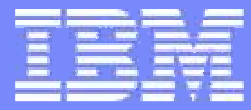

IBM System z Hardware Management Console (HMC) 2.12.1

March 11, 2014

SHARE in Anaheim

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File Updated: 03-05-14

IBM Systems

SHARE Session 15101

Topics

Topics (cont.)

HMC System support

- **The new HMC Version 2.12.1 will support the systems/SE (Support Element) versions shown in the table.**
  - **9672 G5/G6 (Driver 26, SE version 1.6.2) systems are no longer supported.**
- **User Interface**
  - **Classic and Tree styles continue to be supported.**

Machine Family	Machine Type	Firmware Driver	SE Version
zBC12	2828	15	2.12.1
zEC12	2827	15	2.12.1
z114	2818	93	2.11.1
z196	2817	93	2.11.1
z10 BC	2098	79	2.10.2
z10 EC	2097	79	2.10.2
z9 BC	2096	67	2.9.2
z9 EC	2094	67	2.9.2
z890	2086	55	1.8.2
z990	2084	55	1.8.2
z800	2066	3G	1.7.3
z900	2064	3G	1.7.3

Browser Support

- The Internal Console Browser (Firefox) is considerably newer, so there might be a slightly different feel to the local HMC, SE, TKE console panels.

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

New Browser Support on HMC 2.12.0 !!!

HMC 2.12.1 - RSF Infrastructure Changes

- **Introduction of enhanced IBM Support System** 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 as backup 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

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 is not 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 uses 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.

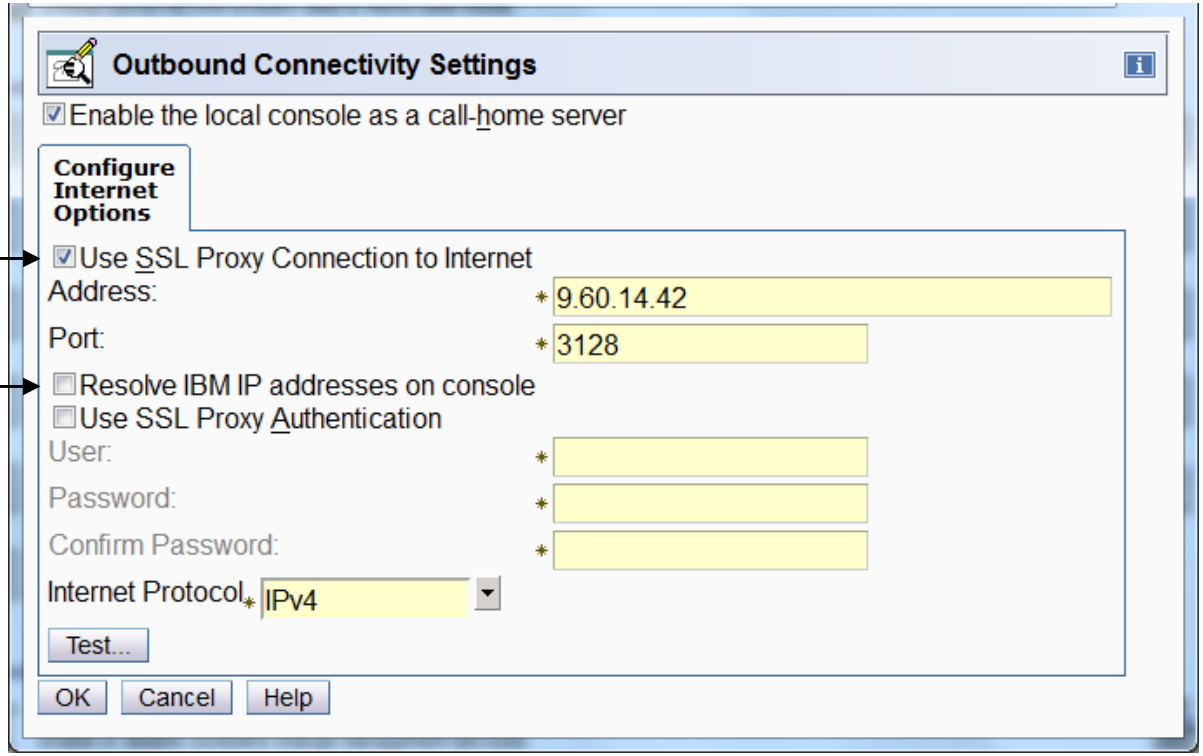
Customize Outbound Connectivity Panel: Proxy usage

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

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

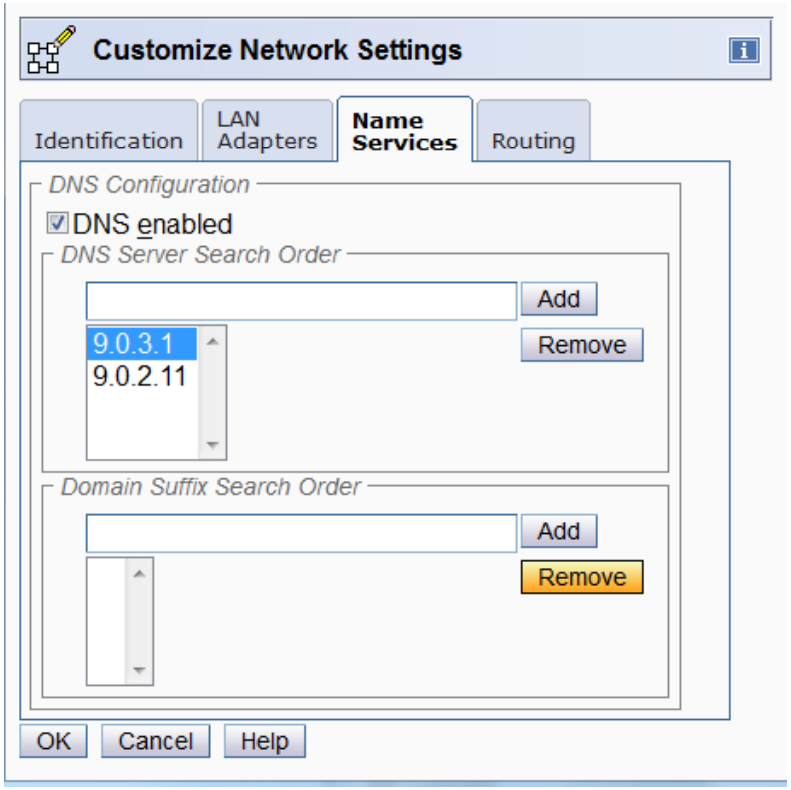
✓ if checked, DNS is required on HMC

❑ if unchecked, DNS is required from SSL Proxy



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**



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)
- 129.42.56.189 (enhanced)
- 129.42.58.189 (enhanced)
- 129.42.60.189 (enhanced)

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

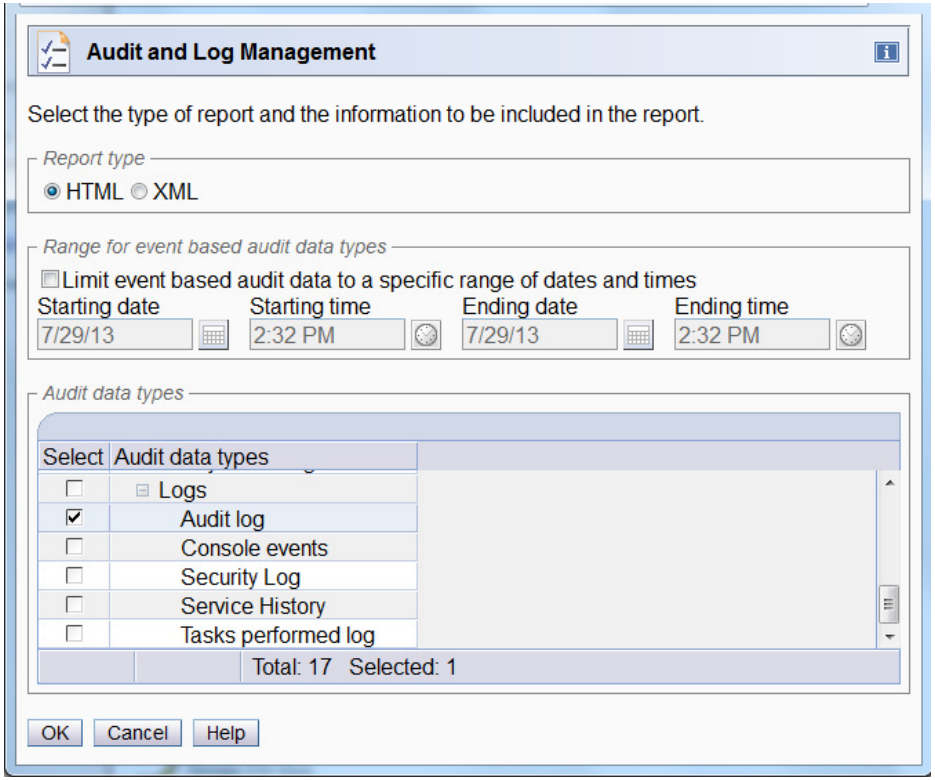
- 2620:0:6c0:1::1000
- 2620:0:6c1:1::1000
- 2620:0:6c2:1::1000
- 2620:0:6c0:200:129.42.56.189 (enhanced)
- 2620:0:6c1:200:129.42.58.189 (enhanced)
- 2620:0:6c2:200:129.42.60.189 (enhanced)

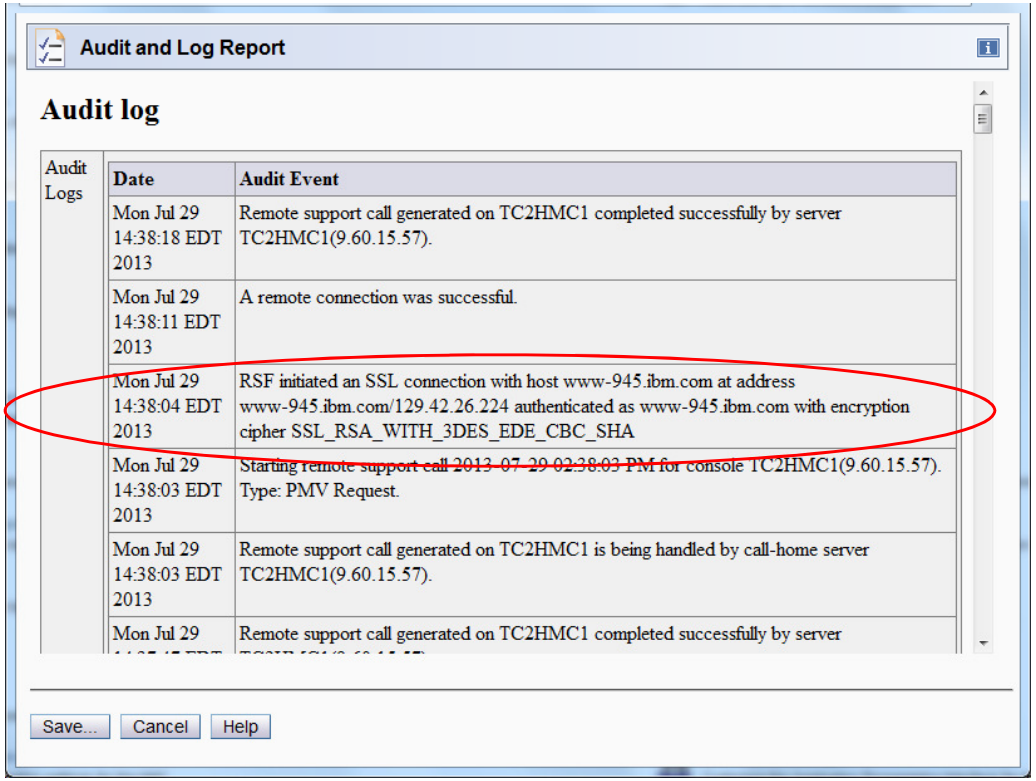
If using an SSL Proxy, and plan for it to resolve host names, it must accept the following host names:

- www-945.ibm.com (traditional)
- esupport.ibm.com (enhanced)

Enhancements to Logging of RSF Events

- **RSF Security events moved from Security to Audit Logs to meet Common Security Criteria**
- **New log entry includes hostname, hostname on certificate, and cipher suite in RSF connection**
- **Below is a sample of the new format, and new connection message**



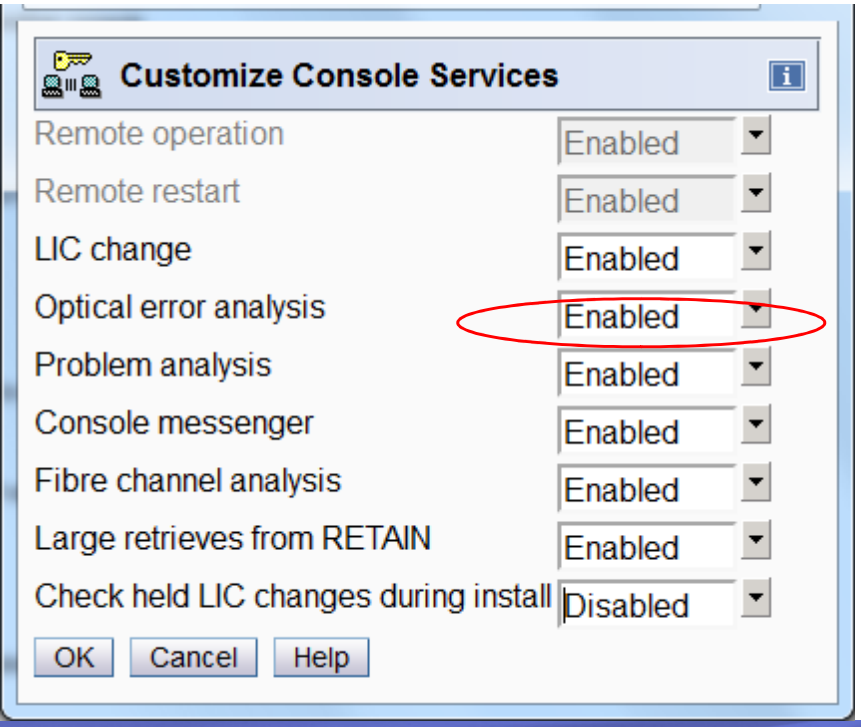


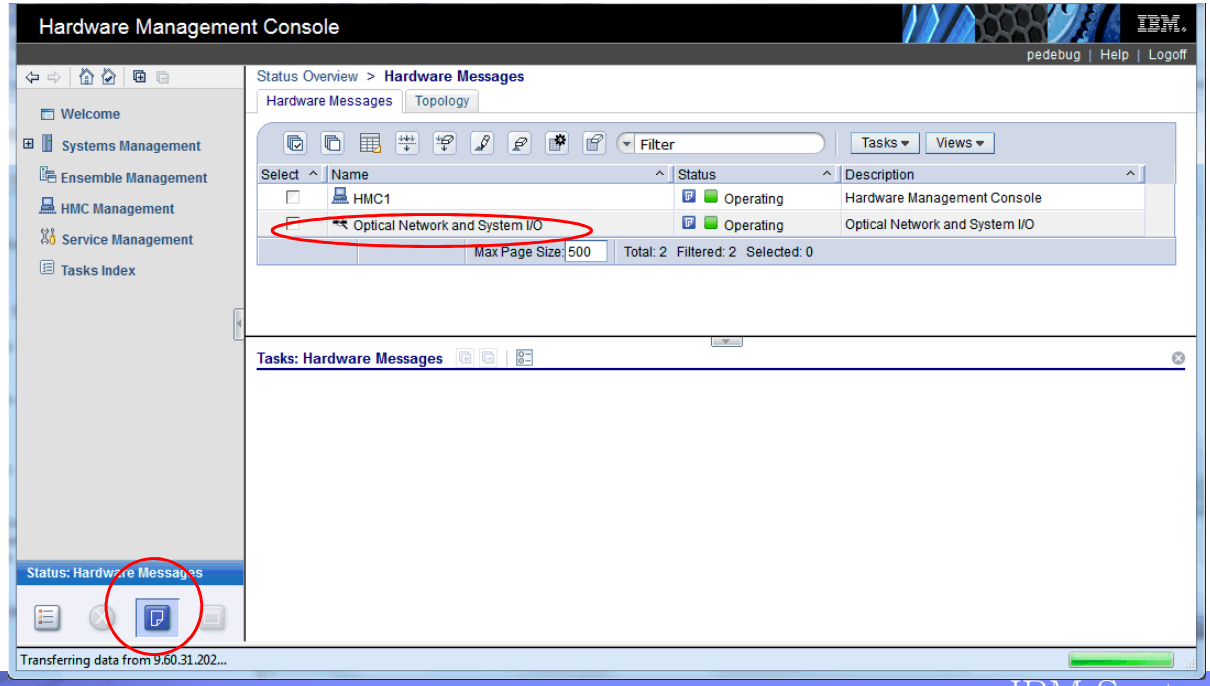
HMC 2.12.1 - RSF Infrastructure Changes Summary

- Introduction of new, “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
- This is the first rollout, currently dual support is available, but IBM recommends you make changes to enable this now.
- RSF Event Logging changes
- 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*

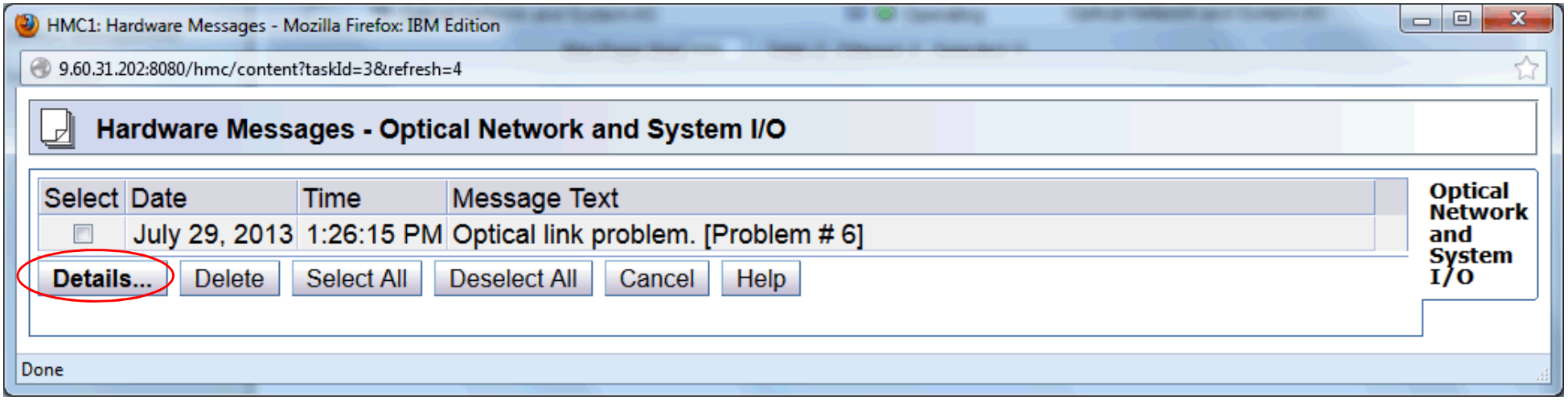
HMC 2.12.1 - Changes to Link Incident Records Management

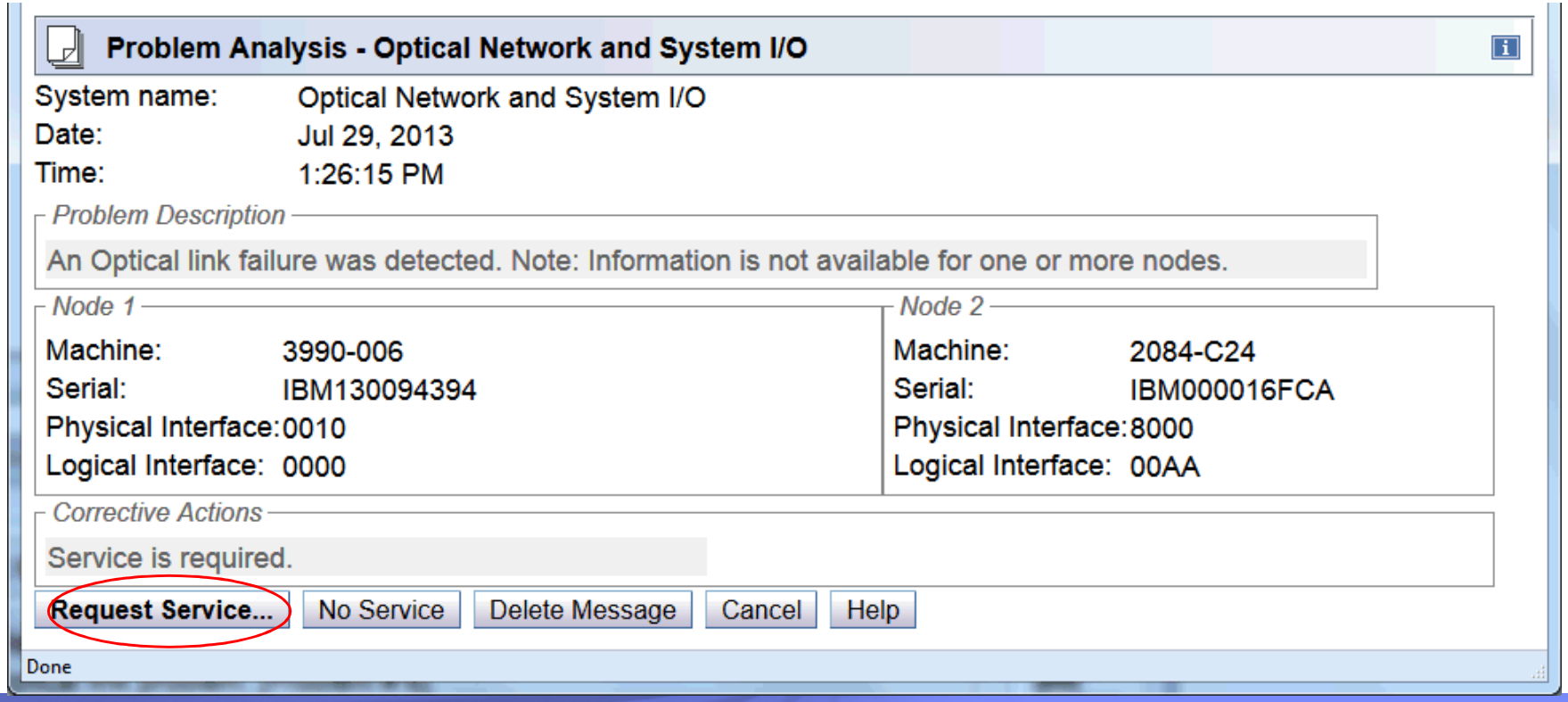
- **Link Incident**
  - Problem detected when an attached device (e.g., Control Unit, DASD) connected with a FICON channel is not connected to the CPC
  - Optical Error Analysis in HMC is enabled.
- In the past, each link incident was automatically called home if Optical Error Analysis was enabled.
  - These were mostly ignored by service as “noise”.
- As of HMC 2.12.1 Link Incidents will continue to create hardware messages, but they will require manual intervention to create a RETAIN PMR using Hardware Messages





Calling home a Link Incident error





HMC/SE Publications/Online Help Strategy Changes

- Previously
  - Publications => High level information
    - Overall Directions, Basic Operations, Task Overview
  - Online Helps => Detailed information only on per task basis
  - Separate information on HMC & SE => both on tasks & concepts

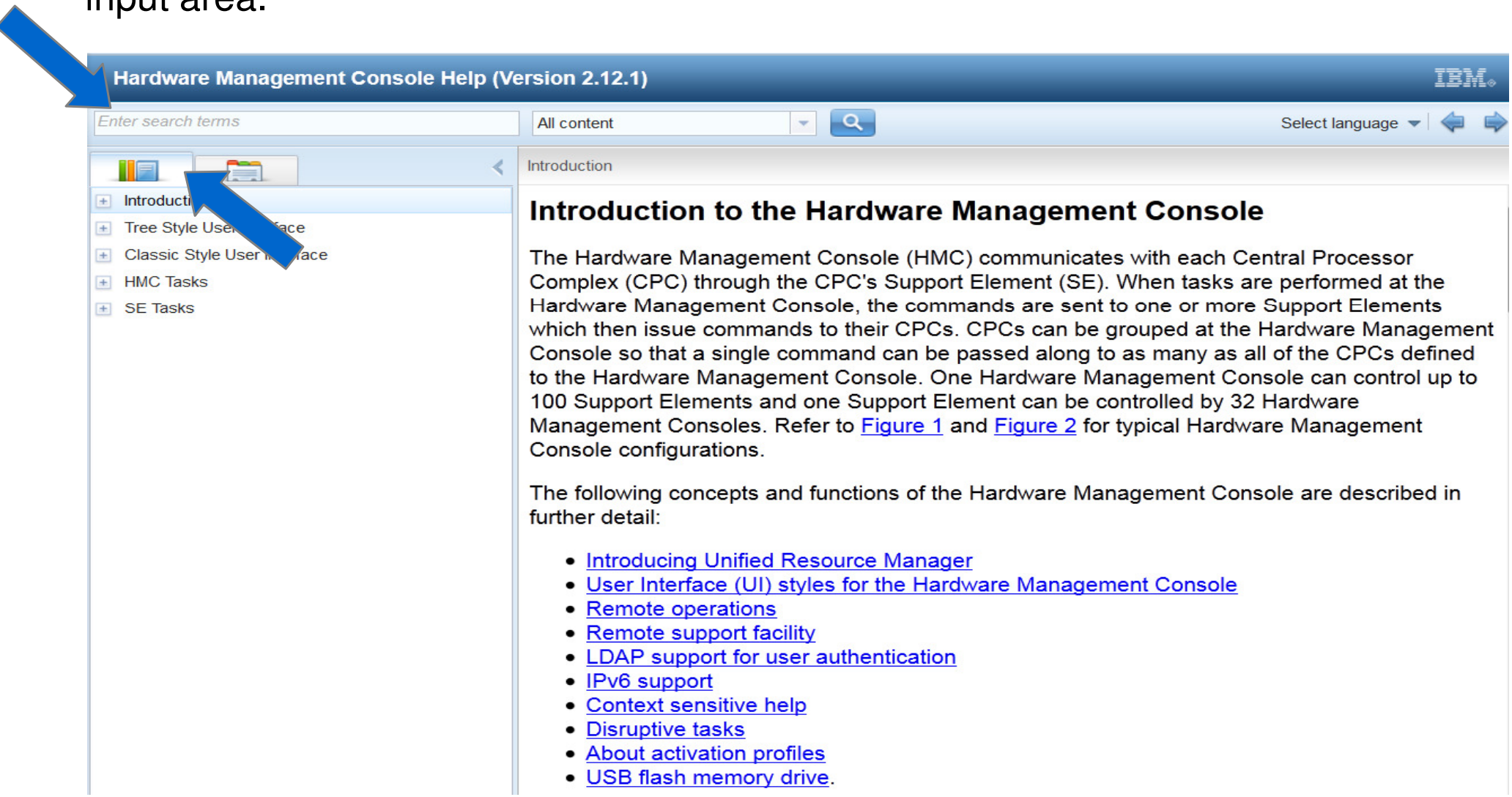
- 2.12.1 Strategy Change
  - Merge HMC/SE Publications and Online Helps
  - One information package available on
    - HMC Online Helps
    - SE Online Helps
    - IBM Information Center
      - http://pic.dhe.ibm.com/infocenter/hwmca/v2r12m1/index.jsp
  - HMC/SE specific publications no longer exist
    - **SC28-6919** *System z Hardware Management Console Operations Guide*
    - **SC27-2622** *zEnterprise System Hardware Management Console Operations Guide for Ensembles*
    - **SC28-6920** *zEnterprise System Support Element Operations Guide*

HMC/SE Publications/Online Help Strategy Changes (cont.)

- Overview/directional information and details available in one place
  - HMC or SE console
  - IBM Information Center
- Ability to offload or print as much information as you like from IBM Info Center
- Search capability from the Table of Contents or Index
- Should hopefully save time without navigating between the publications and the console help.
- Remaining non HMC/SE specific information/publications
  - No change in direction
  - Continue to be available on IBM Resource Link
    - http://www.ibm.com/servers/resourcelink/
    - See Additional Materials for IBM Resource Link access process
    - **Note:** IBM Information Center requires no special registration for access

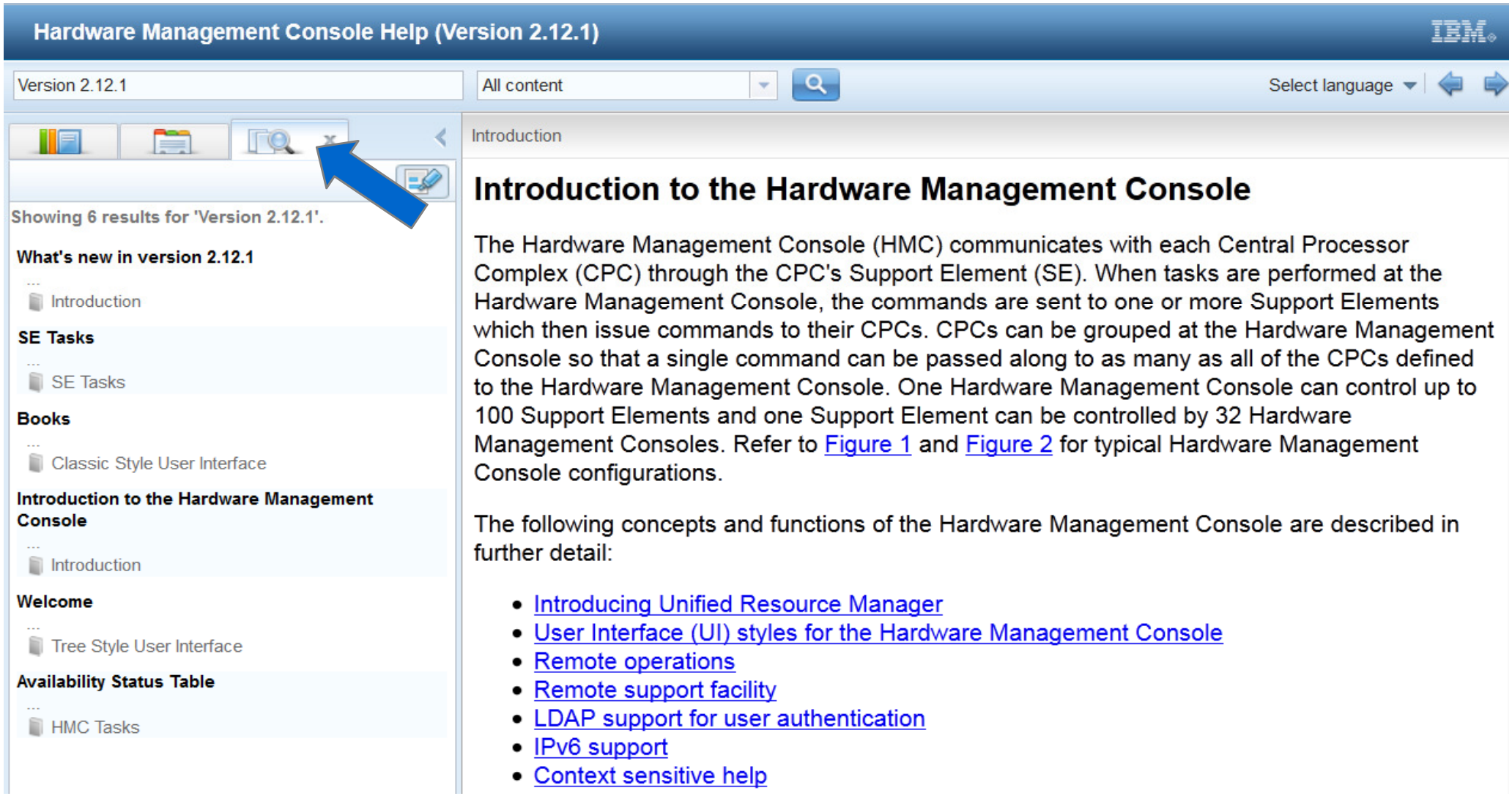
Searching the help content from the HMC or SE

From the **Table of Contents** tab, enter a search string in the *Enter search terms* input area.



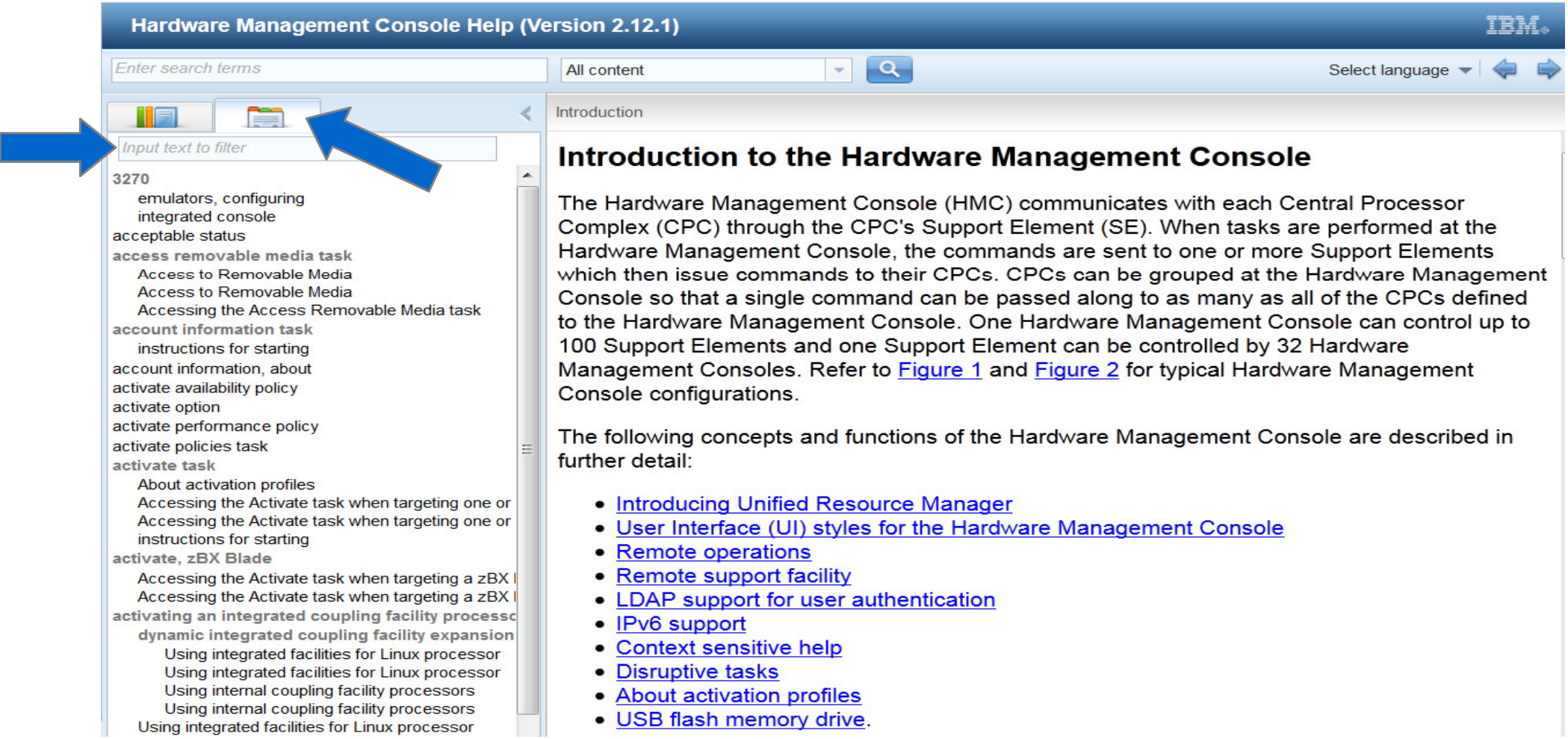
Searching the help content from the HMC or SE

The results of the search are displayed under the **Search** tab.



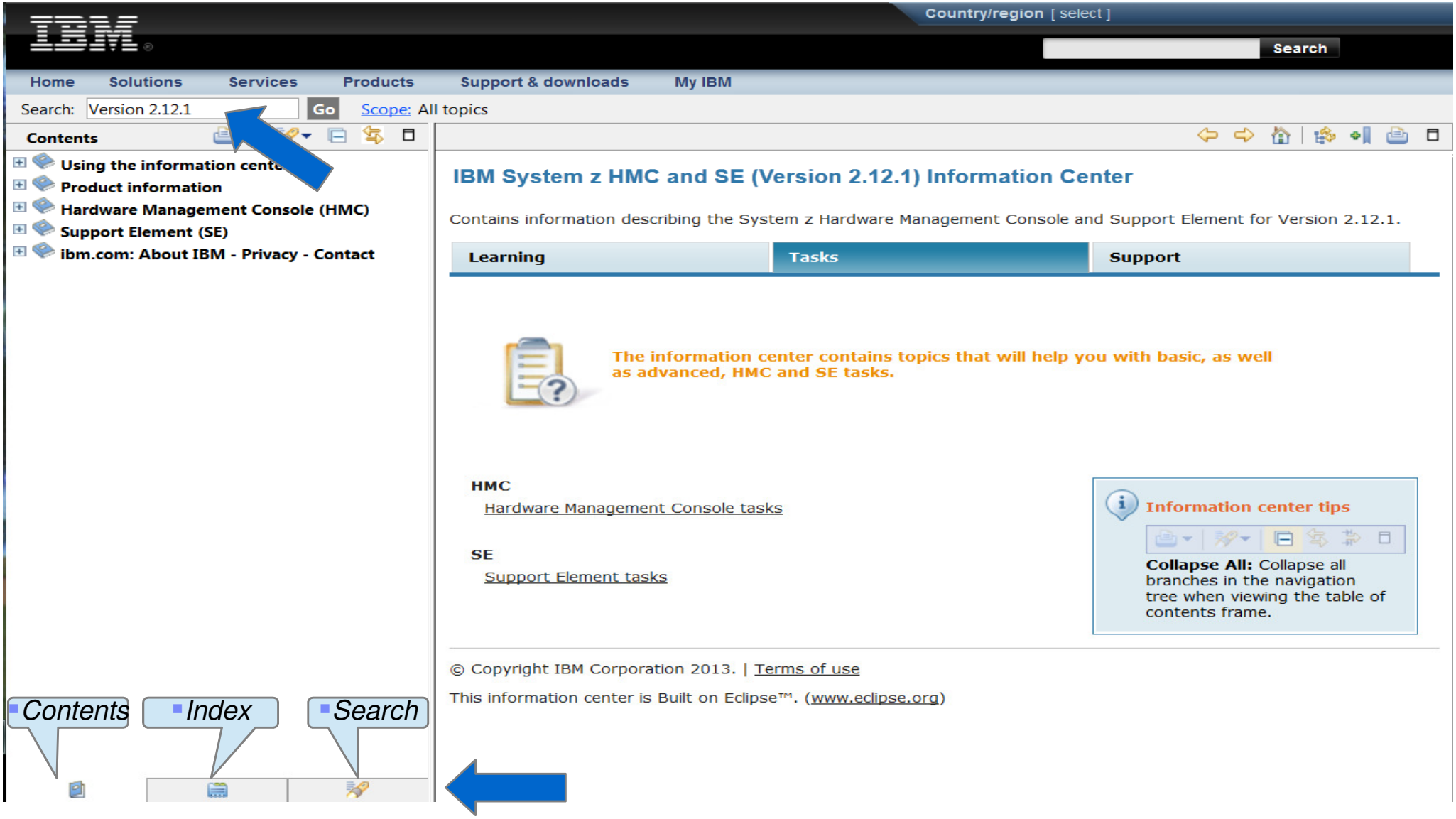
Searching the help content from the HMC or SE

You can also search for content from the **Index** tab. Specify a search string in the *input text to filter input area*.



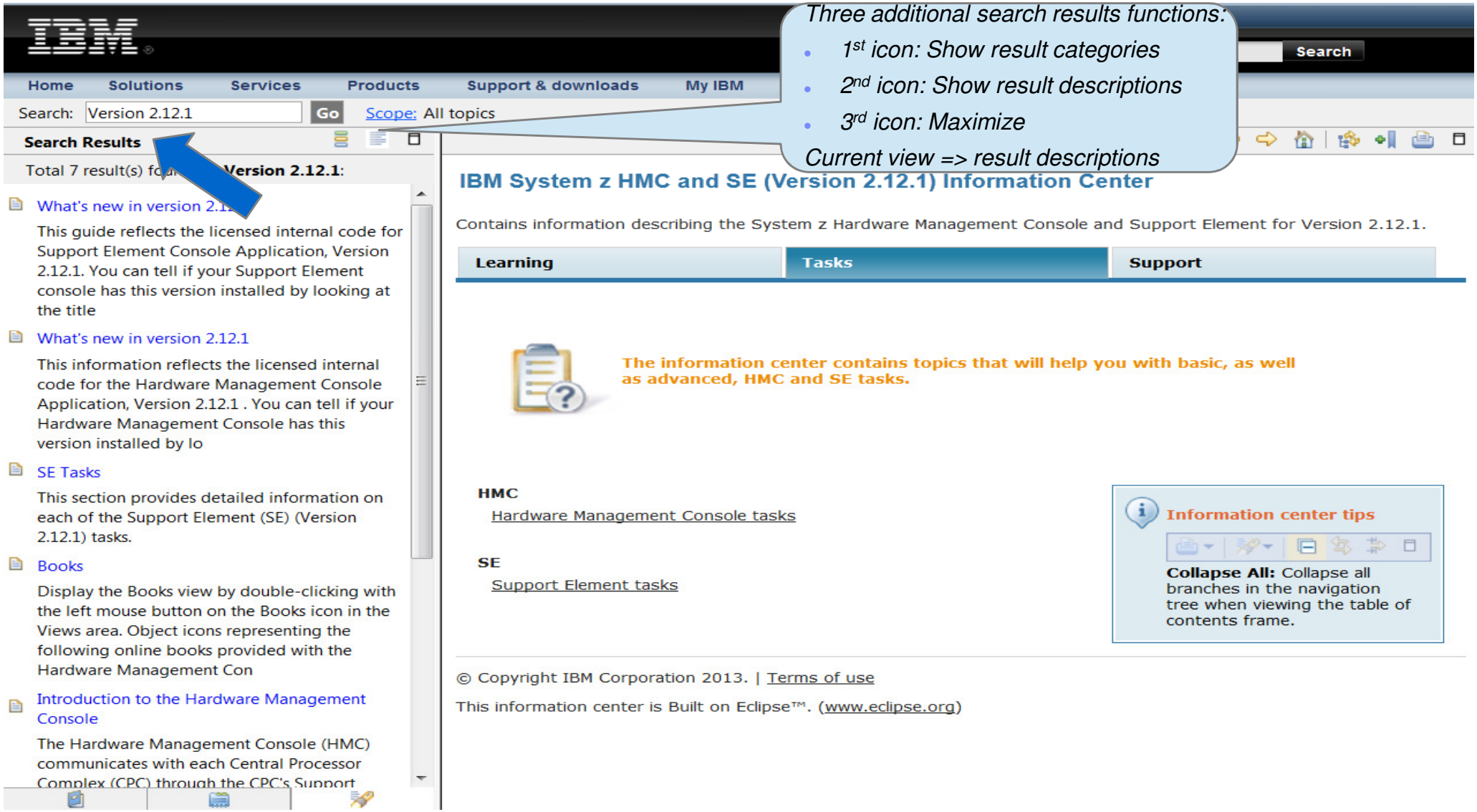
Searching the help content from the Information Center

Specify a search string in the **Search:** input area, then press **Enter** or click **Go**. (Note: tabs appear at the bottom of the left pane in the Information Center.)



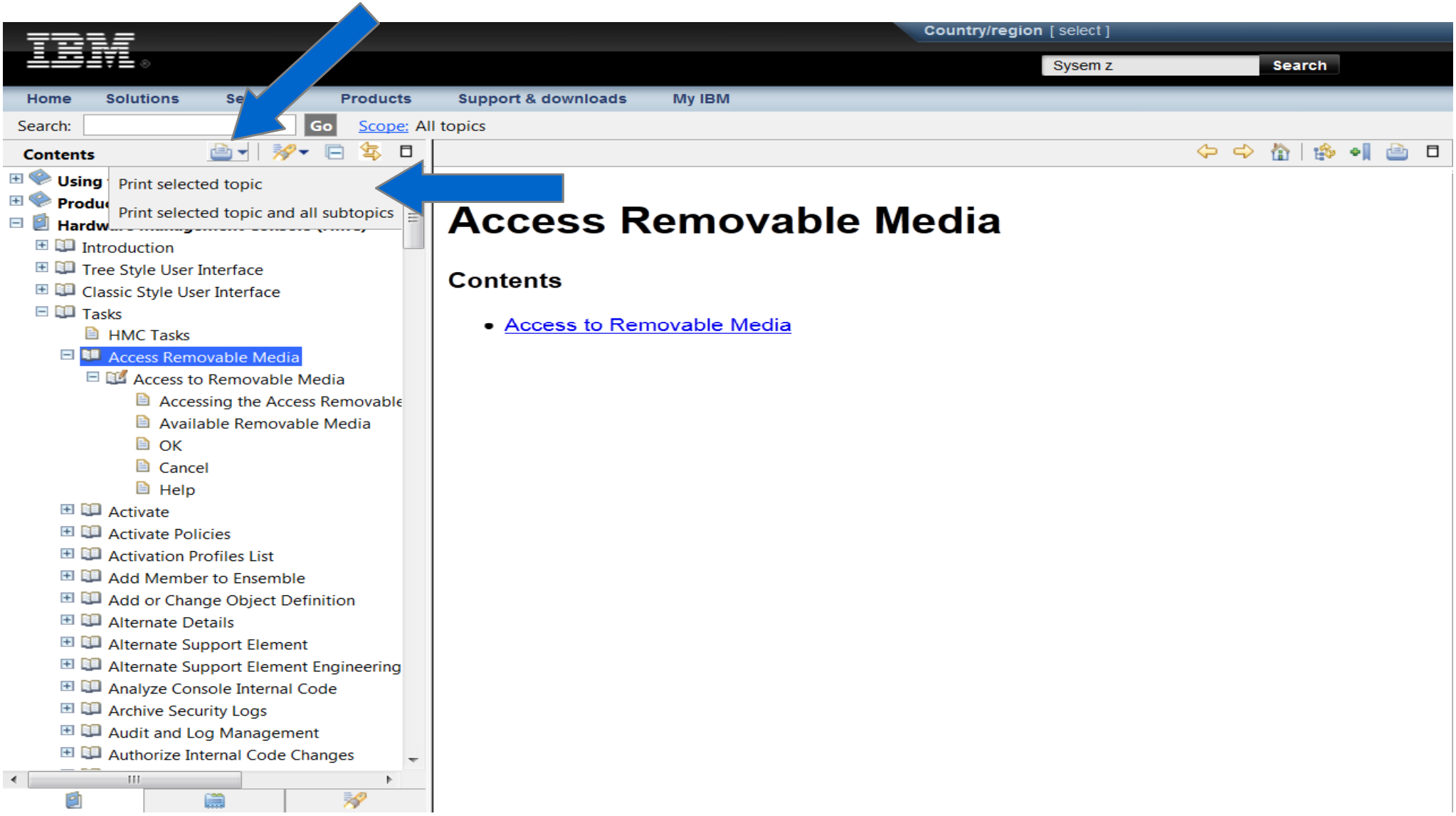
Searching the help content from the Information Center

The results of the search are displayed under the **Search Results**.

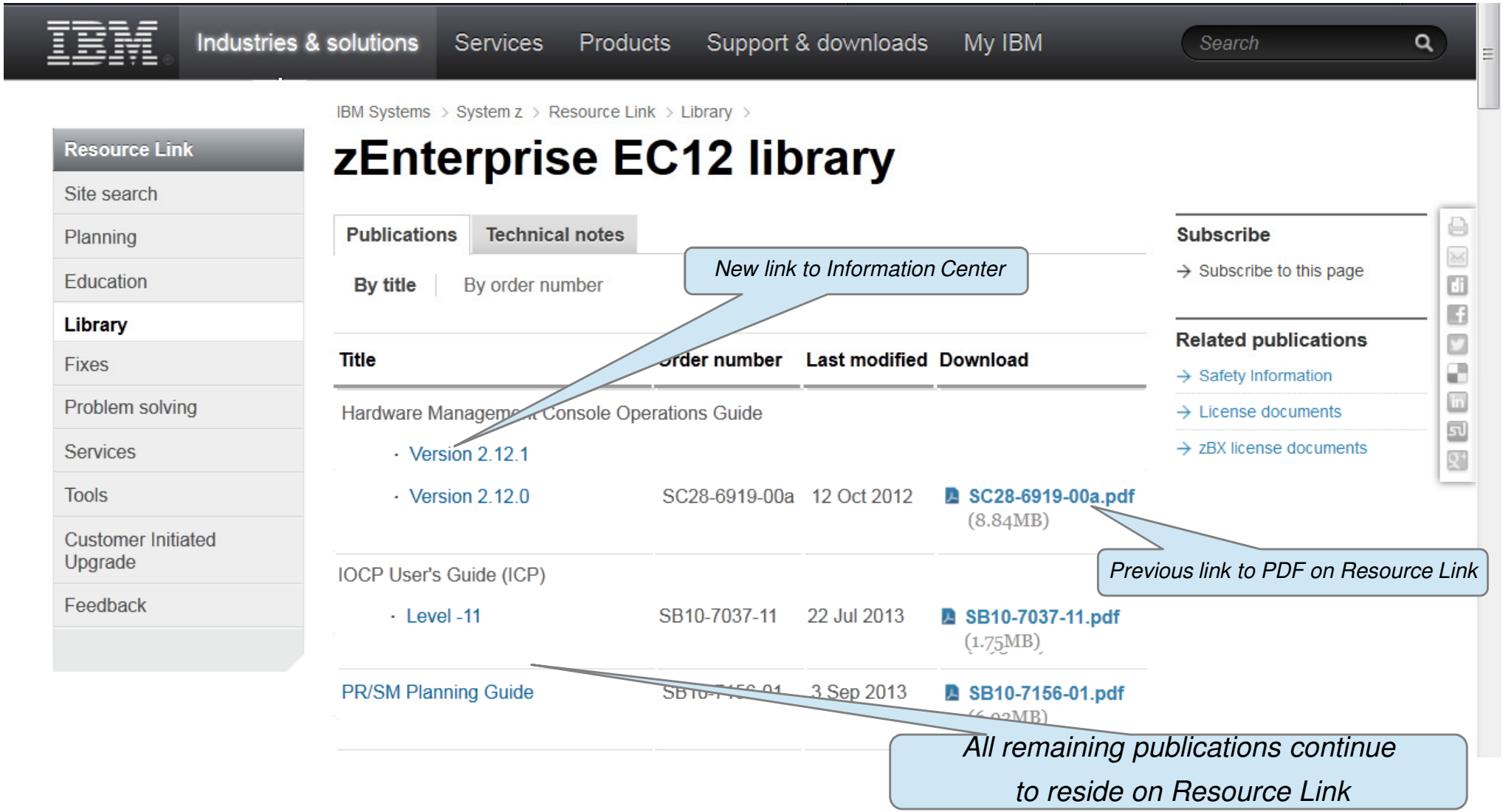


Printing from the Information Center

- You can choose to print one selected topic or the selected topic and all subtopics.



Sample of Resource Link publication entries



Absolute Capping of Logical Partitions

- Existing ways to cap the utilization of a partition
  - Dedicated processors
  - Active manipulation of LPAR weights (i.e. WLM)
  - capping via LPAR weights
  - Limit number of shared logical processors to physical capping requirement (may actually cause LPAR to have under-defined logical processors as compared to the partition's weight)

- Potential drawbacks with methods above
  - Dedicated processors
    - Not very granular, may want to cap less than one processor's worth of capacity
    - May not be possible if there aren't enough engines
    - Loses processor utilization efficiency of shared processors
  - Existing Shared processor capping is based off of the weight of all **active** partitions
    - Customers may fail to compute the capacity correctly
    - Configuration change (processors add) may lead to more capacity being allocated than desired
  - If partitions are deactivated, other active partitions capping increases
    - If only one shared active partition left, result => no capping (100 % of shared pool)

Absolute Capping of Logical Partitions (cont.)

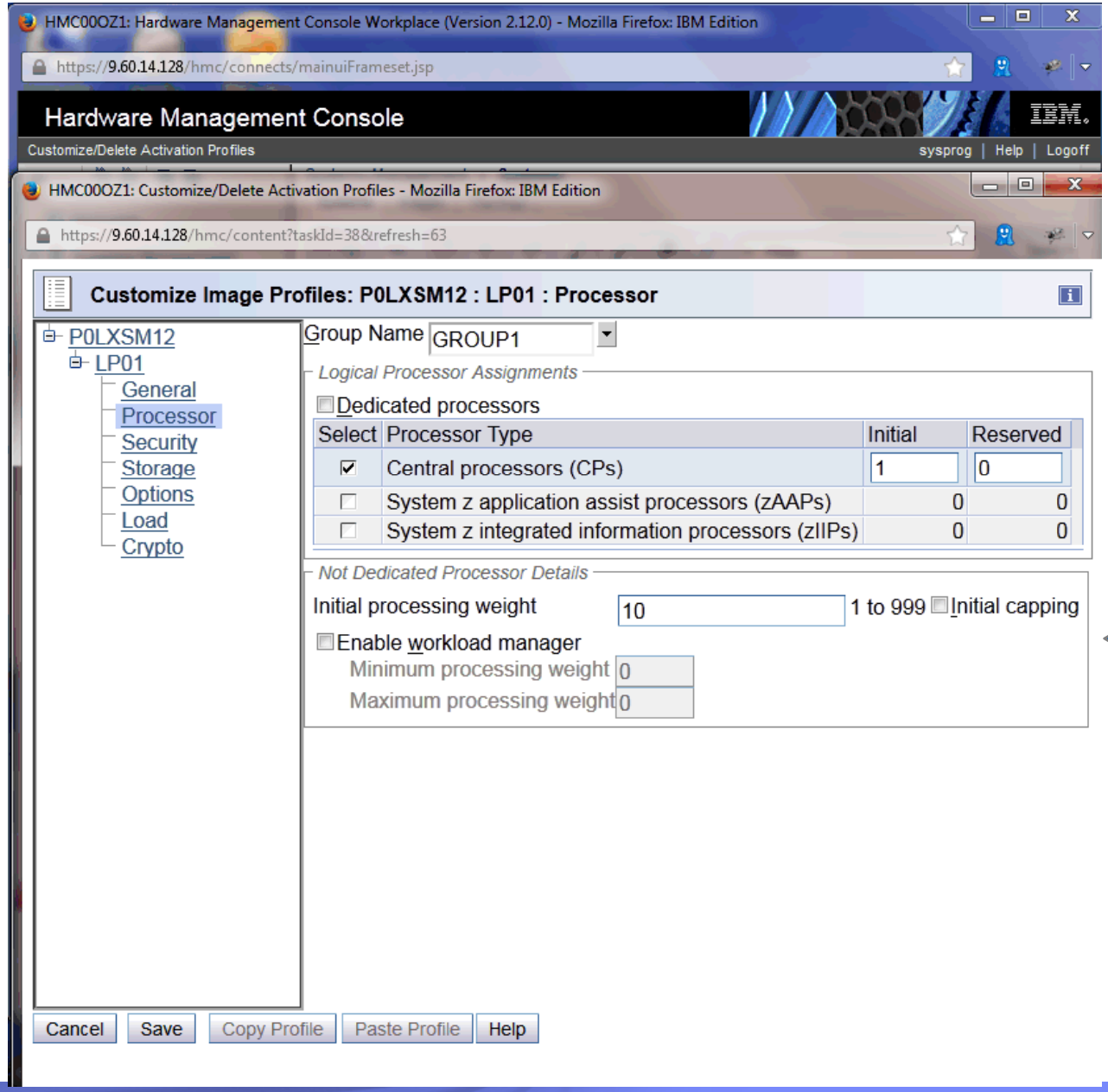
- Absolute Capping introduced to ensure
  - software licensing Terms and Conditions related to capacity are always met
    - ie, Software Pricing

- Absolute Capping => method to define an absolute cap for a given partition
  - Absolute cap, if specified, always works independently of any other capping
  - User or API specifies
    - an absolute number of processors to cap the partition's activity to
  - Absolute cap value
    - Specified to hundreths of a processor (eg 4.56 processors) worth of capacity
      - Increasing processing capacity may require granular controls
    - Value not tied to the LICCC processor maximum
      - 0.01 to 255.00 valid
      - Activation profiles more portable as you migrate to higher machine capacity or newer systems
      - However, if you specify a value above current machine maximum or number of processors defined for a LPAR (Image),
        -- absolute capping ignored, but other capping means honored

Absolute Capping of Logical Partitions (cont.)

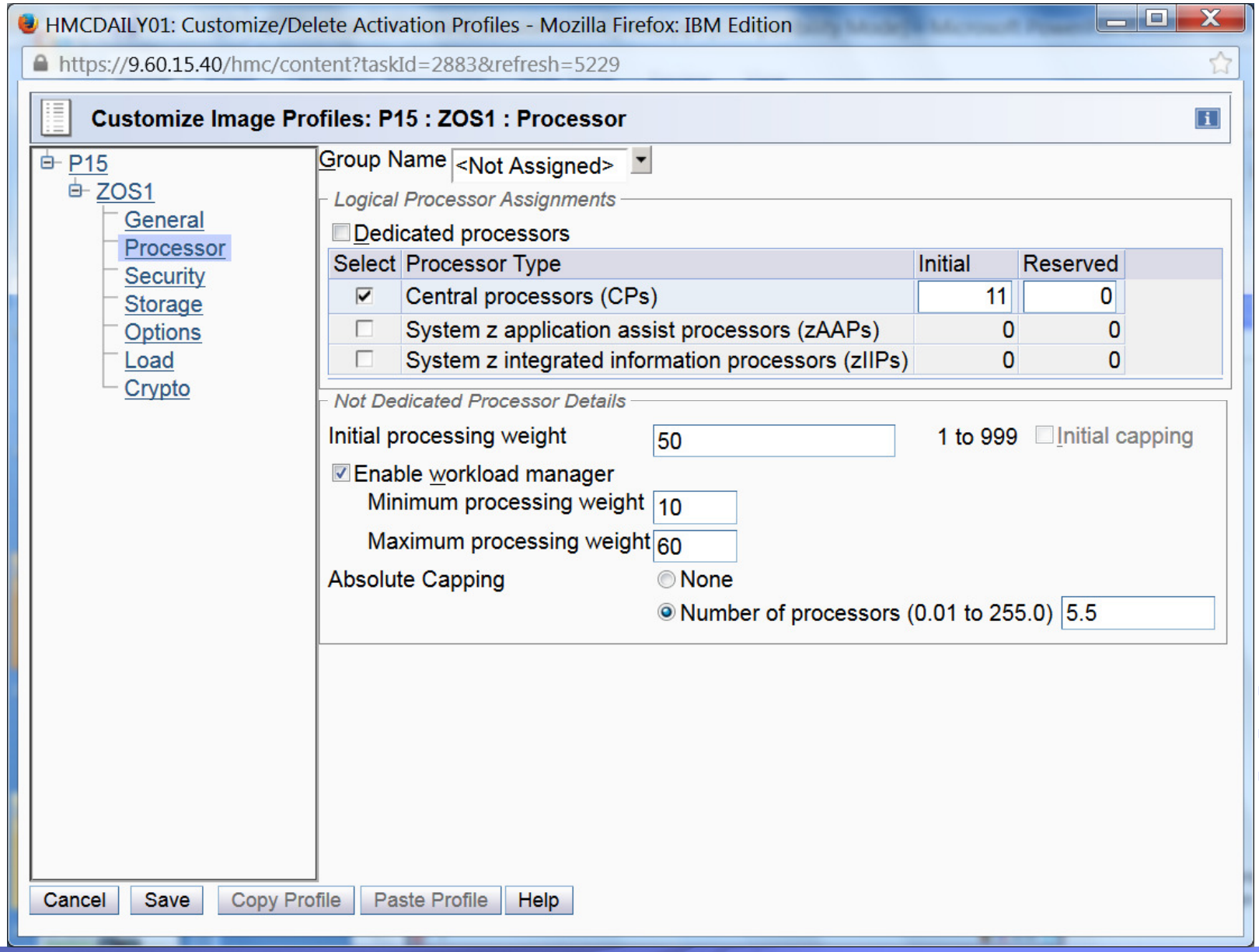
- Absolute Capping support added for:
  - Activation Profiles
    - Customize Activation Profiles
      - Classic editor
      - Profile wizard
    - Change LPAR Controls Task
    - Change LPAR Weights Scheduled Operation
  - APIs
    - SNMP APIs
    - CIMMOM APIs
    - WebServices APIs

Absolute Capping of Logical Partitions (cont.)



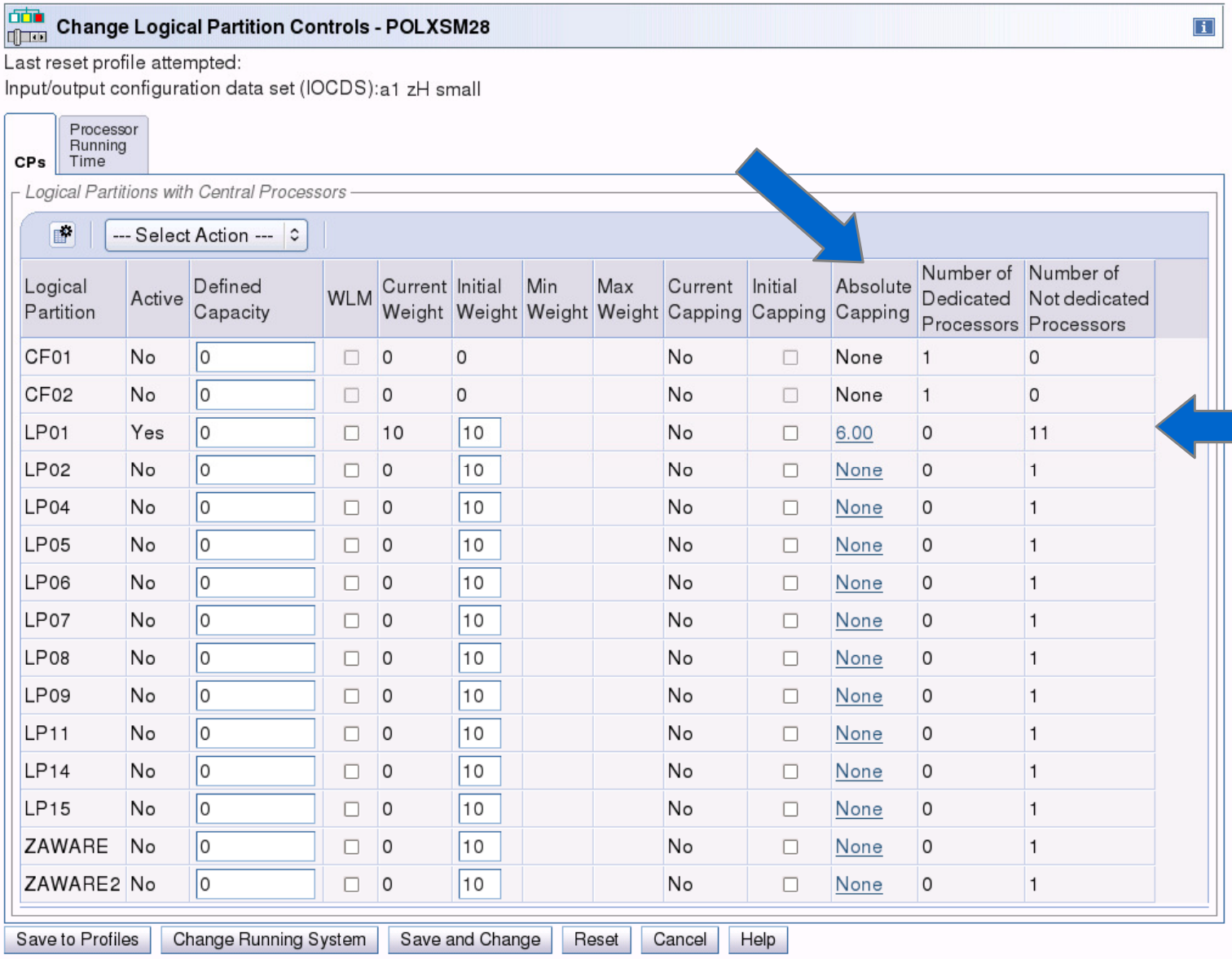
- *HMC 2.12.0*
- *Capping or WLM capping*
- *No Absolute Capping*

Absolute Capping of Logical Partitions (cont.)



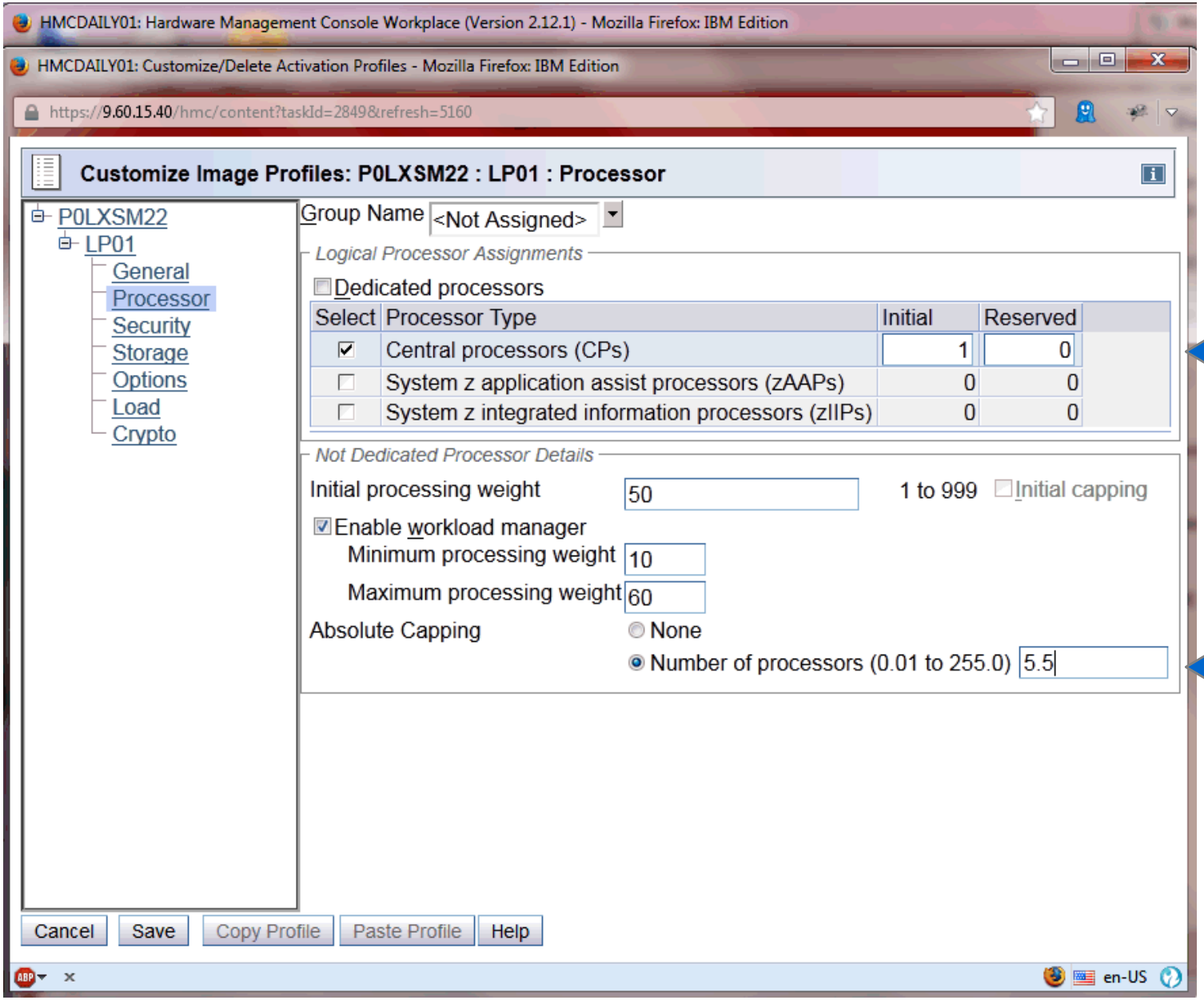
- *HMC 2.12.1*
- *Absolute Capping => 5.5*
- *Also allowed*
  - *Traditional Capping or*
  - *WLM, but not both*

Absolute Capping of Logical Partitions (cont.)



- ***Change LPAR Controls***
- *Without Absolute Capping*
  - *up to 11 CPs*
- *With Absolute Capping*
  - *limit up to 6 CPs*

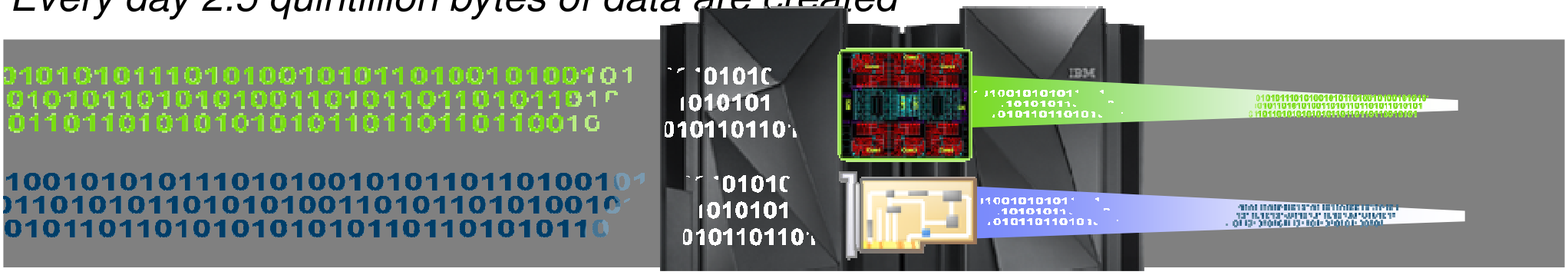
Absolute Capping of Logical Partitions (cont.)



- *HMC 2.12.1*
- *Absolute Capping independent*
- *Absolute Capping => 5.5*
- *Absolute Capping Ignored*
  - *CPs max of 1*

zEnterprise Data Compression (zEDC) - can help to reduce CPU & storage

Every day 2.5 quintillion bytes of data are created



Compress your data 4X

(efficient system data compression)

Should see significant reduction in CPU usage and throughput improvements when zlib uses zEDC

Data Ready

- *Efficiently compress active data by providing a low CPU, high performance, dedicated compression accelerator*
- *Industry standard compression for cross platform data distribution*

- ***Typical Client Use Cases:***
- ***Significant disk savings** with trivial CPU cost for large BSAM/QSAM sequential files*
- ***More efficiently store audit data** in application logs*
- ***Reduce the amount of data** needed for data migration and backup/restore*
- ***Transparent acceleration** of Java compressed applications*

NEW ***zEDC Express*** NEW ***z/VM 6.3 support for guests*** NEW ***z/OS V2.1 zEDC***

zEnterprise Data Compression (zEDC) (cont.)

- zEDC Express adapter for zEC12 and zBC12
  - Compression work is offloaded to the card
  - Minimal CP cycles consumed
  - zlib-based, industry-standard deflate compression
  - Data can be inflated anywhere zlib processing is available

- New terminology/controls used for zEDC (and Shared Memory Communications (SMC-R))
  - Function IDs (FIDs) logical I/O naming versus CSS.CHPIDs
  - Virtualization infrastructure uses a different architecture for new I/O (zEDC/SMC-R) than traditional I/O (OSA, FICON, etc.)
  - PCHIDs (Physical Channel IDs) => still apply for new & traditional I/O

zEnterprise Data Compression (zEDC) (cont.)

- zEDC
  - Shareable by up to 15 LPARs
    - Shared using SR/IOV framework
    - Up to 15 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 one LPAR at a time
    - CSS.CHPIDs can be configured to multiple LPARs

- Sample IOCDS excerpt for zEDCs
  - 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

Shared Memory Communication (SMC-R)

Optimize server to server networking – transparently
"HiperSockets™-like" capability across systems

Significant CPU savings for FTP file transfers across z/OS systems versus standard TCP/IP

Significant reduction in response time and moderate CPU savings for CICS workloads exploiting IPIC using SMC-R versus TCP/IP

Signficant reduction in overall transaction response time for WAS workload accessing z/OS DB2

Significant increase in WebSphere MQ messages delivered across z/OS systems

- ***Shared Memory Communications (SMC-R):***
  - *Exploit RDMA over Converged Ethernet (RoCE) with qualities of service support for dynamic failover to redundant hardware*
- ***Typical Client Use Cases:***
  - *Help to reduce both latency and CPU resource consumption over traditional TCP/IP for communications across z/OS systems*
  - ***Any** z/OS TCP sockets based workload can **seamlessly** use SMC-R without requiring any application changes*

NEW ***z/OS V2.1 SMC-R***

NEW ***z/VM 6.3 support for guests***

NEW ***10GbE RoCE Express***

Shared Memory Communication (SMC-R) (cont.)

- RDMA based technology has been available in the industry for many years – primarily based on Infiniband (IB)
  - RDMA technology provides the capability to allow hosts to logically share memory
  - IB requires a completely unique network eco system (unique hardware such as host adapters, switches, host application software, system management software/firmware, security controls, etc.)
  - IB is popular in the HPC (High Performance Computing) market
- RDMA technology is now available on Ethernet – RDMA over Converged Ethernet (RoCE)
  - RoCE uses existing Ethernet fabric (switches with Global Pause enabled) but requires advanced Ethernet hardware in the host (RDMA capable NICs)
  - ***RoCE is a game changer!***
    - **RDMA technology becomes more affordable and prevalent in datacenter networks**
- Host software exploitation options fall into two general categories:
  - Native / direct application exploitation
    - Several variations, all involve deep level expertise in RDMA and a new programming model
  - Transparent application exploitation (e.g. sockets based)
    - Improve Time to Value by automatically exploiting RDMA/RoCE for sockets based TCP applications
- *Focus is on providing a transparent Sockets over RDMA solution*
  - Obtain performance benefits of RDMA without compromising existing IP based qualities of service

Shared Memory Communication (SMC-R) (cont.)

- Shared Memory Communications over RDMA (SMC-R) is a communication protocol that allows *TCP sockets* applications to transparently exploit RDMA (RoCE)

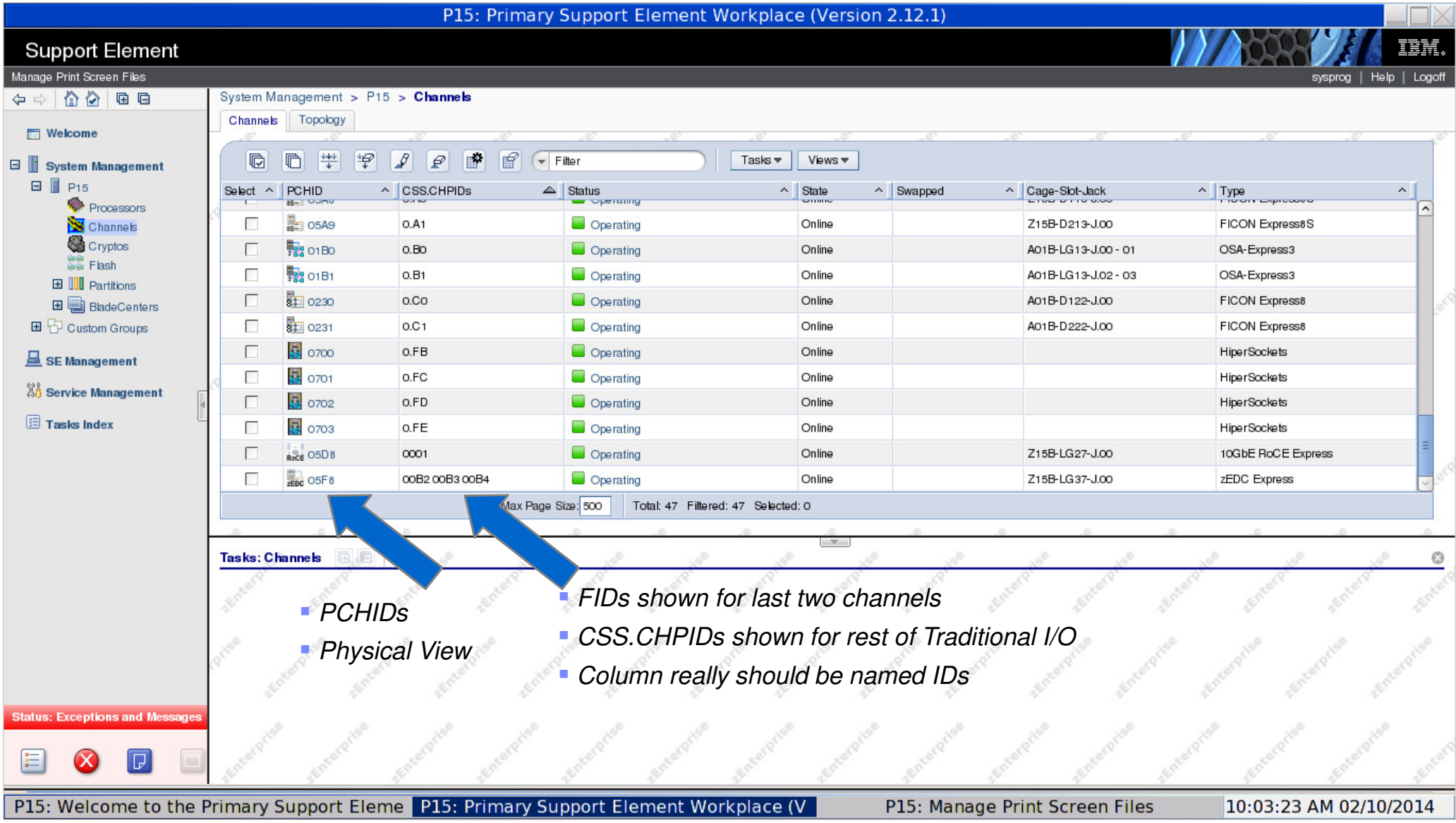
- SMC-R is a “hybrid” solution that:
  - Uses TCP connection (3-way handshake) to establish SMC-R connection
  - Each TCP end point exchanges TCP options that indicate whether it supports the SMC-R protocol
  - SMC-R “rendezvous” (RDMA attributes) information is then exchanged within the TCP data stream (similar to SSL handshake)
  - Socket application data is exchanged via RDMA (write operations)
  - TCP connection remains active (controls SMC-R connection)
  - This model preserves many critical existing operational and network management features of TCP/IP

Shared Memory Communication (SMC-R) (cont.)

- Function ID (FID) for SMC-R currently only support one FID per PCHID
- FID can only be configured to one LPAR, but it is reconfigurable

- Sample IOCDS excerpt for SMC-Rs
  - FUNCTION FID=01,PCHID=5D8,PART=((VMALT1), (VMALT1,VMALT2))
- Notes on Sample
  - FID 01 can be configured to VMALT1 or VMALT2
  - Currently configured to VMALT1

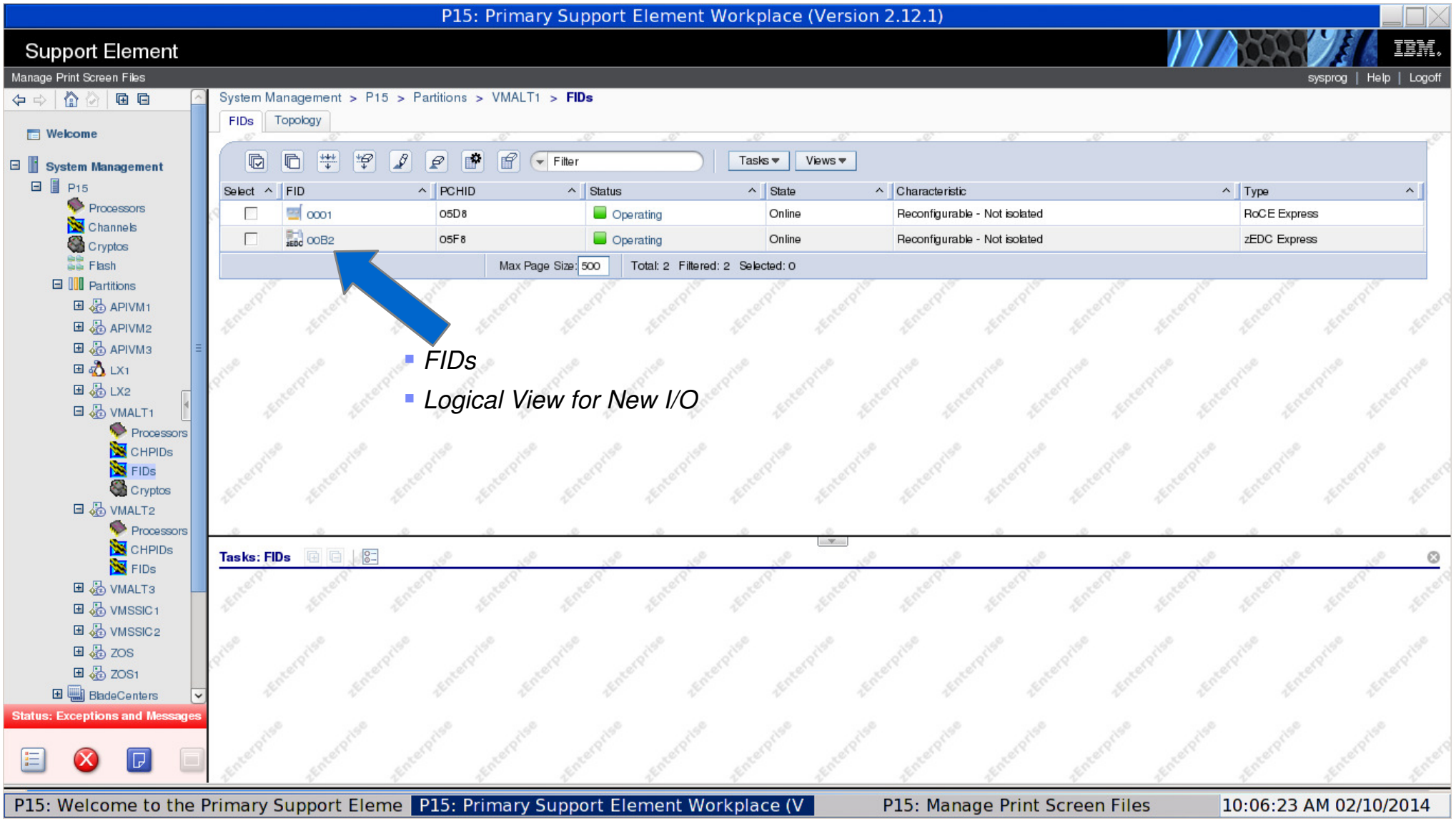
zEDC/SMC-R: Channels View



- *PCHIDs*
- *Physical View*

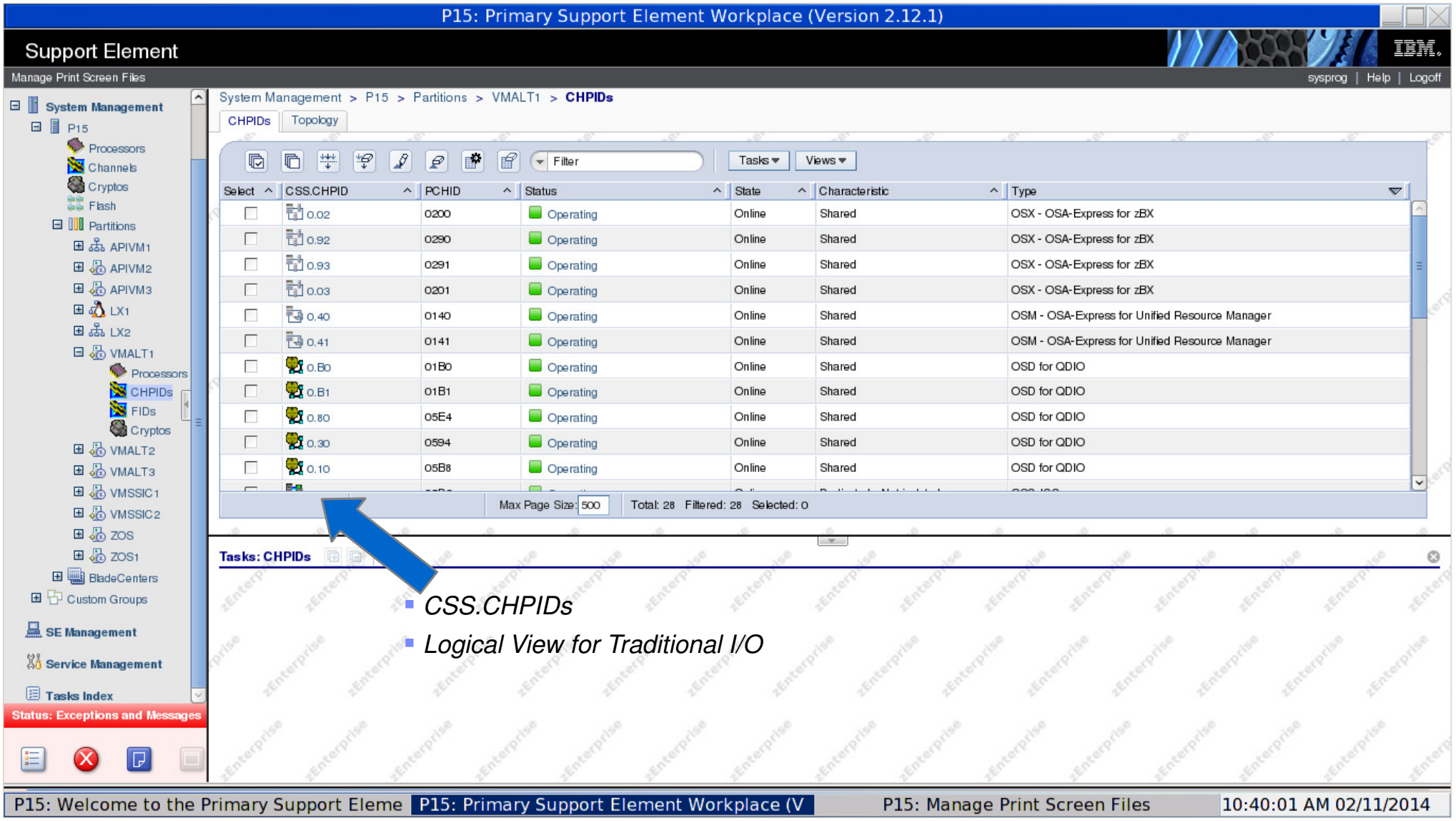
- *FIDs shown for last two channels*
- *CSS.CHPIDs shown for rest of Traditional I/O*
- *Column really should be named IDs*

zEDC/SMC-R: FIDs View



- *FIDs*
- *Logical View for New I/O*

zEDC/SMC-R: CHPIDs View (Traditional I/O)



- *CSS.CHPIDs*
- *Logical View for Traditional I/O*

Migration of OSA Support Facility (OSA/SF) to HMC/SE

- OSA/SF previously available on z/OS => Migrated to HMC/SE as follows
  - z/OS => supports OSA Express 4S and prior OSA generations
  - HMC/SE => supports OSA Express 4S & 5S
  - **Note:** OSA Express 5S only available on HMC/SE

- Overview of OSA/SF support merged into HMC/SE Advanced Facilities
  - Configuration of OSE as well as import/export capabilities
    - Import/Export capabilities to migrate configs from one system to another
  - View OAT (OSA Address Table) for all supported OSAs (OSE, OSD, OSN)
    - OAT defines connection information
      - IP addresses
      - Devices attached to
      - Mode of connection
      - Etc.
  - OSA/SF View parms ported to View Port Parms (with export capabilities)
    - Export commonly used for LAN issues problem determination

Migration of OSA Support Facility (OSA/SF) to HMC/SE

HMC1: OSA Advanced Facilities

Display OSA Address Table (OAT) Entries - P05

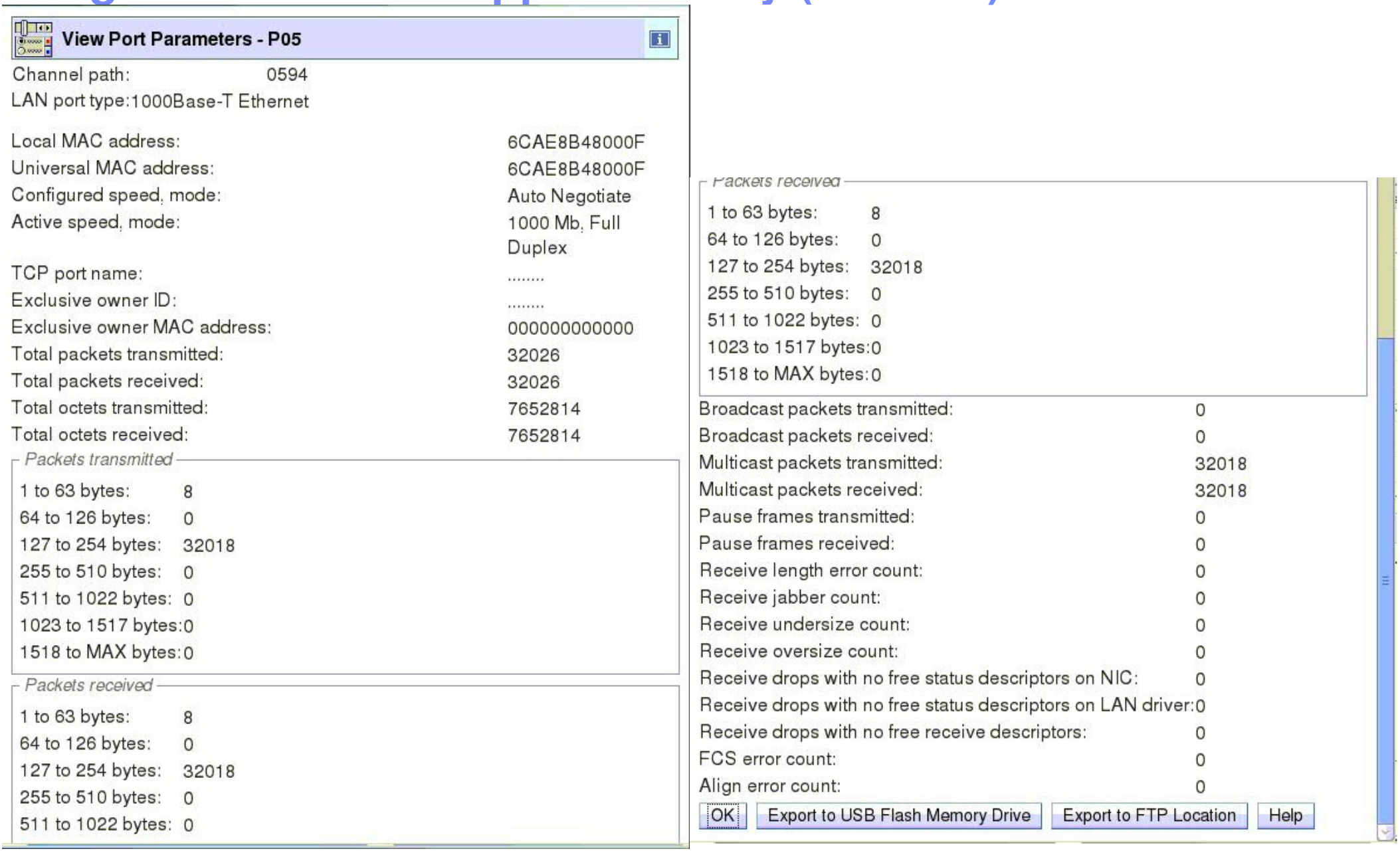
Channel ID:0594 LAN port type:OSE

--- Select Action --- Filter

Select	CSS	IID	Unit Address	Device Number	LPAR Name	Port Number	Session Type	IP Address	Router Indica
◉	00	00	00, 01	0930, 0931	UNKNOWN	0	TCPIP	NONE	NONE
○	00	00	02, 03	0932, 0933	UNKNOWN	1	TCPIP	NONE	NONE
○	00	01	00, 01	0930, 0931	LP01	0	TCPIP	NONE	NONE
○	00	01	02, 03	0932, 0933	LP01	1	TCPIP	NONE	NONE
○	00	02	00, 01	0930, 0931	LP02	0	TCPIP	NONE	NONE
○	00	02	02, 03	0932, 0933	LP02	1	TCPIP	NONE	NONE
○	00	03	00, 01	0930, 0931	LP03	0	TCPIP	NONE	NONE
○	00	03	02, 03	0932, 0933	LP03	1	TCPIP	NONE	NONE
○	00	04	00, 01	0930, 0931	CF02	0	TCPIP	NONE	NONE
○	00	04	02, 03	0932, 0933	CF02	1	TCPIP	NONE	NONE
○	00	05	00, 01	0930, 0931	LP05	0	TCPIP	NONE	NONE
○	00	05	02, 03	0932, 0933	LP05	1	TCPIP	NONE	NONE
○	00	06	00, 01	0930, 0931	LP06	0	TCPIP	NONE	NONE
○	00	06	02, 03	0932, 0933	LP06	1	TCPIP	NONE	NONE
○	00	07	00, 01	0930, 0931	LP07	0	TCPIP	NONE	NONE
○	00	07	02, 03	0932, 0933	LP07	1	TCPIP	NONE	NONE
○	00	08	00, 01	0930, 0931	LP08	0	TCPIP	NONE	NONE
○	00	08	02, 03	0932, 0933	LP08	1	TCPIP	NONE	NONE

Close

Migration of OSA Support Facility (OSA/SF) to HMC/SE



View Port Parameters - P05

Channel path: 0594
LAN port type: 1000Base-T Ethernet

Local MAC address:	6CAE8B48000F
Universal MAC address:	6CAE8B48000F
Configured speed, mode:	Auto Negotiate
Active speed, mode:	1000 Mb, Full Duplex
TCP port name:	.....
Exclusive owner ID:	.....
Exclusive owner MAC address:	000000000000
Total packets transmitted:	32026
Total packets received:	32026
Total octets transmitted:	7652814
Total octets received:	7652814

Packets transmitted

1 to 63 bytes:	8
64 to 126 bytes:	0
127 to 254 bytes:	32018
255 to 510 bytes:	0
511 to 1022 bytes:	0
1023 to 1517 bytes:	0
1518 to MAX bytes:	0

Packets received

1 to 63 bytes:	8
64 to 126 bytes:	0
127 to 254 bytes:	32018
255 to 510 bytes:	0
511 to 1022 bytes:	0

Packets received

1 to 63 bytes:	8
64 to 126 bytes:	0
127 to 254 bytes:	32018
255 to 510 bytes:	0
511 to 1022 bytes:	0
1023 to 1517 bytes:	0
1518 to MAX bytes:	0

Broadcast packets transmitted:	0
Broadcast packets received:	0
Multicast packets transmitted:	32018
Multicast packets received:	32018
Pause frames transmitted:	0
Pause frames received:	0
Receive length error count:	0
Receive jabber count:	0
Receive undersize count:	0
Receive oversize count:	0
Receive drops with no free status descriptors on NIC:	0
Receive drops with no free status descriptors on LAN driver:	0
Receive drops with no free receive descriptors:	0
FCS error count:	0
Align error count:	0

OK | Export to USB Flash Memory Drive | Export to FTP Location | Help

Operating System Messages/Integrated 3270 Console

- Operating System Messages
  - Depending on your requirements:
    - Limit what HMCs can manage the CEC
    - Limit access to which HMC users can access the LPAR
    - Limit access to which HMC users can run the Operating System Messages task
      - Limit to read-only if read-write is not required
  - For z/OS levels prior to z/OS 2.1
    - use RACF profiles to limit which commands can be issued by the system console
    - Operating System Messages commands issued as if from the system console
  - **For z/OS 2.1 or newer,**
    - **use new HMC Integrated 3270 Console support**
    - **Unique user logon/RACF controls for commands**
  - For z/VM and z/Linux consoles accessed from the HMC,
    - Operating System Messages required to logon via an OS user ID
- For additional security recommendations:
  - Attend:
    - March 13th, 9:30 – 10:30 AM
      - **15053**: *IBM System z Security Best Practices*

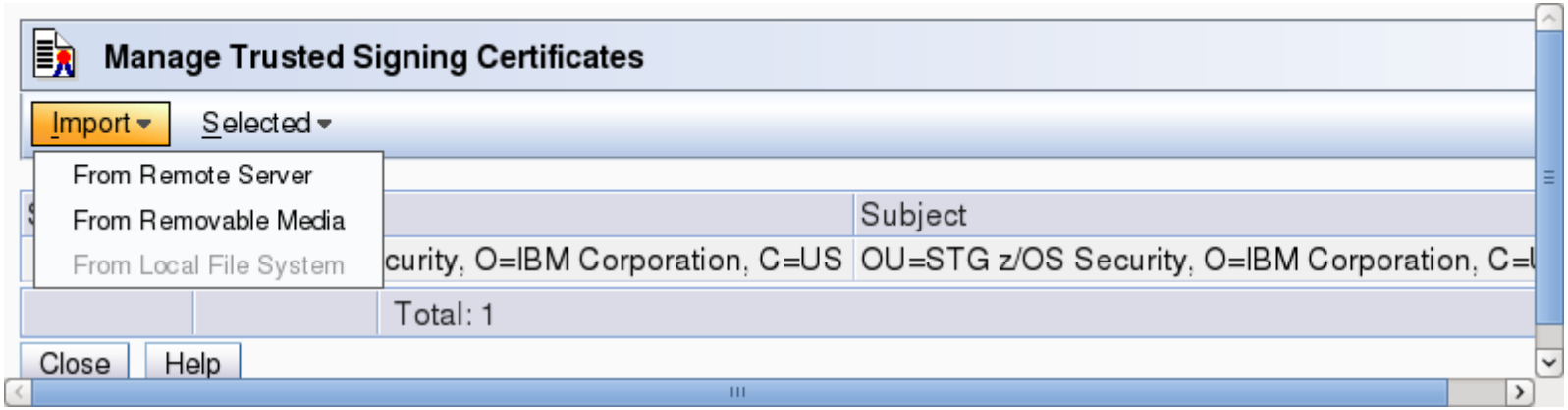
Updates to x3270 Support (aka Secure 3270)

- "Configure 3270 Emulators" task on the HMC and TKE consoles
  - Certificate validation returned by the 3270 server when a secure/encrypted SSL external network connection used
  - "Certificate Management" task
    - used if the certificate(s) returned by the 3270 server are not signed by a well known trusted Certifying Authority (CA) certificate such as Verisign or Geotrust.
    - HMC/TKE as clients to 3270 server
      - Already have installed well known CA certificates
      - Probably don't have Corporate CA certificates

- Usage
  - **TKE (Trusted Key Entry) 7.3**
    - General recommendation to use Secure 3270 enhancement if possible
  - **HMC 2.12.1**
    - Generally, most customers expected to use "Integrated 3270 Console"
      - Uses "internal communication service" between Support Elements and System z LPARs/Operating Systems
      - Integrated 3270 Console support now available on z/OS 2.1
    - However, customers can technically use the Configure 3270 Emulators path
      - External network connection from HMC to System z Operating System

Updates to x3270 Support (aka Secure 3270)

- *The advanced action "**Manage Trusted Signing Certificates**" within the "Certificate Management" task => used to add trusted signing certificates*
  - *For example, if the certificate associated with the 3270 server on OS is signed/issued by a corporate certificate, the corporate certificate will need to be imported.*

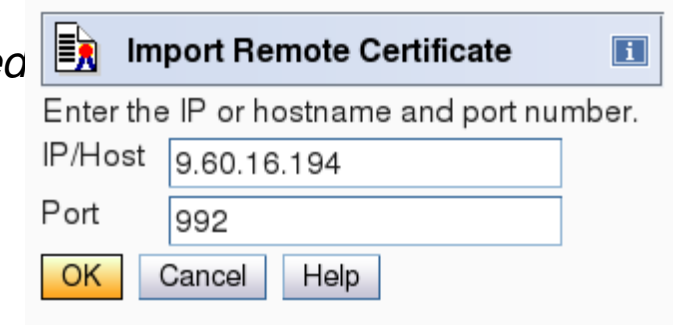


  - *If the connection between the console and the System z Operating System can be trusted at the time of importing the certificate,*

    >> the import from the remote server option can be used

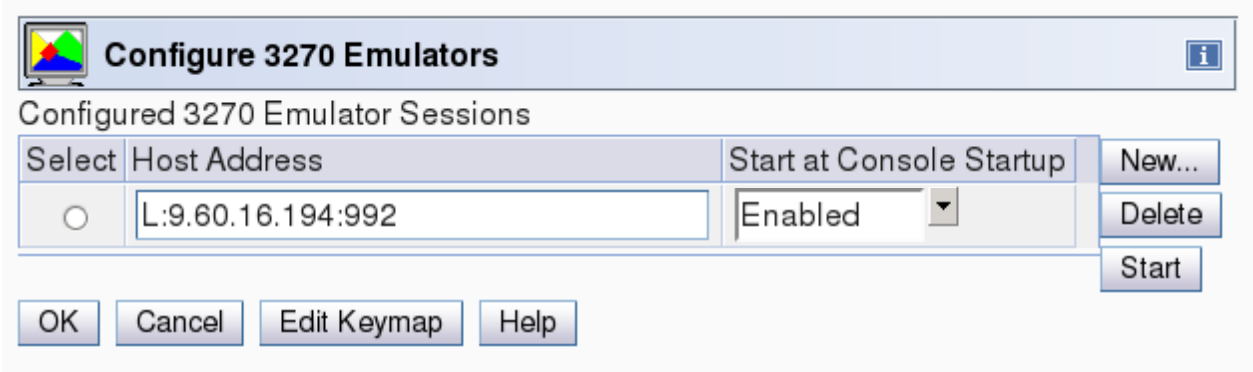
    >> otherwise, the certificate should be imported from removable media:

    ====> media: recommended general practice



Updates to x3270 Support (aka Secure 3270)

- *A secure telnet connection is established by pre-pending a "L:" to the IP address:port of the IBM host*



zBX (System z BladeCenter Extension)

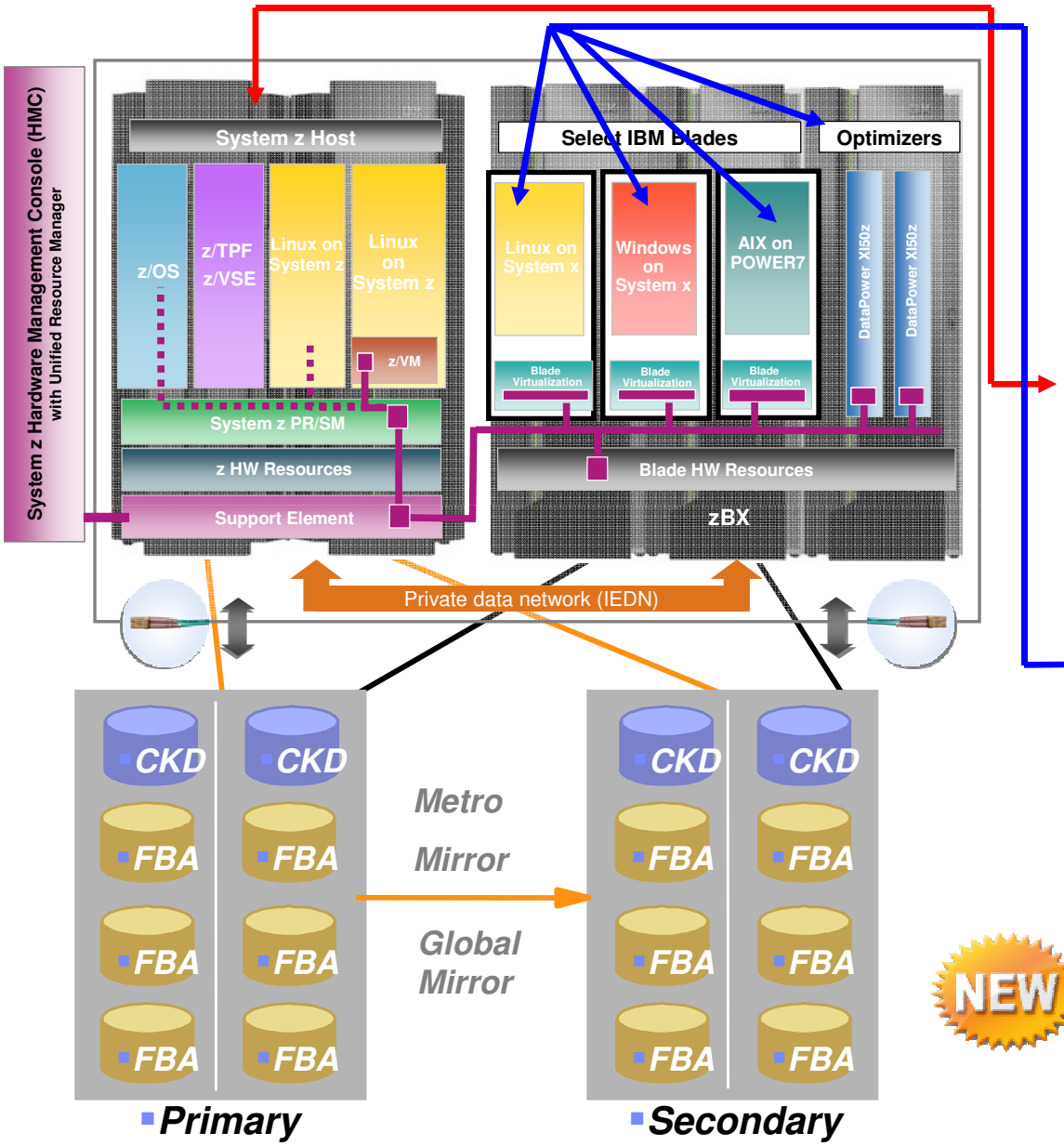
- Pending IBM System x sale to Lenovo
  - IBM will continue to support zBX, and it's service is uninterrupted!
  - IBM has worked with Lenovo before as a partner
    - For example, System z Support Elements that are Lenovo laptops
  - IBM is continuing forward with our plans to support zBX
  - zBX remains an integrated System z component supported by System z Service.

- In regards to HMC/SE 2.12.1
  - Updated all zBX internal firmware
    - AMM, switches, uEFI, IMM, FSPs, DataPower XI50z, etc
  - Support to carry zBX Configuration/Virtualization data to new location in same ensemble
    - Upgrade support
      - z196/z114 (zBX Mod 002) to zEC12/zBC12 (zBX Mod 003)

GDPS zBX Support: Unmatched Resiliency and Availability

- **zBX provides Integration, Resiliency, and Redundancy for increased Availability of Hardware and Firmware components**
  - Pre-configured Hardware Components
  - Encapsulated Hypervisors, deployed as firmware
  - 24 x 7 IBM Maintenance support / Call home
  - Reduced Cabling and Integrated L2 switch
  - zBX firmware treated like CPC Firmware to ensure efficient, secure, concurrent update
  - Redundant Built-in Components: (switches, cables, HMCs. SE's….)
  - All components tested together
- **Unified Resource Manager enables Availability Management of Virtual Servers and Workloads**
  - APIs allows for better integration with availability management and/or dashboard products
  - Existing cluster layer management is supported in the context of zEnterprise (e.g. Sysplex and PowerHA®)
  - Redundant HMCs keep the system available–accessed via the Web and configured to separate role, objects, and actions
  - APIs exist for Starting, Restarting and Stopping virtual servers NEW
- **New Ensemble Availability Manager**
  - Monitor and report virtual server availability based on policy
  - Provide availability status for virtual servers associated with a workload
- **GDPS (Geographically Dispersed Parallel Sysplex) support for zBX**
  - GDPS products support the start, stop, and switching of applications executing on virtual servers in a zBX to active target virtual servers NEW
  - Automated Multi-Site Recovery Extends GDPS/PPRC continuous availability/disaster recovery capabilities to virtual servers in a zBX

GDPS Capabilities for zEnterprise Business Continuity



- **Metro Mirror or Global Mirror configurations**
  - Data consistency across system z (z/OS, zVM, and Linux on System z) and distributed systems running in zBX
  - Single point of control
- **xDR for z/OS and Linux applications on system z**
  - Data consistency, HyperSwap™
  - Planned/Unplanned site switches
- **Distributed Cluster Management (DCM)**
  - Tivoli System Automation Application Manager
  - Veritas® Cluster Server clusters
  - Coordinated Planned and unplanned site switches for
    - zEnterprise sysplex
    - Distributed Cluster Servers in zBX (Windows, AIX, Linux)
- **GDPS Automated multi-site recovery for zBX announced July 23,2013**
  - Extends GDPS/PPRC continuous availability/disaster recover capabilities to virtual servers in a zBX
  - Help facilitate the management of planned and unplanned outages across IBM zEnterprise

GDPS zBX Support Hardware and Software Pre-Reqs

- *GDPS v3.10*
- *IBM z196 Mod 2 zBX or EC12 Mod 3 zBX with p and/or x Blades*
- *IBM zManager HMC primary and backup*
- *Mainframe and Distributed System storage on shared IBM DS8K with OpenLUN*
- *IBM System Automation for z/OS v3.4*
  - *ISQECMD ProcOp and return codes*
  - *zEnsemble commands and return codes*
- *IBM Tivoli System Automation Application Manager (SA AppMan) V3.2.2*
  - *Distributed systems workload management*

GDPS zBX Support

Q2 2013: GDPS/PPRC & GDPS/GM v3.10

- *Support for zBX running AIX, Linux and/or Windows*
- *zBX workload management provided by GDPS Distributed Cluster Management (DCM) and SA AppMan*

Q3 2013: GDPS/PPRC & GDPS/GM v3.10

- *SA AppMan Toggle Support*
- *Agentless Adapter support to control standalone zBX server workloads*

Q4 2013: GDPS/PPRC v3.10

- *zBX hardware control*
  - *Hardware provisioning as part of workload site failover*
  - *Planned and Unplanned CA/DR for virtual servers on zBX blades*
- *zManager HMC Automatic Failover*

Summary: Ensemble Availablity Manager (EAM)

Monitor, display and emit workload availability requirements within installation-defined objectives

- *Monitor Operating status of Workload Elements (Virtual Servers, Workload Element Groups)*
- *Workload Availability Policy Management*
- *Workload Availability Status and Goal Compliance*
- *Workload Element Group Management*
- *Virtual Server Availability Status*
- *Availability Status Reports (Workload Resource Groups, Virtual Servers, Workload Element Group)*

First step to delivering on Availability management in Unified Resource Manager

Value delivered with Ensemble Availability Manager (EAM)

- **Consistent high availability management across Virtual Servers in the zCEC & zBX in Ensemble**
  - **Availability assessment for Virtual Servers in Workload Resource Groups, given a user-defined Availability Policy**
    - **PR/SM LPARs (zCEC)**
    - **KVM guests (zBX)**
    - **PowerVM virtual machines (zBX)**
  - **Availability enhancements**
    - **Differentiated levels of availability management within the ensemble, based on**
      - **WRG availability importance**
      - **Redundancy**
      - **Capacity management**

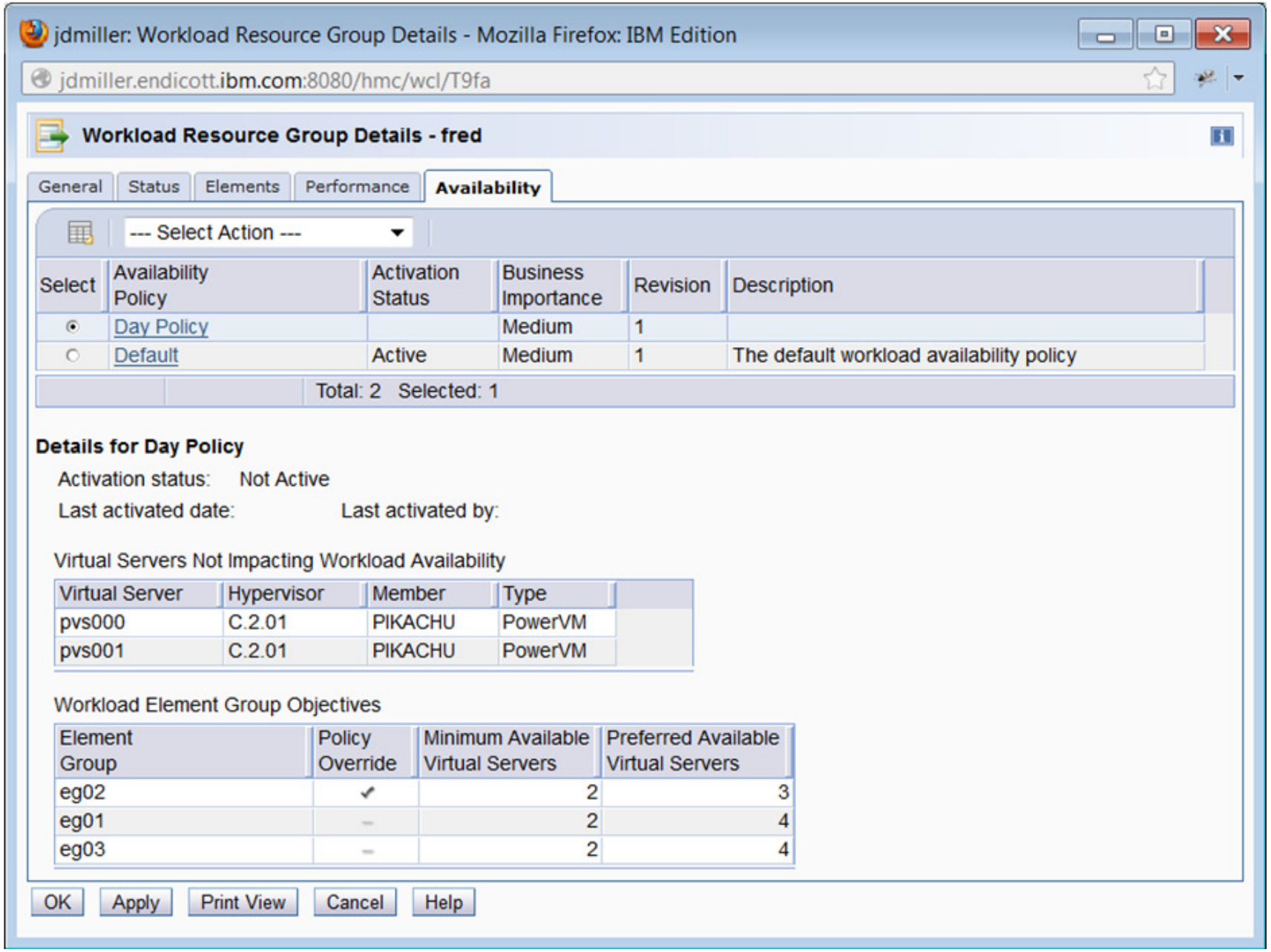
Ensemble Availability Manager

- Goal: Ensure WRG availability requirements are met, within installation-defined objectives

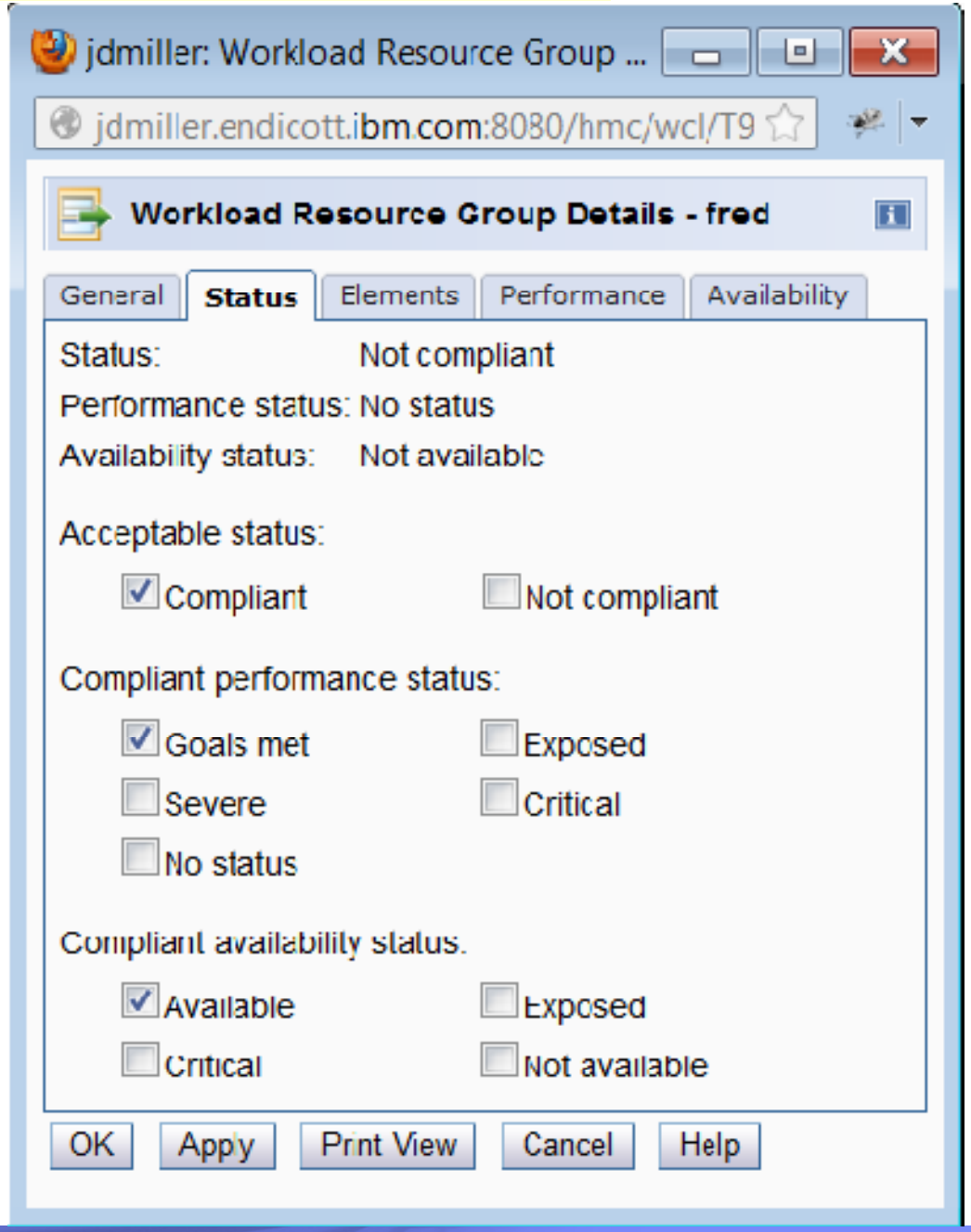
- **Monitor the operating status** of the Workload elements (virtual servers, workload element groups)
- **Determine Workload availability status** on all "element" status changes
- **Present Workload & Virtual Server Availability status:** Available, Exposed, Critical, Not Available
  - Status "reason" identifies Workload elements for exposed & not available states
- **Create, Monitor Workload Element Group compliance:** redundant servers associated with 1 or more workloads
- **Prioritize availability management via Workload Availability Policy**
  - Workload availability importance, Workload Impact (Directly-assoc VS), Redundancy Objectives
- **HMC display of Availability status**, "metric" for Workloads, EGs, VS's
- **Workload Availability Report**
  - All workloads, Selected workload, Virtual server, all elements
- **Interoperate with data center availability management** via external API to define Availability configuration/policy, or receive Availability status updates

** Ensemble must be at the AUTOMATE entitlement level

Workload Details – *Availability Tab*



Workload Details *Status*



Tivoli System Automation can ensure Application Software availability using insight from EAM's view of Virtual Servers

Management of software stack and Business Application availability

Policy

GDPS

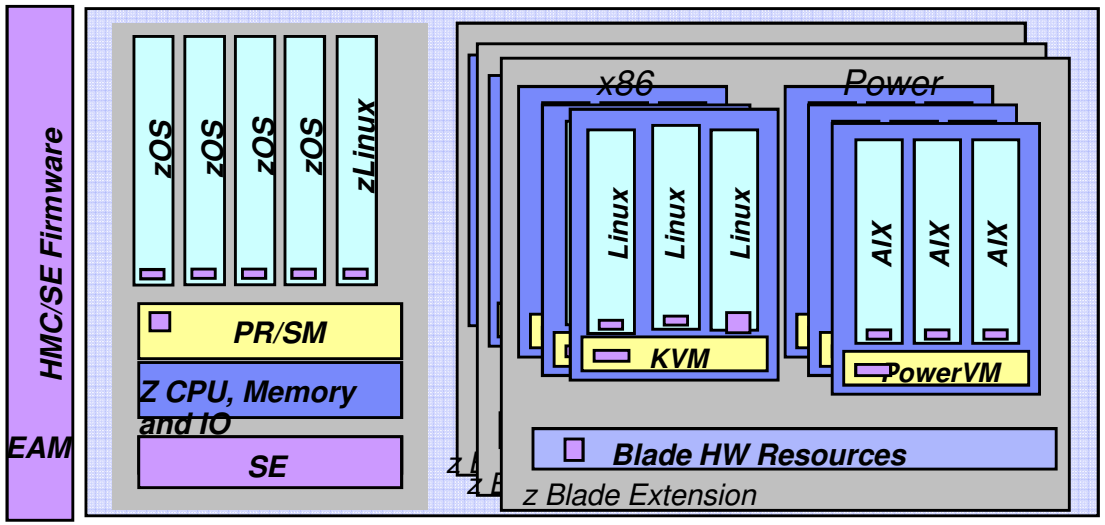
Automate Operations

Integrated Workload availability for normal operations and disaster recovery! (e.g., Planned app move, Recover workload)

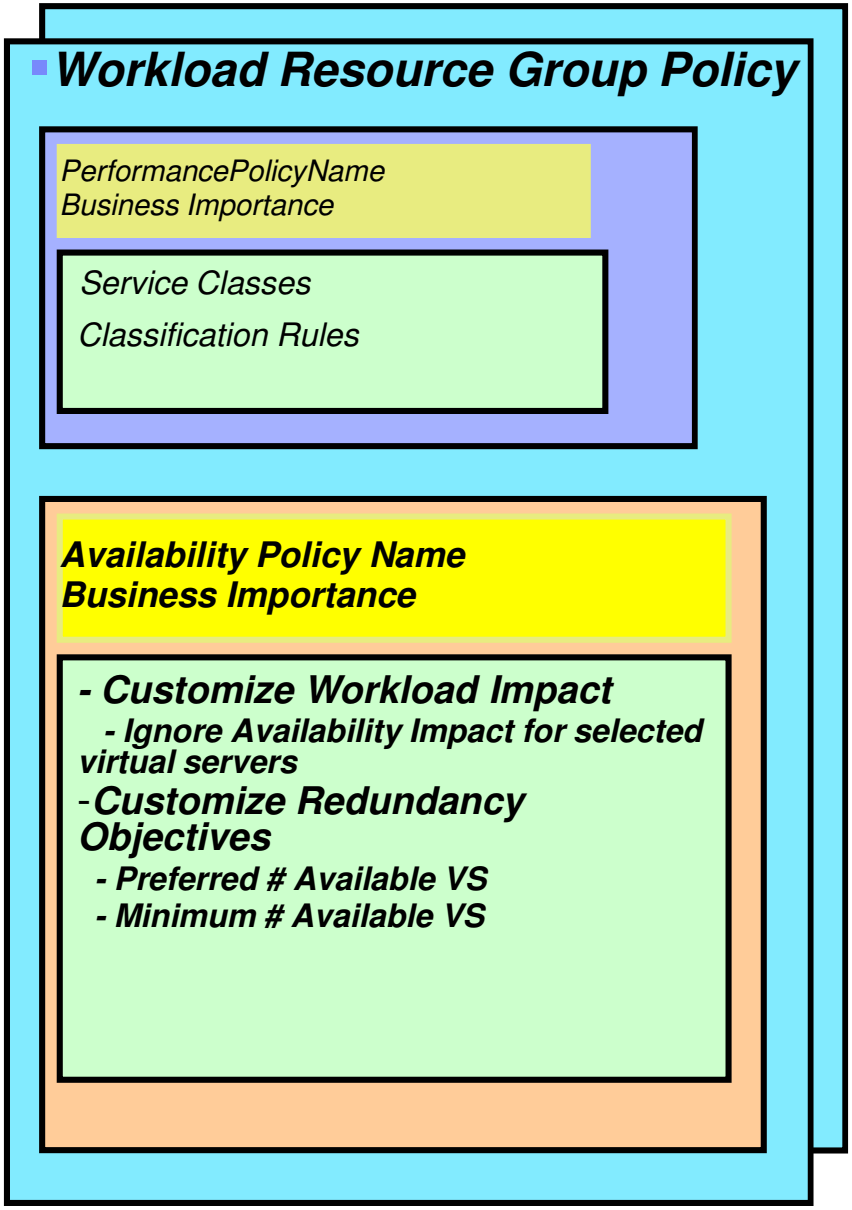
EAM Availability status & events

Availability for hypervisor view of Workload Resource Groups with Virtual Server containers

Unified Resource Manager APIs



Workload Resource Group Availability Policy

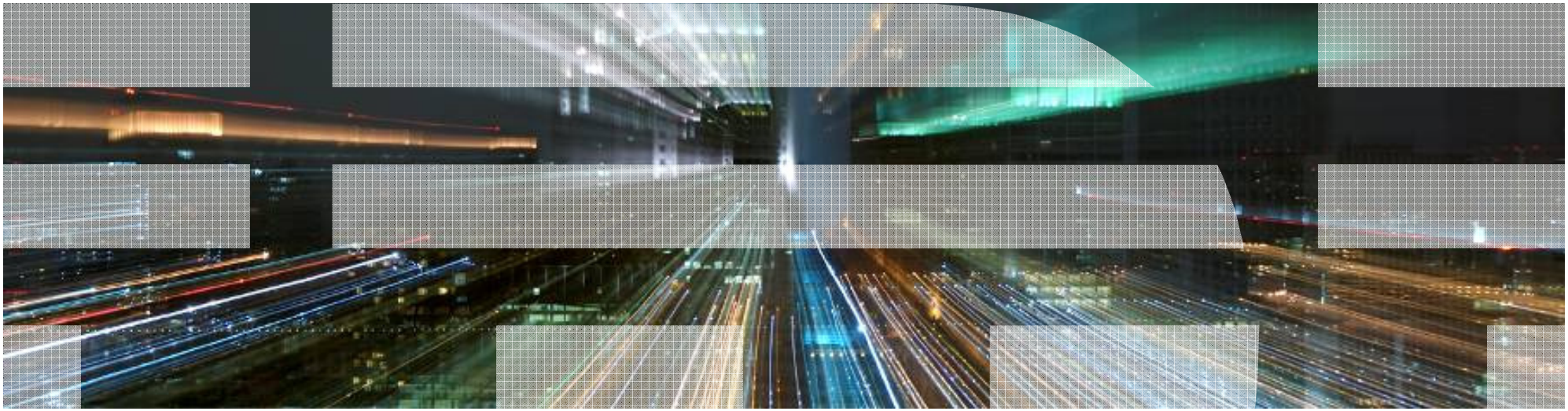


- Availability Business Importance (highest, high, medium, low, lowest)
- Customize Redundancy Objectives by workload
- Workload impact:
  - Indicate virtual servers that will not affect the workload's availability status when the selected availability policy is active

What's New for zEnterprise Monitoring and Discovery

zEnterprise Monitoring Agent (v6.2.3.2)
TADDM (IBM Tivoli Application Dependency Discovery Manager)7.2.2

Released 1H2013



zEnterprise Monitoring Agent v6.2.3.2 - New Content

- **Visibility of zAware LPAR Health –** The zEnterprise Monitoring Agent monitors the availability and key performance metrics, such as CPU utilization, of zAware logical partitions. Historical CPU utilization measurements can be used for capacity planning to evaluate the need of additional CPU utilization before bringing on-line more zAware clients.

- **End-to-end visibility of all virtualized workloads running across both zBX and the zCPC** – The zEnterprise Monitoring Agent can now monitor the availability and key configuration settings for all Logical Partitions defined in the Ensemble. Detailed monitoring information about the z/OS or z/VM virtual servers is available for each LPAR. This addition completes the detailed monitoring of all hypervisor and virtual server types supported by the zEnterprise platform.

- **Intra-ensemble data network monitoring** – The zEnterprise Monitoring Agent provides a summary of all Virtual Networks and Uplinks defined in an Ensemble. Monitoring of key performance metrics can be used to quickly see overall utilization and health of the intra-ensemble data network (IEDN).

- **Dynamic workspace linking to OMEGAMON zVM and Linux for faster problem resolution** – As with Linux, AIX, and Windows agents, the zEnterprise monitoring agent also links to OMEGAMON for z/VM and Linux to provide more detailed information about z/VM configuration settings and performance metrics.

- **Visiblity to the health of zEnterprise Monitoring Agent** - Monitors the availability of the Hardware Management Console (HMC) connection and notifies operations if the agent is no longer able to monitor resources managed by that HMC.

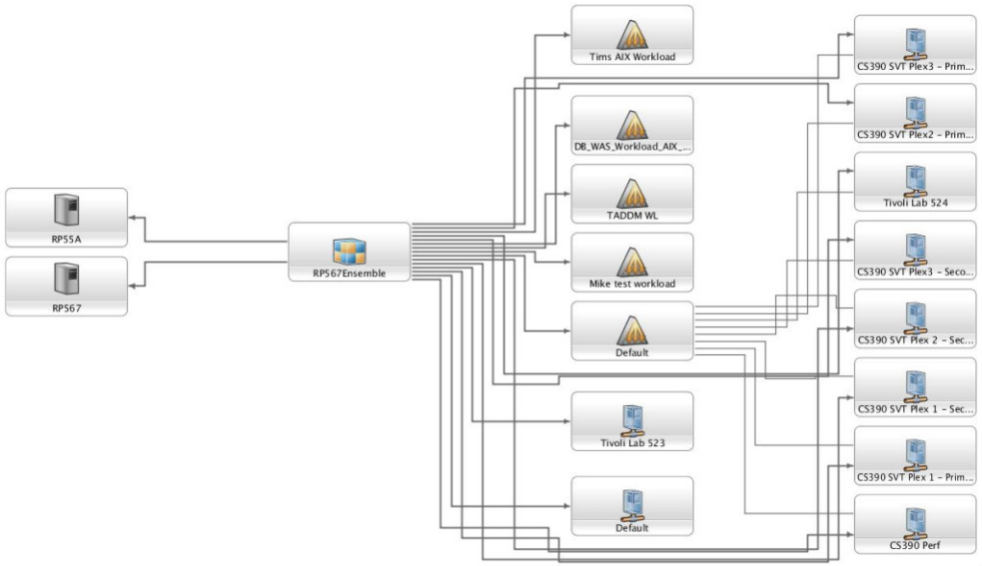
- The zEnterprise Monitoring Agent ships with IBM Tivoli Monitoring (ITM).
- Utilizes HMC WebServices APIs.

zEnteprise Discovery with TADDM 7.2.2

- TADDM (IBM Tivoli Application Dependency Discovery Manager) - **Provides robust and automated discovery and application mapping for building an inventory of applications, configurations and dependencies**
- Agent-less Discovery of zEnterprise resources **- Discover and create new zEnterprise resource objects and their associated configuration using "agent-less" System z Hardware Management Console (HMC) API and TADDM sensor technology**
- Extend and complement existing System z discovery **– Extend investments in TADDM, z/OS DLA and z/VM DLA installations to include zEnterprise physical and logical resource configuration.**
- Extend and complement existing distributed discovery **– Extend investments for operating systems that can be hosted on zEnterprise zBX virtual servers (i.e. Linux, AIX and Windows®)**
- Create relationships between resources **within the zEnterprise ensemble and the associated System z environment workload topology**
- Visibility into configuration setting for zEnterprise Systems -**Track high level configuration data provided by the System z HMC**

Ensemble entities discovered with TADDM zEnterprise sensor

- **Physical:**
  - **CPC (zEC12, z196, z114)**
  - **zBX**
  - **Rack**
  - **BladeCenter**
  - **IBM System x Blade**
  - **IBM POWER7 Blade**
  - **IBM WebSphere® DataPower® Integration Appliance XI50 for zEnterprise**
  - **Virtualization Host Storage Resource**
- **Logical:**
  - **Ensemble**
  - **z/VM Virtualization Host**
  - **PowerVM® Virtual Server**
  - **xHyp Virtual Server**
  - **PR/SM™ Virtual Server**
  - **z/VM® Virtual Server**
  - **Logical Partition**
  - **Virtual Network**
  - **Workload Resource Group**



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***

Additional Materials

- **Other SHARE Sessions of Related Interest**
- **Registering for IBM Resource Link Access**
- **Notable HMC/SE Publications**

Other SHARE Sessions of Related Interest

- March 11th, 9:30 – 10:30 AM
  - **14680**: *z/OS V2R1 Communications Server: Shared Memory Communiations – RDMA (SMC-R)*
- March 11th , 12:15 – 1:15 PM
  - **14571**: *Crypto and TKE – Your Future*
- March 11th , 3:00 – 4:00 PM
  - **14209**: *Experiences with IBM zAware and zEDC*
- March 12th, 8:00 – 9:00 AM
  - **15048**: *What's New in BCPii in z/OS 2.1? Full REXX Support and Faster Data Retrieval*
- March 12th, 9:30 – 10:30 AM
  - **14652**: *Introducing the IBM zEnterprise BC12 and EC12 Updated Hardware: Processor, Memory, System Structure, and Installation Planning*
- March 13th, 9:30 – 10:30 AM
  - **15053:** *IBM System z HMC Security Best Practices*
- March 13th, 4:30 – 5:30 PM
  - **15043**: *zEC12 User Experiences*

Registering for IBM Resource Link Access

- **Registering for IBM Resource Link Access**
- **To view the documents on the Resource Link Web site. you need to register your IBM Registration ID (IBM ID) and password with Resource Link.**
- **To register:**
  - **Open the Resource Link sign-in page: http://www.ibm.com/servers/resourcelink/**
  - **You need an IBM ID to get access to Resource Link.**
    - **If you do not have an IBM ID and password, select the "Register for an IBM ID" link in the "Your IBM Registration" menu. Return to the Resource Link sign-in page after you get your IBM ID and password.**
    - **Note: If you're an IBM employee, your IBM intranet ID is not an IBM ID.**
  - **Sign in with your IBM ID and password.**
  - **Follow the instructions on the subsequent page.**

Reference Documentation

- **Available from IBM Resource Link: Library->zEC12->Publications**
  - **Info Center Link: *Hardware Management Console Operations Guide Version 2.12.1***
  - **Info Center Link: *Support Element Operations Guide Version 2.12.1***
  - **Info Center Link: *Hardware Management Console Operations Guide for Ensembles Version 2.12.1***
  - **IBM SB10-7030: *Application Programming Interfaces***
  - **IBM SC28-2605: *Capacity on Demand User's Guide***
  - **IBM SC27-2626: *Hardware Management Console Web Services API Version 2.12.1***
  - **IBM SB10-7156: *PR/SM Planning Guide***
  - **IBM SA22-1088: *System Overview***
  - **IBM Z121-0243: *Hardware Management Console: Frequently Asked Questions***
- **Available from IBM Resource Link: Library->zEC12->Technical Notes**
  - ***System z Hardware Management Console Security***
  - ***System z Hardware Management Console Broadband Remote Support Facility***
  - ***System z Activation Profile Update and Processor Rules***

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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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