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Cisco Intelligent Gigabit Ethernet Switch

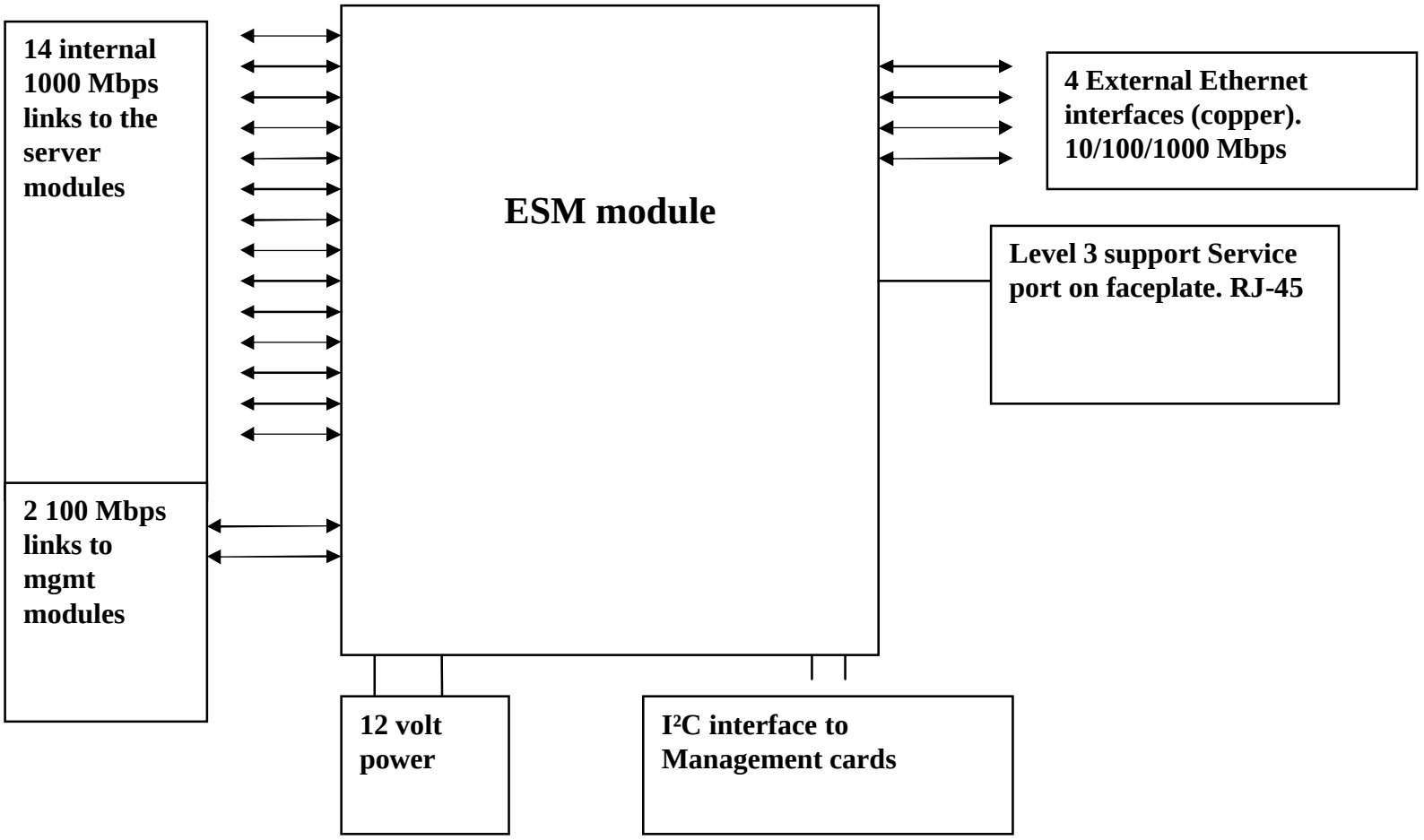
Objectives

- Present the system architecture, configuration and troubleshooting of the Cisco IGESM
- Demonstrate the interaction between the CIGESM and IBM BladeCenter Management Module
- Obtain hands-on experience of the switch setup and feature configuration

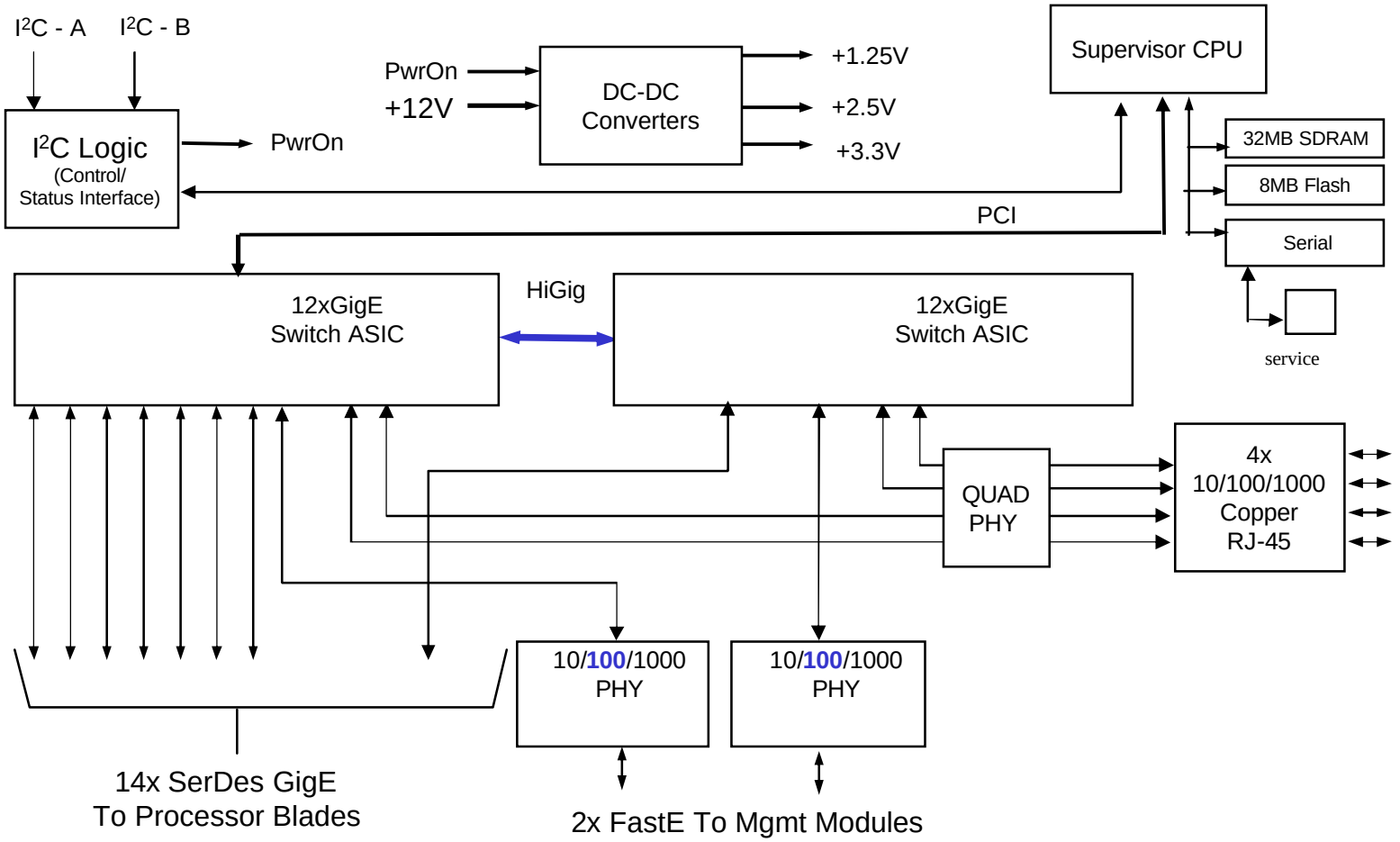
CIGESM Agenda Overview

- Introduction
- System Overview
- Management Module/CMS Interaction
- Managing CIGESM
- Feature Configuration
- Serial Over LAN
- Troubleshooting
- Summary

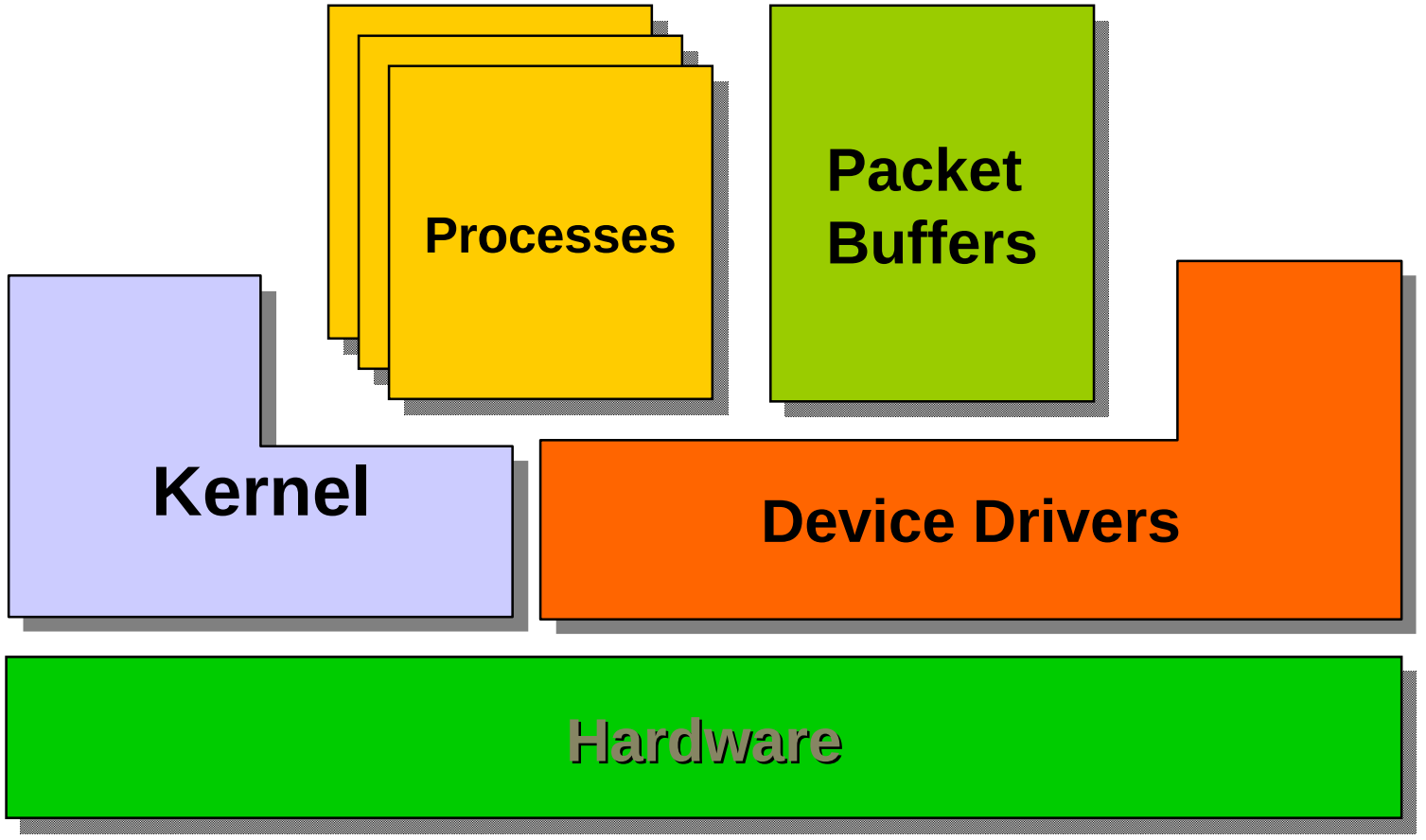
Cisco Intelligent Gigabit Ethernet Switch Module (CIGESM) Overview



HW Block Diagram



SW Block Diagram



Partial Software Feature List

- 4K VLAN ID range
- 250 active VLANs
- 8K MAC addresses
- Port monitoring
- Trunking
  - IEEE 802.1Q
  - VTP
  - DTP
  - VTP Prunning
- Security
  - Port security
  - IEEE 802.1x
  - RADIUS/TACACS+
  - Secure Shell
  - BPDU Guard
- QoS
  - 4 Priority Queues
  - IEEE 802.1p priority
  - Weighted Round Robin
  - Strict Priority Scheduling
  - Unicast/Multicast/Broadcast Storm Control
  - Voice VLAN
- IP Multicast
  - IGMP snooping
  - MVR
- Link Aggregation
  - LACP (802.3ad)
  - PAgP
- Spanning Tree
  - IEEE 802.1D
  - IEEE 802.1w (RSTP)
  - IEEE 802.1s (MSTP)
  - PVST/PVST+/PVRST+
  - Port fast
  - Uplink fast
  - Root guard
  - Backbone fast
- Manageability
  - CDP
  - NTP
  - SNMP v1, v2, v3

CIGESM Boot-Up

Bootup sequence

1. Management module validates the switch module. Instructs switch to bootup.
2. Switch executes bootloader out of reserved section in FLASH
3. Bootloader runs diagnostics/POST on CPU cache, DRAM (every time), and Flash
4. Bootloader loads IOS image from FLASH to DRAM and turns control over to IOS
5. IOS starts basic kernel and platform initialization
6. IOS performs POST tests on switching Hardware
7. IOS processes configuration file, updates information in VPD, and signals POST complete to Management Module
8. Management module reads VPD to get IP Address and POST status

CIGESM POST Failure Code

Sub-Test Name	Diagnostic Indicator (in Hex)	Failing Functional Area	Failure Criticality
CPU Cache memory	0x01	Base Internal Functions	Critical
Non-Cache DRAM	0x02	Base Internal Functions	Critical
Internal ASIC packet memory	0x03-0x04	Base Internal Functions	Critical
ASIC PCI memory	0x05-0x06	Base Internal Functions	Critical
data path test: mgmt ports	0x07-0x08	Base Internal Functions	Critical
VPD region read test	0x09	Base Internal Functions	Critical
Flash Memory in Extended Post	0x0A	Base Internal Functions	Critical
Flash Memory in regular POST	0x0B	Base Internal Functions	Critical
Data path test: Internal GE ports	0x81-0x8E	Internal Interface Failure	Non-Critical
Data path test: External ports	0xA1- 0xA8	External Interface Failure	Non-Critical

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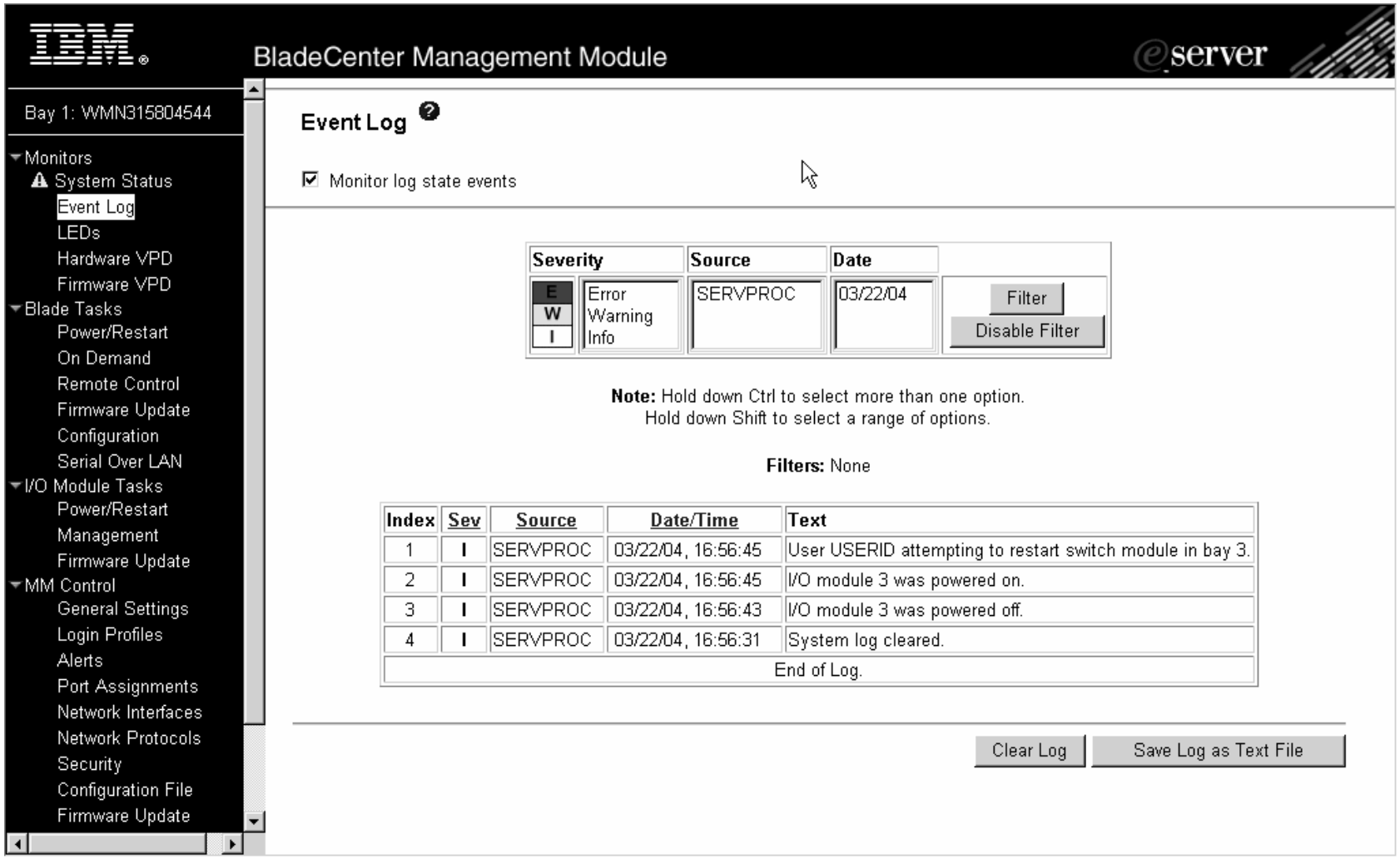
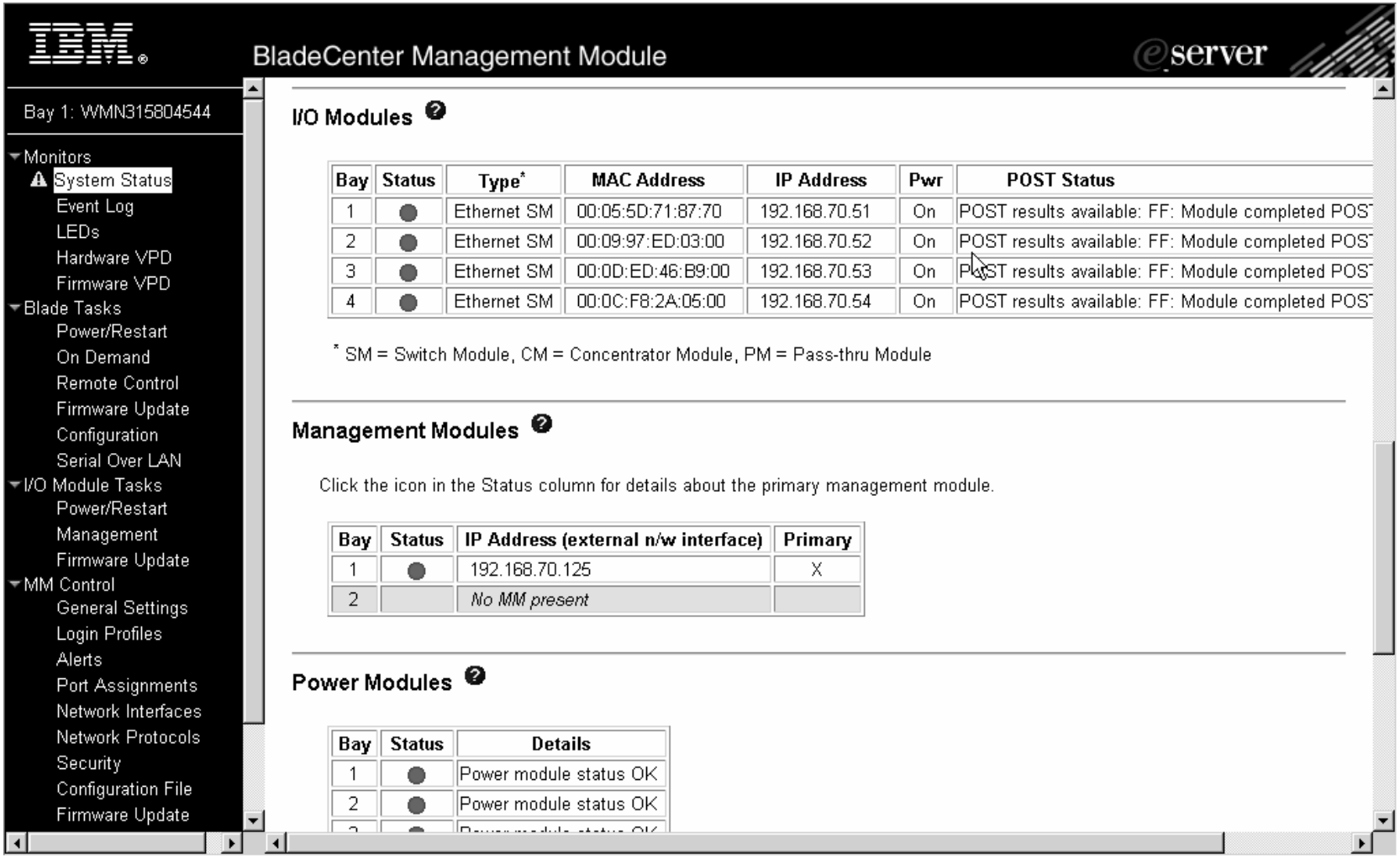
Cisco Intelligent Gigabit Ethernet Switch

Management Module/CMS Interaction

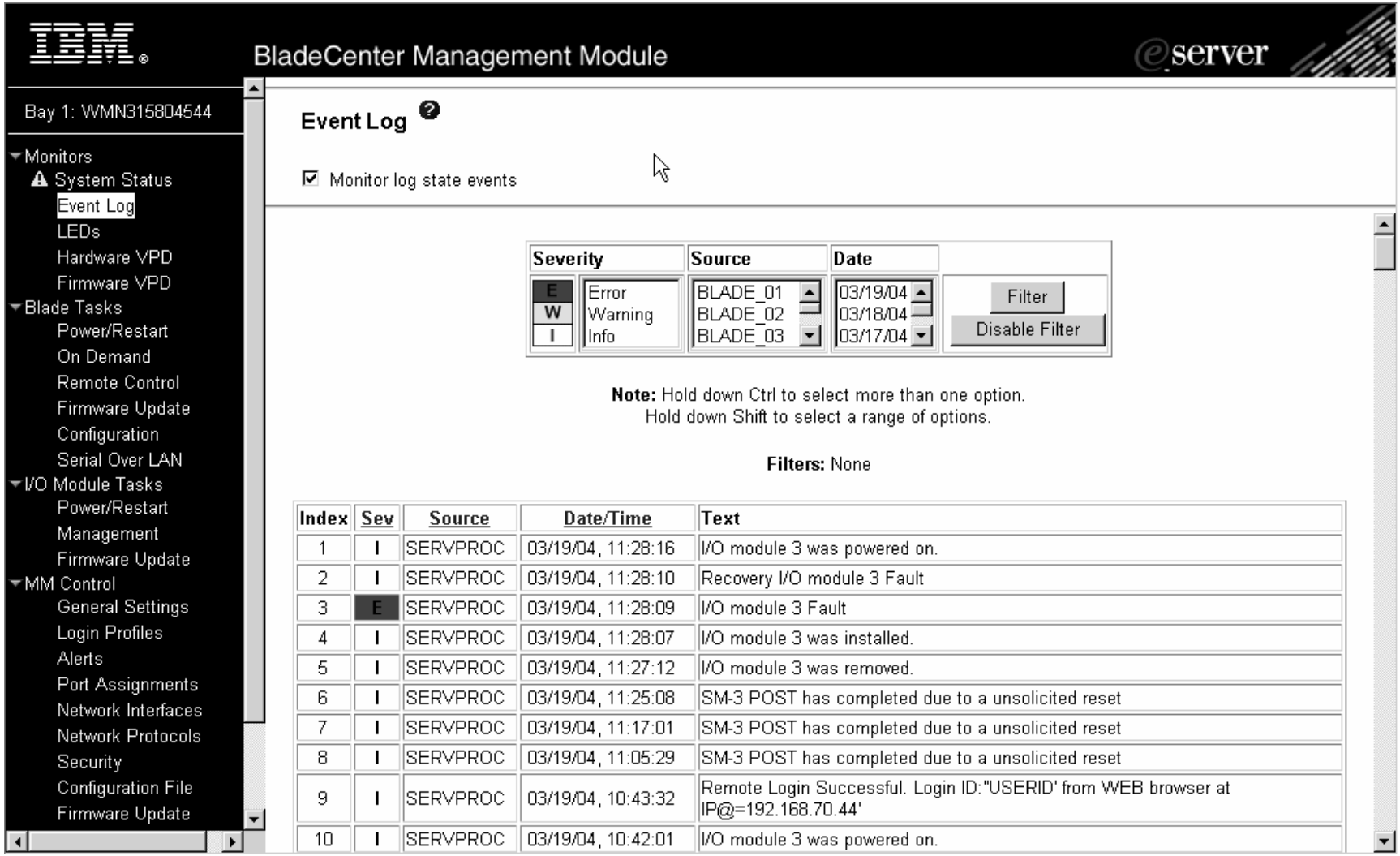
Management Module Restart



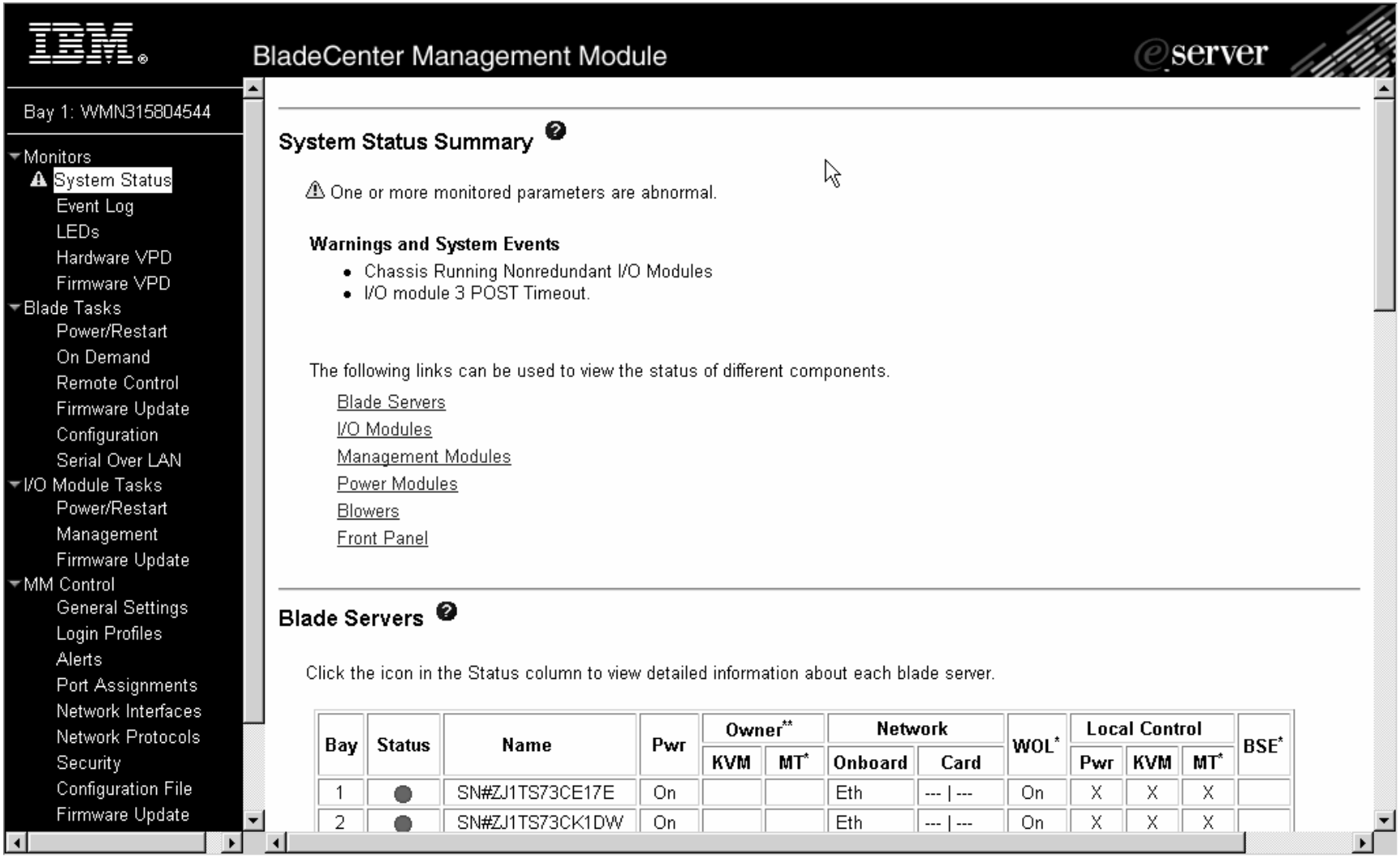
Results of Power-on Self Test



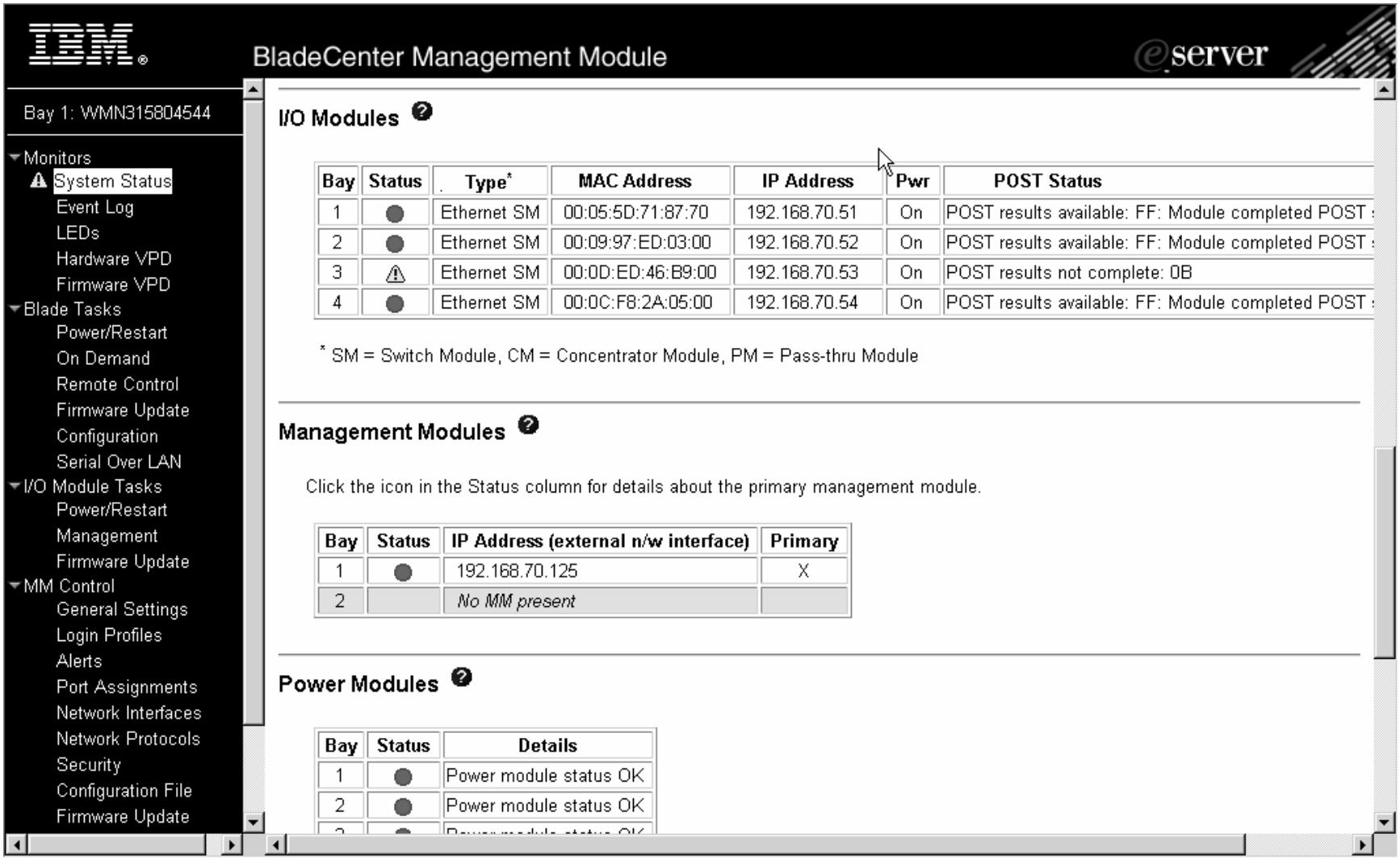
Cisco Switch Fault



Cisco Switch Fault



Cisco Switch Fault



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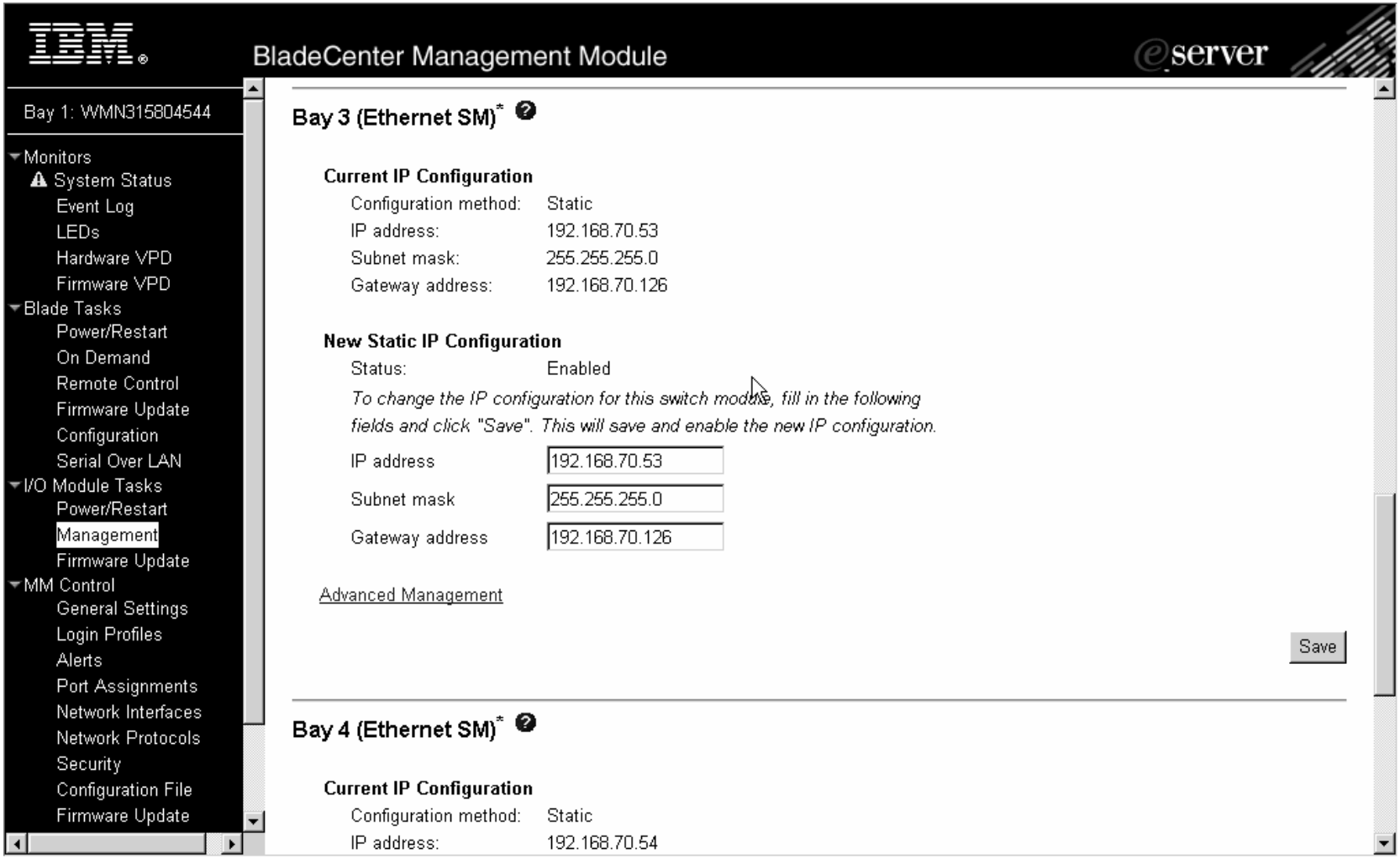
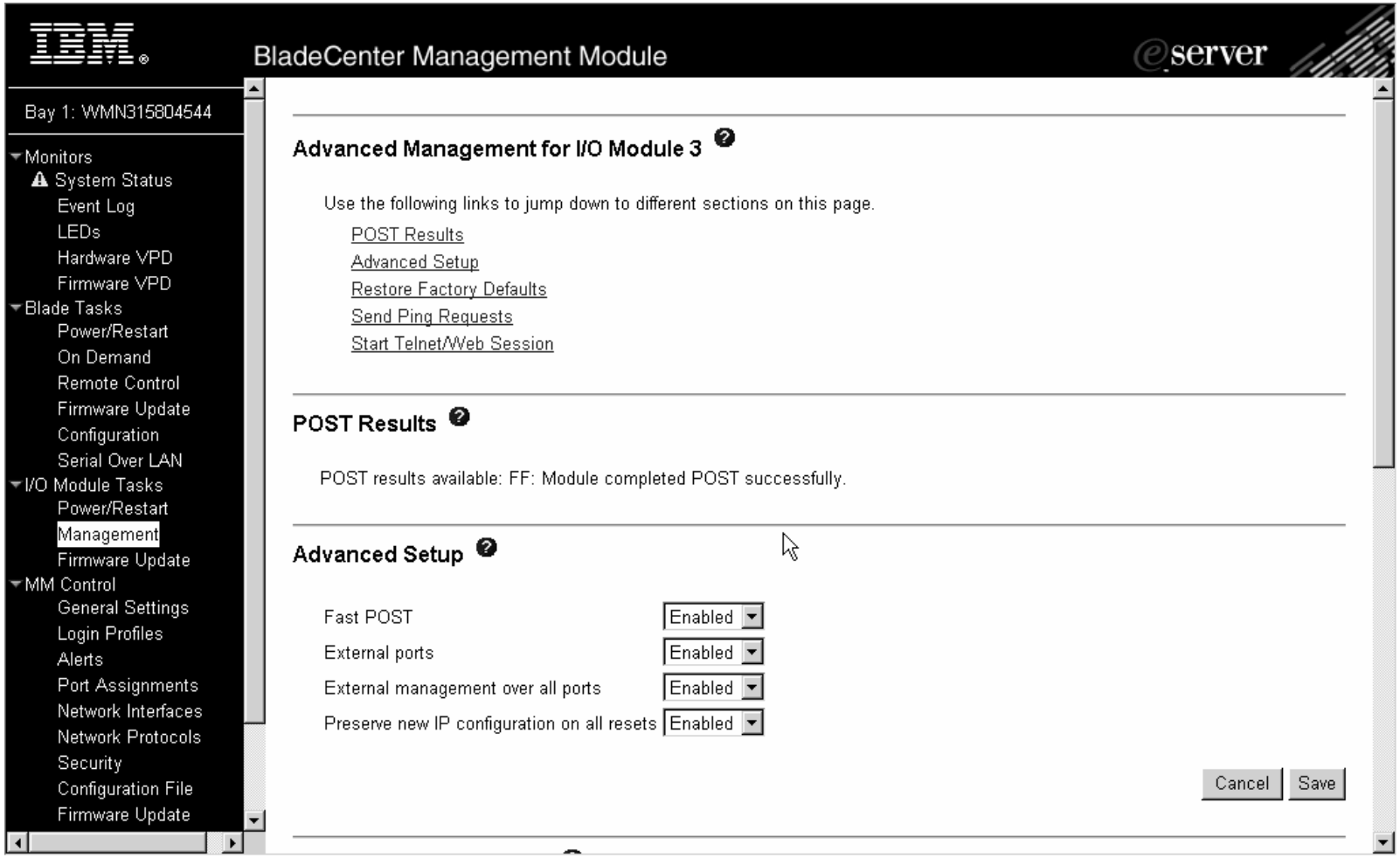
IP Addressing



Management over External Ports



Different Restart Options

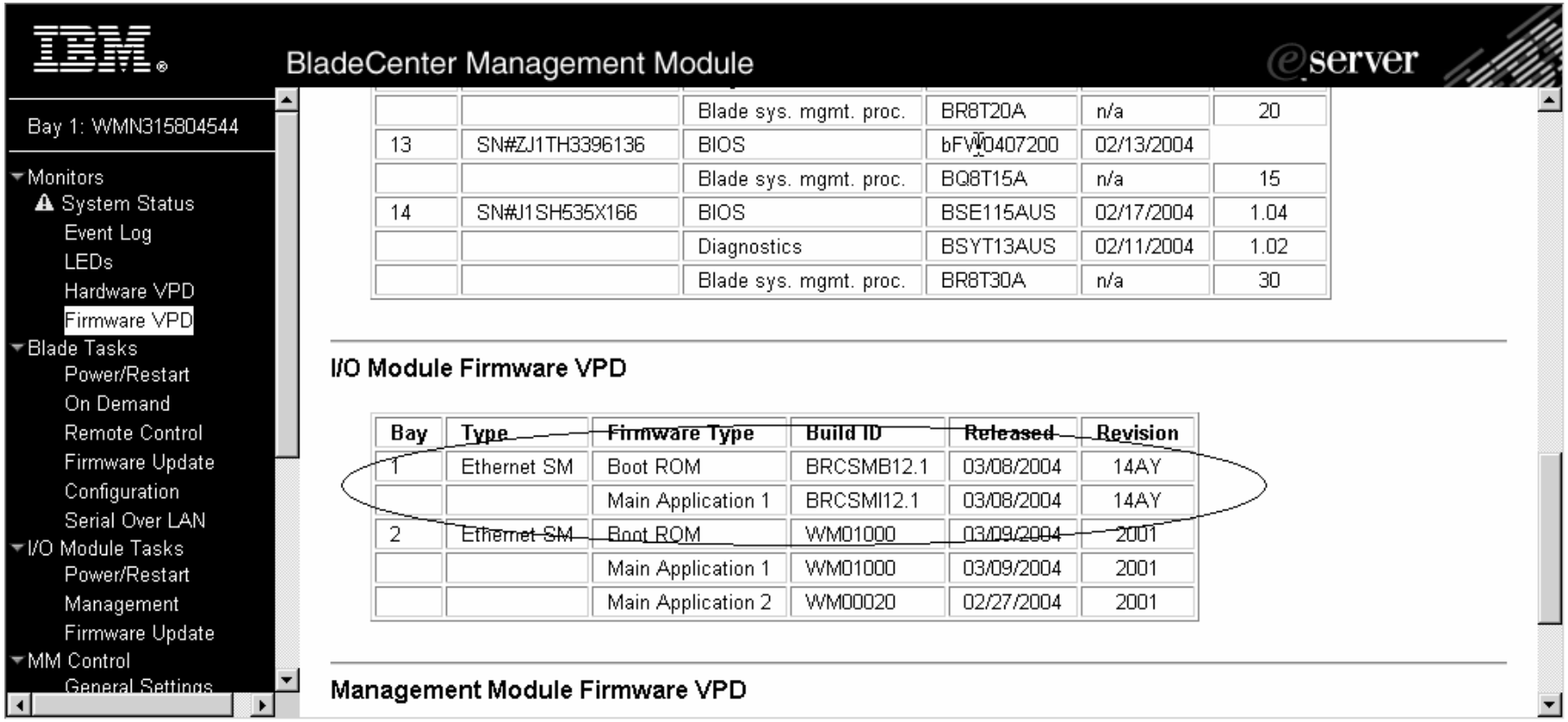
Case	Reset Initiator	Preserve new IP Config	Restore Factory Default[1]		Resulting GbESM IP Configuration	IP Comm between MM and GbESM
			MM	Sw		
1	**MM**	**Disabled**	**Yes**	**n/a**	**Factory setting[2]: 10.90.90.9x, etc.[3]**	**Possibly4]**
2	**MM**	**Enabled**	**Yes**	**n/a**	**New Static IP Configuration[5]**	**Available**
3	**MM**	**Disabled**	**No**	**n/a**	**New Static IP Configuration**	**Available**
4	**MM**	**Enabled**	**No**	**n/a**	**New Static IP Configuration**	**Available**
5	**GbESM**	**Disabled**	**n/a**	**Yes**	**Factory setting: 10.90.90.9x, etc.**	**Possibly**
6	**GbESM**	**Enabled**	**n/a**	**Yes**	**New Static IP Configuration**	**Available**
7	**GbESM**	**Disabled**	**n/a**	**No**	**Current IP Configuration[6]**	**Disabled[7]**
8	**GbESM**	**Enabled**	**n/a**	**No**	**New Static IP Configuration**	**Available**

Management Module Firmware Update

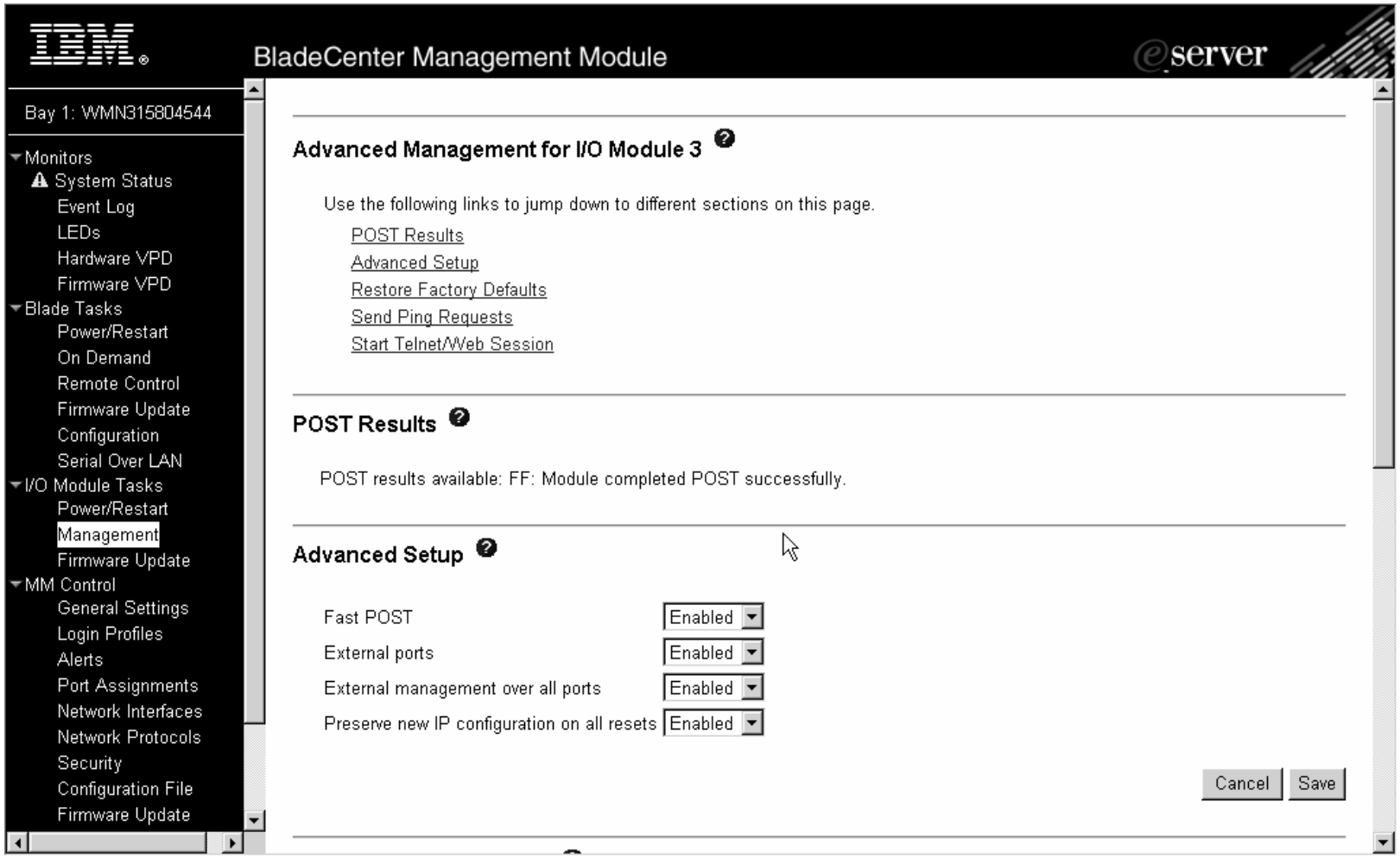
- A Management Module firmware update reloads the current IP address
- This means that if the customer has set his own IP address in his switch and is managing it externally, the customer ***loses*** connection with the switch
- The customer ***must reconfigure*** the IP address on each affected switch

Management Module Interaction

Firmware Versions

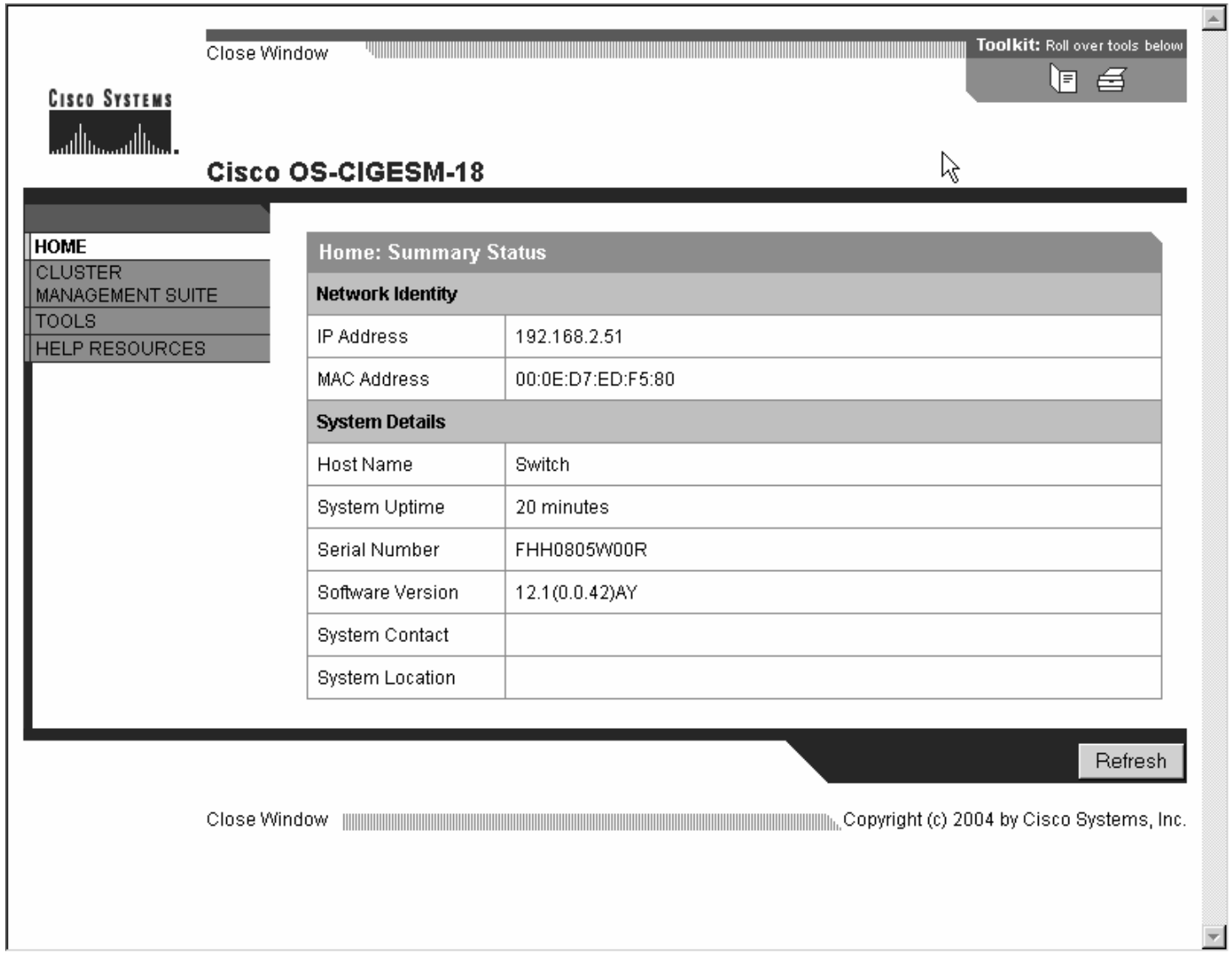


Advanced Cisco Switch Management

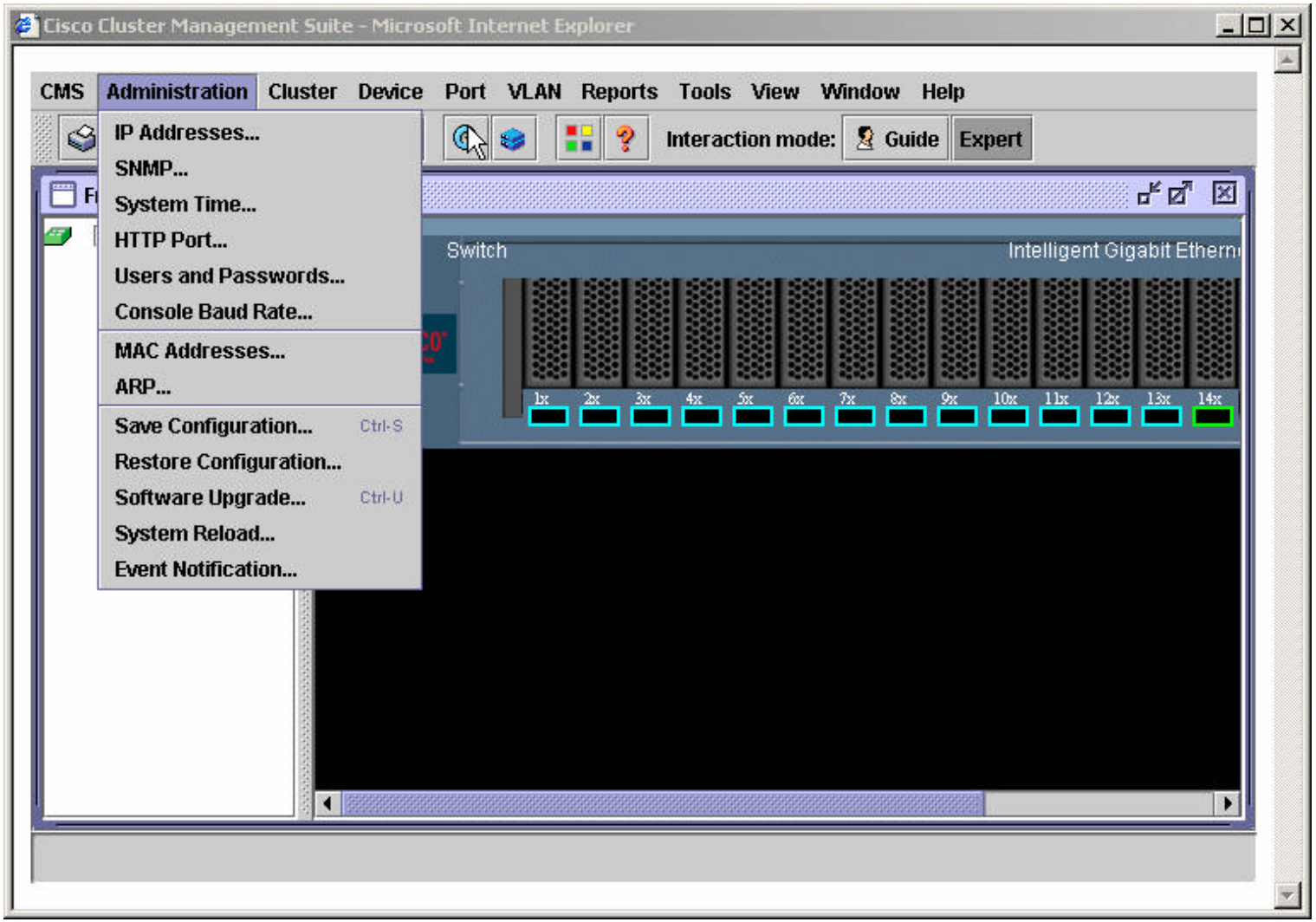


Starting a Web Session from the Management Module

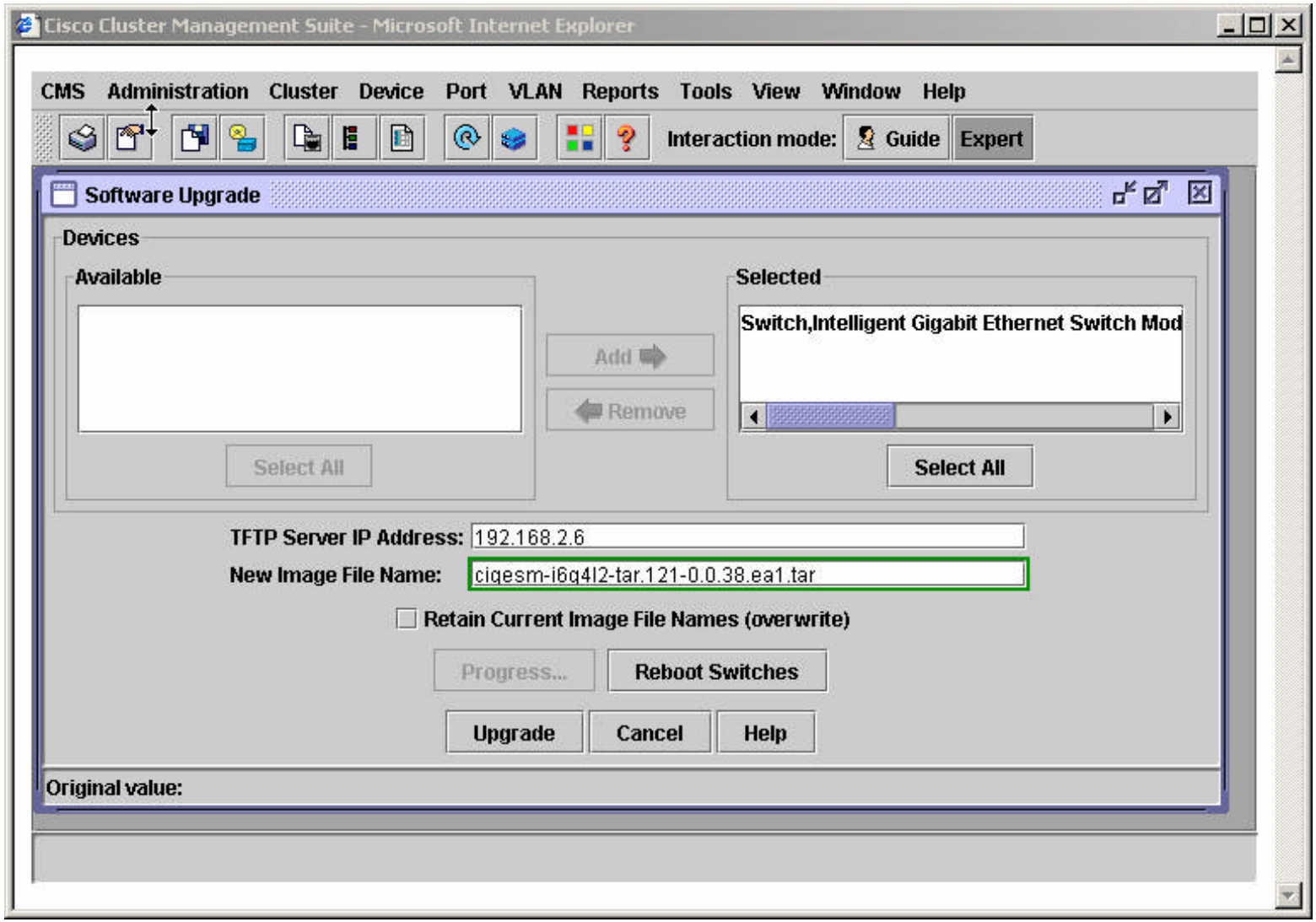
Cisco Switch Module Browser



Software Upgrade – Web Interface



Software Upgrade – Web Interface



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Managing CIGESM

IOS mode

Mode	Functions	Prompt	How to get to
User	Limited privilege	**Switch>**	**Telnet or service port**
Privilege (Enable)	Super user power	**Switch#**	**Enter** Enable **from User mode**
Global configuration	Make global changes or the change has system-wide impact	**Switch(config)#**	**Enter** config terminal **from privilege mode**
Interface configuration	Set up interface specific config	**Switch(config-if)#**	**Enter** interface_name **from global config mode**
VLAN configuration	New way to configure VLAN	**Switch(config-vlan)#**	**Enter** vlan # **from global config mode**
VLAN database	Old way to configure VLAN	**Switch(vlan)#**	**Enter** vlan database **from privilege mode**
Bootloader	Set boot environment	**Switch:**	**POST failure**

- Inspect the CIGESM
  - check software version, system uptime

```
switch# show version
```

  - check system health

```
switch# show process cpu
```

```
switch# show memory summary
```

  - check system configuration

```
switch# show running-config
```

- Inspect the CIGESM
  - check port status

```
switch# show interface status
```

  - check system history

```
switch# show log
```

  - check platform specific information

```
switch# show platform summary
```

Managing CIGESM

- change hostname

```
switch(config)# hostname NAME
```

- set up system time and date manually

```
switch# clock set HH:MM:SS Day Month Year
```

```
switch# show clock
```

- enable/disable message display to the screen

```
switch# terminal monitor
```

```
switch# terminal no monitor
```

Switch Manufacturing Defaults

- Default user login name and password

```
switch# show running-config
Building configuration...

Current configuration : 5545 bytes
!
version 12.1
no service password-encryption
!
username USERID privilege 15 secret 5 $1$wHcM$k2V7ULW2HsnsExS6JSd3a/
!
```

  - login: USERID password: PASSW0RD (note the zero)
  - Same as the defaults used for management module
  - Used to authenticate Telnet, CMS
  - Used in case you need to recover a switch

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Software Upgrade

Software Upgrade

- Only IOS needs to be upgraded
- Regular IOS image vs. crypto image (no upgrade procedural difference)
  - Regular image: **cigesm-i6q4l2-mz.121-0.0.42.AY.bin**
  - Crypto image: **cigesm-i6k2l2q4-mz.121-0.0.42.AY.bin**
- Binary file vs. TAR file (copy vs. archive)
  - TAR file includes both IOS binary image and CMS files
  - **cigesm-i6q4l2-tar.121-0.0.42.AY.tar**
  - **cigesm-i6k2l2q4-tar.121-0.0.42.AY.tar**
- Where to get IOS images for CIGESM .....?
- Upgrade through TFTP

Upgrade IOS binary image only using Command Line Interface (CLI)

1. Download image to TFTP server
2. Ping from the switch to the TFTP server

```
switch# ping ip_address_of_tftp_server
```

3. Make sure you have enough space in FLASH

```
switch# dir flash:
Directory of flash:/

  3  -rwx         736   Mar 01 1993 00:00:27  vlan.dat
  4  -rwx          16   Sep 10 2003 10:00:27  env_vars
  5  -rwx        6631   Mar 01 1993 00:10:36  config.text
 10  drwx         192   Mar 04 1993 23:32:49  cigesm-i6q4l2-mz.121-0.0.42.AY

7612416 bytes total (1999872 bytes free)
```

Upgrade IOS binary image only using CLI (cont.)

4. Copy image from TFTP to switch's FLASH

```
switch#copy tftp flash:
Address or name of remote host []? 192.168.10.1
Source filename []? cigesm-i6q4l2-mz.121-0.0.42.AY.bin
Destination filename [cigesm-i6q4l2-mz.121-0.0.42.AY.bin]?
Accessing tftp://192.168.10.1/cigesm-i6q4l2-mz.121-0.0.42.AY.bin...
```

Upgrade IOS binary image only using CLI (cont.)

5. Change switch boot path variable

```
switch(config)# boot system flash:new_image_name
```

6. Save the change and reload switch

```
switch# show boot
switch# copy running-config startup-config
switch# reload
```

7. Verify the change

Upgrade IOS and CMS with TAR file using CLI

1. Download TAR file to TFTP server
2. Ping from the switch to the TFTP server

```
switch# ping ip_address_of_tftp_server
```

3. Make sure you have enough space in FLASH

```
switch# dir flash:
Directory of flash:/

  3  -rwx         736   Mar 01 1993 00:00:27  vlan.dat
  4  -rwx          16   Sep 10 2003 10:00:27  env_vars
  5  -rwx        6631   Mar 01 1993 00:10:36  config.text
 10  drwx         192   Mar 04 1993 23:32:49  cigesm-i6q4l2-mz.121-0.0.42.AY

7612416 bytes total (1999872 bytes free)
```

Upgrade IOS and CMS with TAR file using CLI (cont.)

4. Archive download TAR file from TFTP to switch's FLASH

```
switch# archive download-sw ?
  /force-reload  Unconditionally reload system after successful sw upgrade
  /imageonly     Load only the IOS image
  /leave-old-sw  Leave old sw installed after successful sw upgrade
  /no-set-boot   Don't set BOOT -- leave existing boot config alone
  /overwrite     OK to overwrite an existing image
  /reload        Reload system (if no unsaved config changes) after successful sw upgrade
  /safe          Always load before deleting old version
  flash:         Image file
  ftp:           Image file
  rcp:           Image file
  tftp:          Image file
```

Upgrade IOS and CMS with TAR file using CLI (cont.)

4. Archive download-sw

```
switch# arch down tftp://192.168.10.1/systemtest/cigesm-i6q4l2-tar.121-0.0.41.AY.tar
examining image...
Loading stiletto/cigesm-i6q4l2-tar.121-0.0.41.AY.tar from 192.168.10.1 (via Vlan1): !
extracting info (282
bytes)!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
[OK - 5357568 bytes]

Image info:
    Version Suffix: i6q4l2-121-0.0.41.AY
    Image Name: cigesm-i6q4l2-mz.121-0.0.41.AY.bin
    Version Directory: cigesm-i6q4l2-mz.121-0.0.41.AY
    Ios Image Size: 3042304
    Total Image Size: 5355008
    Image Feature: LAYER_2|MIN_DRAM_MEG=32
    Image Family: CIGESM
    Image Minimum DRAM required: 32
```

Upgrade IOS and CMS with TAR file using CLI (cont.)

4. Archive download-sw. The whole process can be interrupted by Ctrl-shift-6.

```
switch# arch down tftp://192.168.10.1/systemtest/cigesm-i6q4l2-tar.121-0.0.41.AY.tar
examining image...
.....
Not enough free space to download w/o first deleting existing and/or current version(s)...
Deleting flash:/cigesm-i6k2l2q4-mz.121-0.0.42.AY...done.
Extracting files...
Loading systemtest/cigesm-i6q4l2-tar.121-0.0.41.AY.tar from 192.168.10.1 (via Vlan1): !
extracting info (282 bytes)
cigesm-i6q4l2-mz.121-0.0.41.AY/ (directory)
cigesm-i6q4l2-mz.121-0.0.41.AY/html/ (directory)
extracting cigesm-i6q4l2-mz.121-0.0.41.AY/html/CMS.sgz (1357883
bytes)!!!!!!!!!!!!!!!!!!!!!!!!!!.!!!!!!!! [Interrupted]

Premature end of tar file
ERROR: Problem extracting files from archive.
Switch#
```

Upgrade IOS and CMS with TAR file using CLI (cont.)

5. Check the boot path variable

```
switch# show boot
BOOT path-list:      flash:/cigesm-i6k2l2q4-mz.121-0.0.42.AY/cigesm-i6k2l2q4-mz.121-0.0.42.AY.bin
Config file:         flash:/config.text
Private Config file: flash:/private-config.text
Enable Break:        no
Manual Boot:         no
HELPER path-list:
NVRAM/Config file
    buffer size:    32768
```

6. Reload the switch

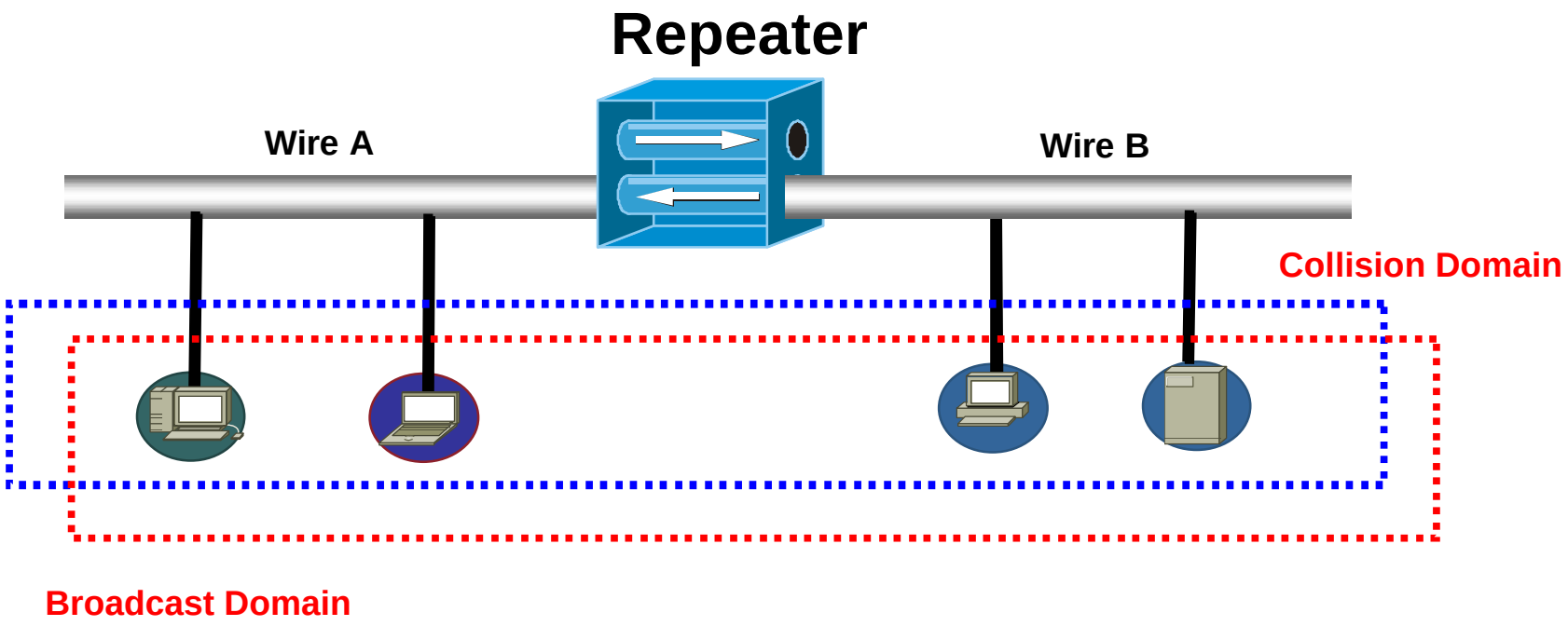
7. Verify the upgrade

Software Upgrade

Upgrade IOS and CMS with TAR file using GUI

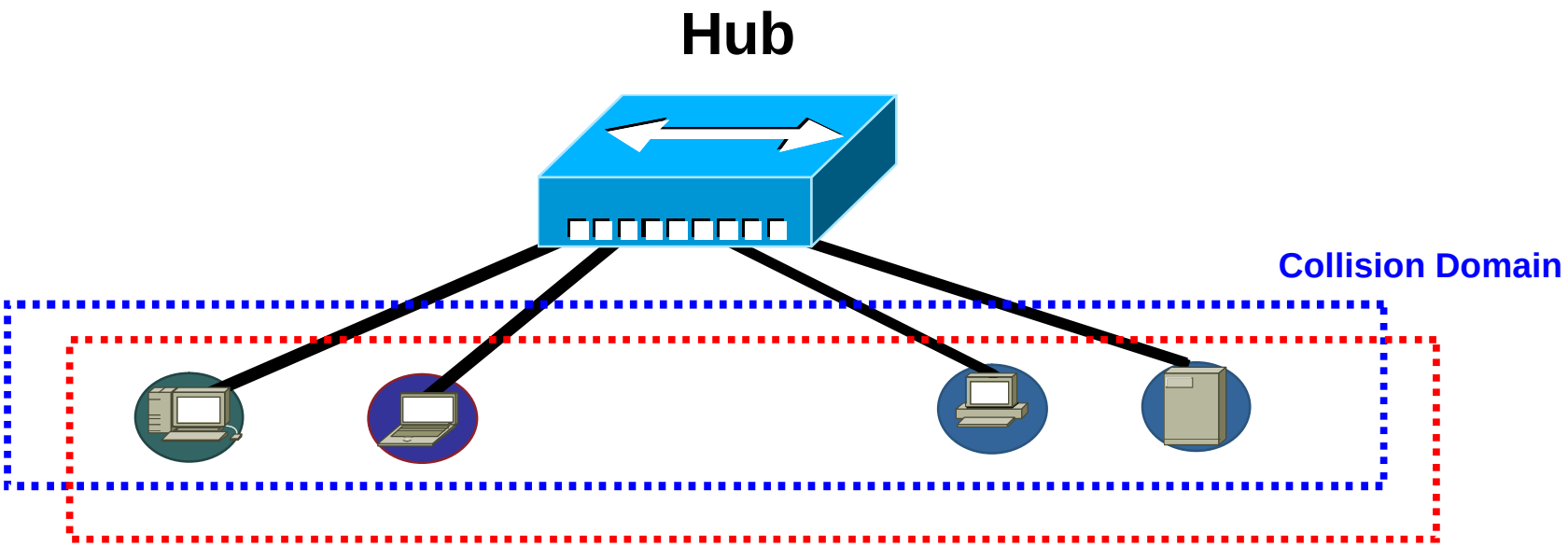
1. CMS GUI is based on IOS CLIs
2. Software upgrade is based on Archive CLI

Layer 2 Repeater Device:



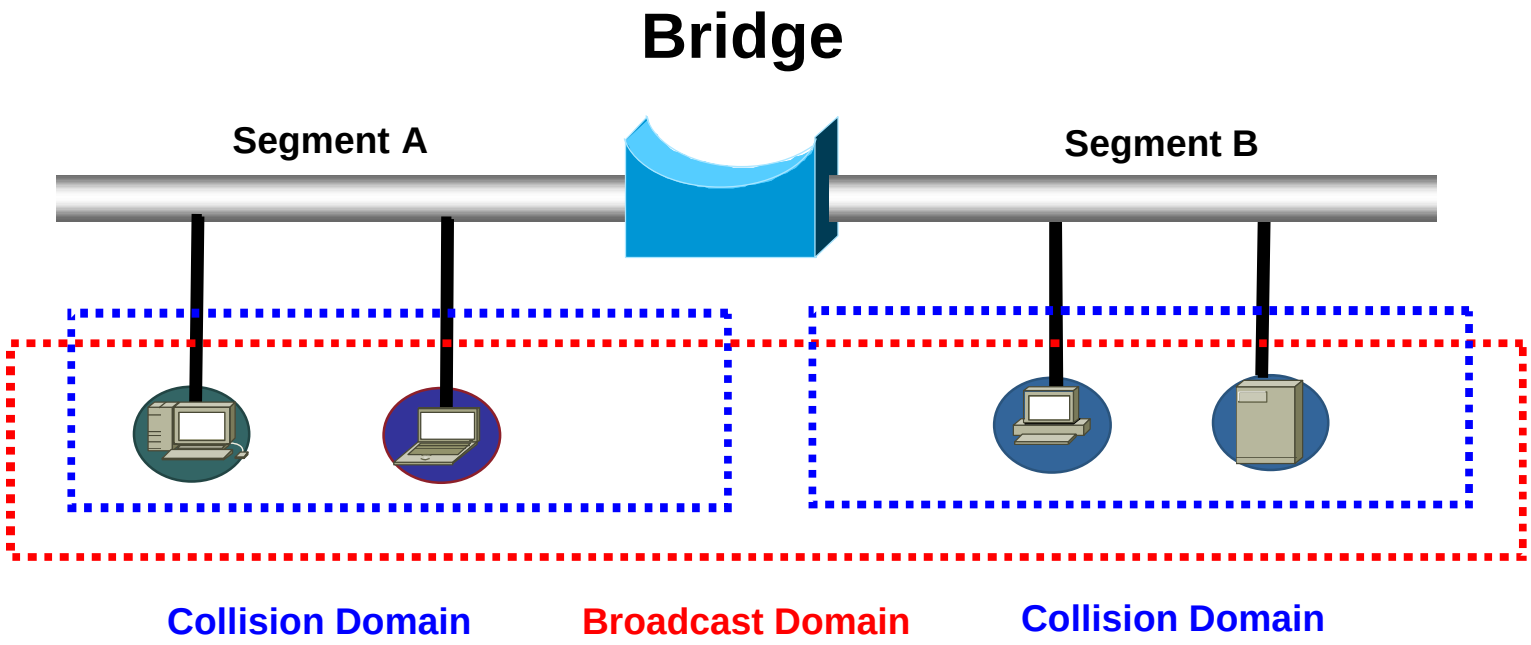
Repeater:
- Ø operates at layer 1 of OSI model
- Ø appears as an extension to the wire segment
- Ø regenerates the signal from one wire to the other

Layer 2 Hub Device:



Hub – multi-port repeater !

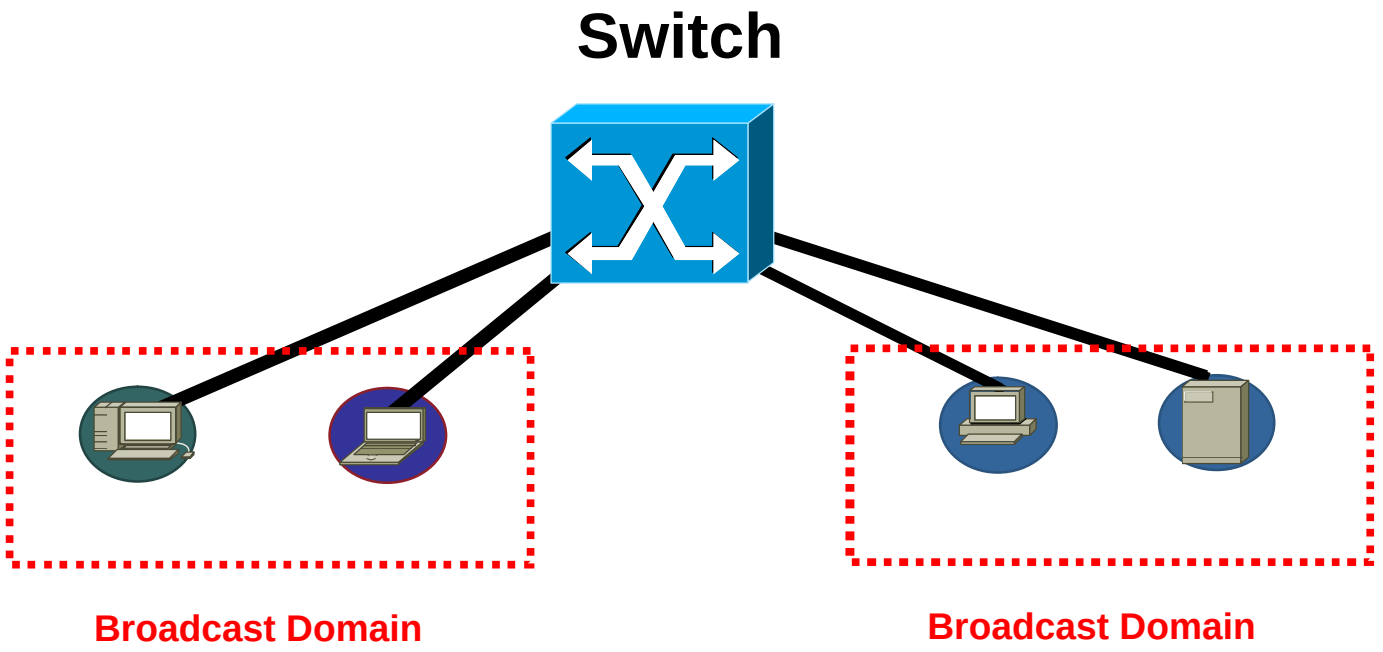
Layer 2 Bridge Device:



Bridge:

- Ø operates at layer 2 of OSI model
- Ø forwards frames based on header information such as MAC address

Layer 2 Switch Device:



Switch – multi-port bridge !
Ø broadcast domain based on the VLAN (virtual LAN)
Ø what happened to collision domain ?
Switch with VLAN – multi-port multi-bridges