close   Refresh   Help

S32: View LPAR Conflicts

Conflicts - LP09

Crypto numbers in conflict: 0-7
Usage domains in conflict: 0

Conflicts

Partition	Crypto Number	Domain Index
LP08	0-7	0

Close   Help

I/O Enhancements

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SAN Explorer for FCP (Fiber Channel Protocol)

- **Enhances channel problem determination abilities**

  ► **FCP only**

  ► **No active operating system required.**

  ► **SAN discovery performed by**

    ● **New option "SAN Explorer" under the SE Channel Problem Determination task**

  ► **Data provided:**

    ● **Device number, WWPN, assigned FC-ID**
    ● **All the remote ports available to this initiators zone.**
    ● **Inquiry information and or RNID data**
    ● **For each remote N-Port the Report LUN's data.**
    ● **LESB**
    ● **Test Unit Ready response**
    ● **Echo**
    ● **FC trace route and FC Ping**

SAN Explorer for FCP - Devices

CP16: Channel Problem Determination - Mozilla Firefox: IBM Edition

9.56.194.241:8080/hmc/content?taskId=14&refresh=37

SAN Explorer - PCHID0514

CSS.CHPID:	0.8A	PCHID:	0514
Partition ID:	0	MIF image ID:	1

NPIV: Disabled   Physical port WWPN: C05076FFFC005141   Physical port FC-ID: E10400

Devices

--- Select Action --- ▼   Filter

Select ^	Device Number ^	World Wide Port Name ^	FC-ID ^
●	5140	C05076FFFC005141	E10400
○	5141	C05076FFFC005141	E10400
○	5142	C05076FFFC005141	E10400
○	5143	C05076FFFC005141	E10400
○	5144	C05076FFFC005141	E10400
○	5145	C05076FFFC005141	E10400
○	5146	C05076FFFC005141	E10400
○	5147	C05076FFFC005141	E10400
○	5148	C05076FFFC005141	E10400
○	5149	C05076FFFC005141	E10400
○	514A	C05076FFFC005141	E10400
○	514B	C05076FFFC005141	E10400
○	514C	C05076FFFC005141	E10400
○	514D	C05076FFFC005141	E10400
○	514E	C05076FFFC005141	E10400
○	514F	C05076FFFC005141	E10400

Page 1 of 1   Total: 16   Filtered: 16   Displayed: 16

Close   Refresh

SAN Explorer for FCP – Zone Data

CP16: Channel Problem Determination - Mozilla Firefox: IBM Edition

9.56.194.241:8080/hmc/content?taskId=14&refresh=39

SAN Explorer - Zone Data - PCHID0514

CSS.CHPID:	0.8A	PCHID:	0514
Partition ID:	0	MIF image ID:	1
NPIV:	Disabled	Physical WWPN:	C05076FFFC005141	Physical FCID:	E10400
Device number:	514C	Logical WWPN:	C05076FFFC005141	Logical FCID:	E10400

Zones

--- Select Action ---   Filter

Select	World Wide Port Name	FC-ID	Manufacturer	Type/Model	Sequence number	Plant	Tag	World Wide Node Name	Symbolic Port Name
●	C05076FFFC005141	E10400						5005076400C57488	IBM 2827 020000000574 88 PCHID: 0514
○	5005076304014739	E36100	IBM	002107/922	0000000CLTZ1	75	0011	5005076304FFC739	
○	50000972C00B411C	E37800						50000972C00B4000	SYMMETRIX::0001949 00720::SAF- 8eA::F C::5876_251::EMUL B80F0000 40E32A8B 94555C 09.03.13 09 :36�
○	50060E8005430E5E	E39800						50060E8005430E5E	
○	50050763081386D0	E3A600	IBM	002107/951	0000000LX521	75	0232	5005076308FFC6D0	
○	500507630813C6D0	E3A700	IBM	002107/951	0000000LX521	75	0233	5005076308FFC6D0	
○	50050763081806D0	E3A800	IBM	002107/951	0000000LX521	75	0300	5005076308FFC6D0	
○	50050763081846D0	E3A900	IBM	002107/951	0000000LX521	75	0301	5005076308FFC6D0	
○	50050763081886D0	E3AA00	IBM	002107/951	0000000LX521	75	0302	5005076308FFC6D0	
○	500507630818C6D0	E3AB00	IBM	002107/951	0000000LX521	75	0303	5005076308FFC6D0	
○	C05076FFFC005351	E3D700	IBM	002827/H20	000000057488	02	F09B	5005076400C57488	IBM 2827 020000000574 88 PCHID: 0535
○	5005076801404DAA	E3E000						5005076801004DAA	

Page 1 of 1	Total: 12 Filtered: 12 Displayed: 12

Close   Refresh

SAN Explorer for FCP – Remote N_Port - LUNs

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SAN Explorer for FCP – Remote N_Port – Node ID

SAN Explorer for FCP – LUN Details

CP16: Channel Problem Determination - Mozilla Firefox: IBM Edition

9.56.194.241:8080/hmc/content?taskId=18&refresh=54

SAN Explorer - LUN Details - PCHID0514

Local Port

CSS.CHPID:	0.8A	PCHID:	0514
Partition ID:	0	MIF image ID:	1

NPIV:	Disabled	Physical WWPN:	C05076FFFC005141	Physical FCID:	E10400
Device number:	5140	Logical WWPN:	C05076FFFC005141	Logical FCID:	E10400

Remote Port

WWPN: 5005076304014739   FCID: E36100   Symbolic Port Name:

Logical Unit

LUN: 4010409000000000   UUID:

Inquiry | **Test Unit Ready** | **Extended Inquiry** | **Read Capacity**

```
Standard Inquiry:
 PQual=0  Device_type=0  RMB=0  Version=0x5  [SPC-3]
 [AERC=0]  NormACA=1  HiSup=1  Response_data_format=2
 SCCS=0  ACC=0  TPGS=1  3PC=0  Protect=0
 [BQue=0]  EncServ=0  VS=0  MultiP=1  [MChngr=0]  Addr16=0
 [RelAdr=0]  WBUS16=0  SYNC=0  [Linked=0]  CmdQue=1

Peripheral Device Type: disk
Vendor Identification: IBM
Product Identification: 2107900
Product Revision Level: 36.5

Raw Inquriy Data:
0000: 00000532 9F101002 49424D20 20202020
0010: 32313037 39303020 20202020 20202020
0020: 33362E35 3735434C 545A3131 30393020
0030: 20202020 20202020 00600DA0 0A000300
```

Close   **Refresh**

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SR-IOV for 10 Gbps RoCE

- ## RoCE

  - ### Shareable by up to 31 LPARs

    - Shared using SR/IOV framework
    - Up to 31 Function IDs (FIDs) per PCHID
      - These FIDs can be assigned to customer LPAR

  - ### More on FIDs

    - FIDs => unique across the CEC
    - FIDs => can be configured to only on LPAR at a time
      - CSS.CHPIDs can be configured to multiple LPARs

  - ### Sample IOCDS

    - Function FID=B2,PCHID=5F8,VF=1,PART=((VMALT1),(VMALT1,VMALT2))
    - Function FID=B3,PCHID=5F8,VF=2,PART=((VMALT1),(VMALT1,VMALT2))
    - Function FID=B4,PCHID=5F8,VF=3,PART=((VMALT1),(VMALT1,VMALT2))

  - ### Notes on Sample

    - FIDs can be configured to VMALT1 or VMALT2
    - Currently configured to VMALT1

SR-IOV for 10 Gbps RoCE

• Two shared FIDs

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New Channels

- **FICON Express 16s**

  ▶ **No significant changes to HMC/SE**

    ● **Except new PCHID icon**

    ● **All other functionality same as FICON Express 8S**

- **IBM Intergrated Coupling Adapter Short Range (ICA SR)**

  ▶ **New high speed coupling channel**

    ● **No significant changes to HMC/SE**

      – **Except new Channel type**

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Alternative to USB Flash Drive Details

Configure the FTP backup server

- **The backup FTP server must be configured before you can select it as an alternative to USB**

  ▶ **There is a new task called Configure Backup Settings.**

    ● **You need the following information to configure the FTP server:**
      – **IP Address / Name**
      – **User ID**
      – **Password**
      – **Backup directory (where the backup files will be stored)**

Configure Backup Settings -- screen shots

Configure Backup Settings -- screen shots

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Backup for HMC

- **Once the user selects the Backup Critical Console Data task, the following windows are displayed:**

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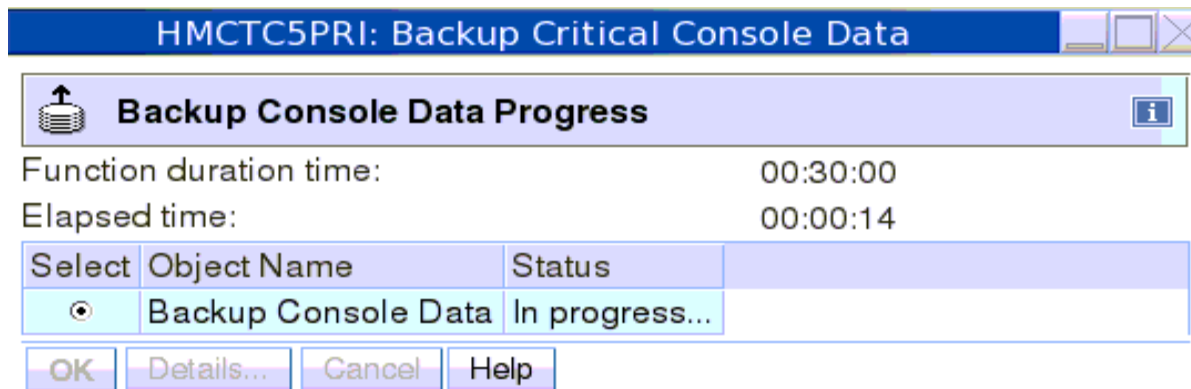
Backup for IBM z13 & zBX Node SE

- **The SE no longer supports backing up to removable media**

  - ▶ **Users now will have the option to backup to:**
    - ● **Primary and Alternate SE Hard Drives**
    - ● **Primary SE, Alternate SE, and FTP server**
    - ● **We will maintain backing up to USB only for Legacy SEs (z196 & previous).**

  - ▶ **If the FTP server information has not been added to the Configure Backup Settings, then users cannot backup to the FTP server.**

  - ▶ **The same support has also been implemented for SE backups created via Scheduled Operation.**

Backup for SE – IBM z13/zBX Mod 004

- **The user selects the Backup Critical Data task for zBX/ IBM z13 systems**

Backup Critical Data Confirmation

Select the destination for each node's backup.

Select	Name	Backup Destination
○	P00ZFX07	Primary and Alternate SE
○	S32	Primary and Alternate SE
○	ZBX51	Primary SE, Alternate SE, and FTP Server

Primary and Alternate SE
Primary SE, Alternate SE, and FTP Server

OK   Cancel   He

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Backup for SE – Legacy Systems

- **The user selects the Backup Critical Data task for Legacy systems – only USB**

Backup Critical Data Confirmation

Ensure that a formatted USB flash memory drive, with label ACTBKP, is inserted.

Select	Name	Backup Destination	
○	MP13	USB	
○	R32	USB	

[OK] [Cancel] [Help]

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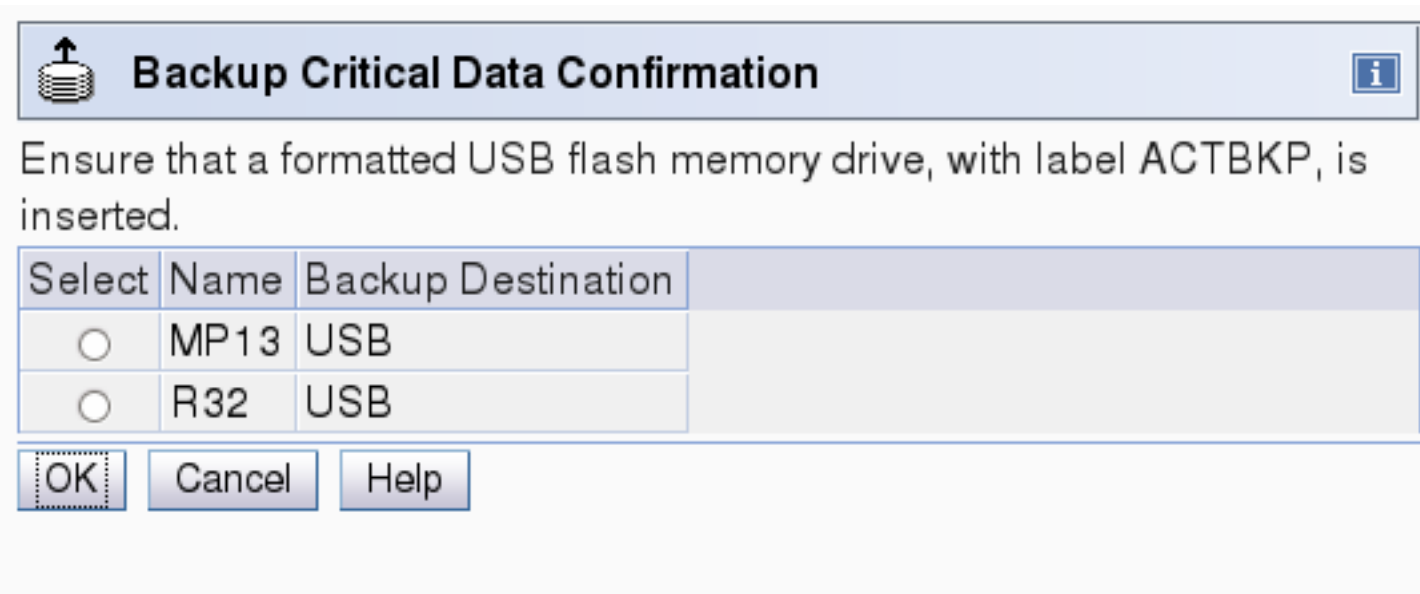
Hard Disk Restore for IBM z13 HMC, SE, TKE

- **Hard Disk Restore => IBM Service action**

- **If customer doesn't use FTP option as only backup option,**
  - ▶ **Remains IBM Service action with no input from customer**

- **If data for Hard Disk Restore will come from FTP Server,**
  - ▶ **Customer will need to work with IBM SSR to provide input for FTP Server access**

Security Log
UUID Details

Security Enhancements – UUID Details

▶ **Unique in time ID (UUID) associated with every user**

- ● **Helps distinguish between user IDs created with the same name at different times**
  - – **e.g. User "Sally" is deleted and 6 months later a new user "Sally" is created.**
  - – **recorded in security and audit logs**

Security Enhancements – Security Auditing (cont.)

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RSF
Infrastructure Changes Requirements Details

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DNS resolution of addressing to enhanced IBM Support structure

DNS host name resolution is required for connectivity to the Enhanced IBM infrastructure.

- ▶ If RSF connection <u>is not</u> configured to use an SSL Proxy Server
  - Network Settings on call-home HMCs must include DNS configuration
  - Recommend a backup DNS for reliability
- ▶ If RSF connection <u>uses</u> an SSL Proxy Server, customer has choice where the ip address resolution is done:
  - Can be resolved on HMC, using Network Settings on HMC
  - Can be resolved at SSL Proxy, if Proxy has DNS available

Note: Use of hostnames usage facilitates dynamic management of redundant servers.

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Customize Outbound Connectivity Panel: Proxy usage

Outbound Connectivity Settings

☑ Enable the local console as a call-home server

Configure Internet Options

Indicates if proxy required to connect to the internet, and how to reach it

☑ Use SSL Proxy Connection to Internet
Address: * 9.60.14.42
Port: * 3128

Resolve setting dictates whether hostnames or ip addresses passed to SSL Proxy

☐ Resolve IBM IP addresses on console
☐ Use SSL Proxy Authentication
User: *
Password: *
Confirm Password: *

✓ if checked, DNS is required on HMC

Internet Protocol* IPv4

❑ if unchecked, DNS is required from SSL Proxy

Test...

OK   Cancel   Help

Network Setting customized on HMC for DNS

- **Name Services is defined using Customize Network Settings Task**
- **Select DNS enabled**
- **One or more DNS Servers must be defined in search order**
  - **Recommendation that at least 2 be defined to avoid single point of failure**
- **Domain Suffix Search Order is not used by RSF, can be configured for other reasons**
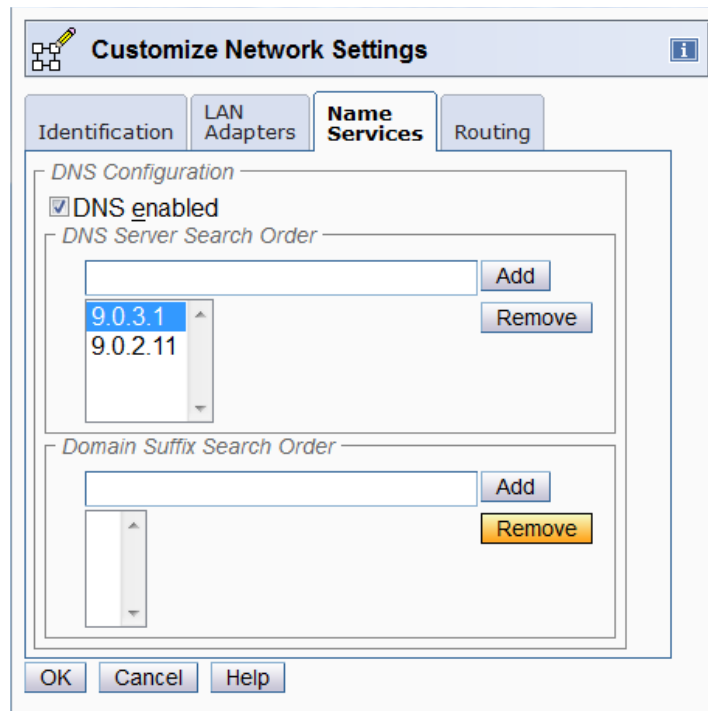
RSF Infrastructure Changes Summary

▶ "Enhanced", IBM infrastructure

- Outside of initial setup, functionality is equivalent and transparent

▶ Depending on your current installation, there may be changes required to exploit this:

- DNS enablement
- Additional firewall rules

▶ Currently dual support is available, but IBM recommends you make changes to enable this now.

▶ Full description for RSF setup can be found in:

- **SC28-6927-01**: *zEnterprise System Integrating the Hardware Management Console's Broadband Remote Support Facility into your Enterprise*

Backup
zBX Mod 004

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Introduction/Benefits

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Introduction

▶ zBX Node Infrastructure

- Improve flexibility and scale-out by eliminating 1-1 coupling with a CPC
- Support customer investment in current BladeCenter- H technology
- Provide CEC only upgrades to IBM z13
  - ♦ Migrate zBX Mod 002/003 to BCH Node
  - ♦ Eliminates CEC/zBX Upgrade complexities
- Continue to offer advanced virtualization management as well as integrated hardware management via zManager-based management

Introduction (cont.)

- **zBX Node: Decouple zBX from CPC**
  - zBX Rack(s) plus Redundant 1U SEs
- **Provide same zBX values**
  - Full z Systems Integration with Concurrency, Security, Automatic Discovery and Configuration
  - Change Mgmt, Serviceability Mgmt (Problem Reporting and Repair),
  - Virtual Server Life Cycle Mgmt, Platform Performance Mgmt
  - Unified Resource Manager value add
    - **Ensemble Mgmt of Virtualized Set of Resource**
- **Also, includes same Networking value**
  - Intra Ensemble Data Network
  - Intra Node Management Network
- zBX already separate Machine Type Model for Service Warranty
- zBX is just another node in the Ensemble
  - z Systems CPCs connect to zBX as today when zBX is shared by multiple CPCs
    - zBX Node simply no longer has a CPC owner
- New rules for Ensemble node maximum

zEC12 Ensemble

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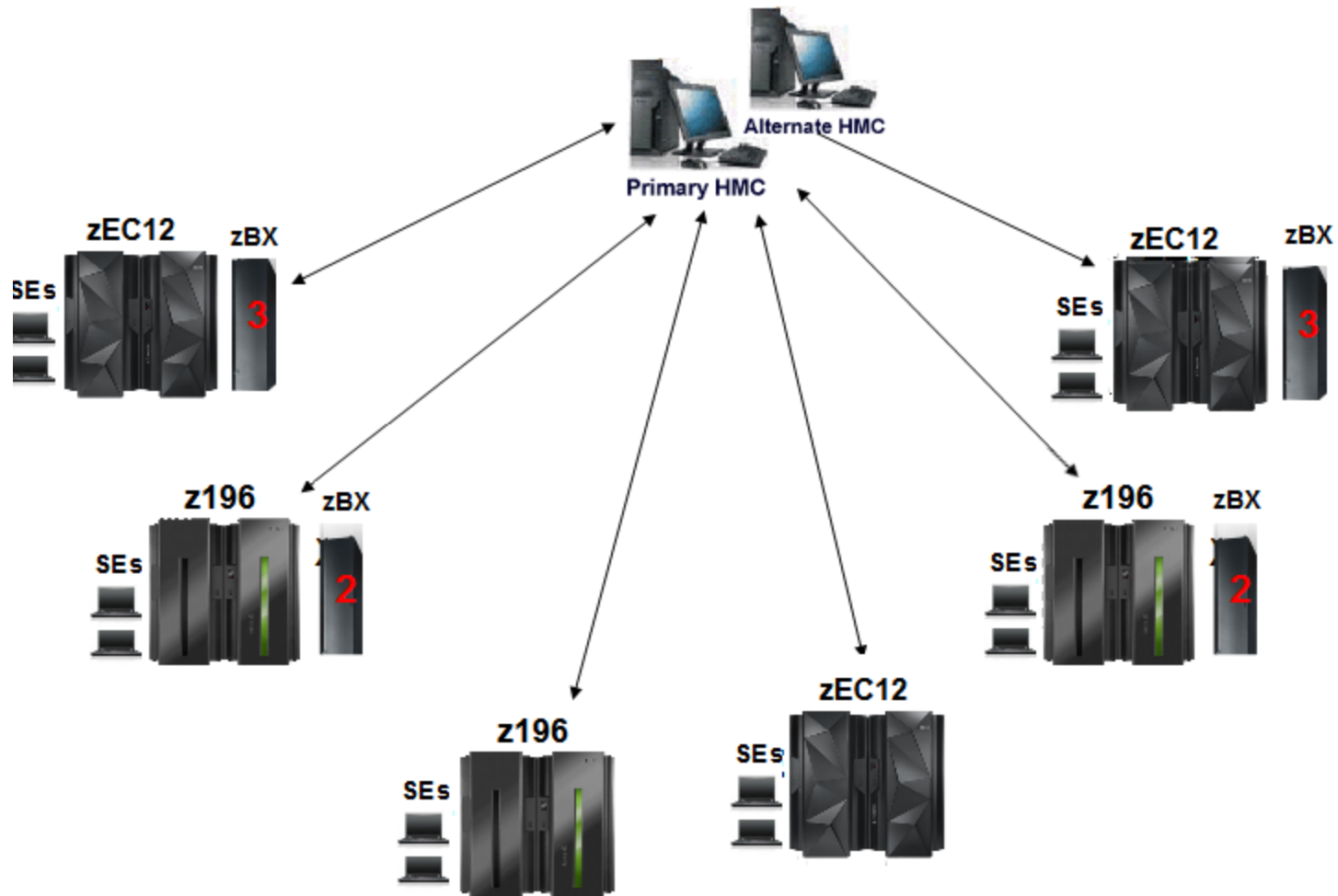
IBM z13 & zBX Node Ensemble

Alternate HMC

Primary HMC

zBX

SEs

4

zEC12 **zBX**

SEs

3

IBM z13

z196 **zBX**

SEs

2

SEs

- **IBM z13 will never own a zBX!**

zEC12

SEs

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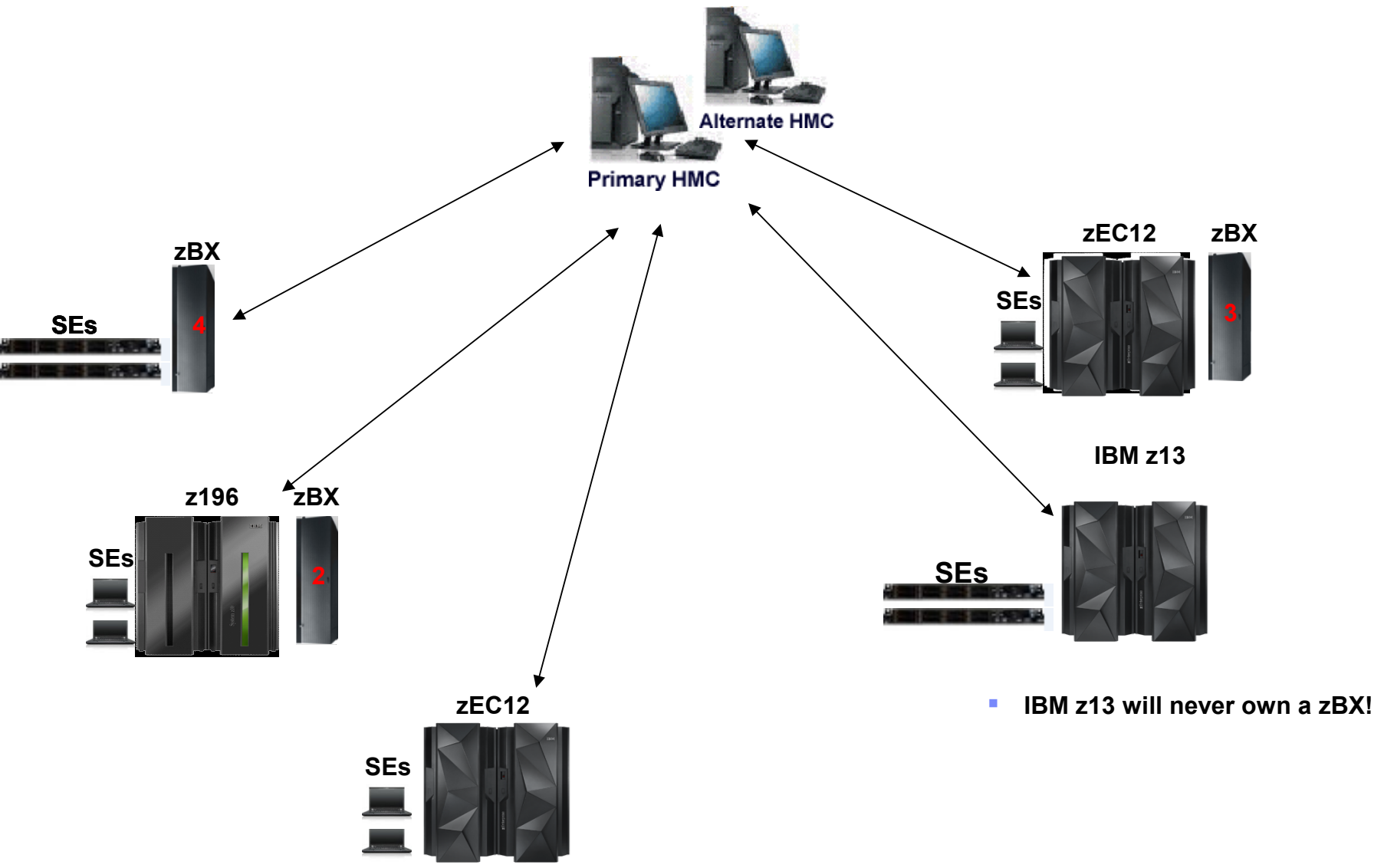
Model 004 Upgrade

Customer Benefit:

➢Firmware Updates and Service Activity Not Linked to the CEC
➢zBX May Be Moved Beyond 25 Feet from CEC
➢Lifecycle Updates (Datapower 7.0 and Latest Fix Releases)
➢May Participate in an Ensemble with z196/z114, zEC12/zBC12, z13 EC servers
➢Investment Protection including blades, DataPower and zManager

How:

➢Install two Support Elements and Cabling
➢Carry Forward Current Infrastructure and Blades
➢Install Model 004 Firmware

What is Available for Model 004:

➢MES Upgrade From a Model 002 or Model 003 to a Model 004
➢Code Updates: Entitlement Increases, DP Features, QoS
➢After Upgrade DP Moves from Model 002/003 to Model 004
➢HW Features: Optics, Top Exit and Doors (Acoustic/Cooling)

What is Not Available for Model 004:

➢Adding Chassis to the Model 002 and 003 during upgrade
➢Adding Chassis to the Model 004 after upgrade
➢Moving DP Blades from another zBX during the upgrade

Special Note:

❑Upgrade does Not Require a IBM z13

Hardware Setup

- ▶ zBX Node
  - Take current fully redundant hardware zBX with CPC and remove CPC
  - Add Two SEs (Support Elements) into zBX
    - Redundant 1U System x Servers (3550 M4, Ivy Bridge processor)
      - ♦ AC powered versus the DC powered ones used for CPC
    - Redundant 1U RackMount Display/Keyboard
      - ♦ Slideout Keyboard/Display (7316-TF3 Display/Keyboard)
      - ♦ Intended for SSR or PE only use
      - ♦ Customer physical console access via HMC
  - Same as CPC, HMC must be at Code Release level >= zBX Node SE
    - Must meet HMC HW requirements for that HMC release level

- ▶ Blade maximums
  - System x: 56
  - Power: 112
  - DataPower: 28

General Information

- **Ensemble rules**
  - ▶ **Up to 16 members**
    - ● **1 - 8 CPC**
    - ● **0 - 8 zBX Model 002 / 003/ 004**
- **No classic UI on zBX Model 004 Support Element**
  - ▶ **Classic UI supported on HMC**
  - ▶ **Classic UI supported on CPC SE**
- **New support**
  - ▶ **Activate / Deactivate at zBX Node level**
  - ▶ **Activate / Deactivate at BladeCenter level**
  - ▶ **Service mode on / off at blade level**
    - ● **Isolate blade - Details in later presentation**
  - ▶ **Service required state**

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