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CISCO

Troubleshooting the Cisco UCS Compute Deployment

BRKCOM-3001

Agenda

Troubleshooting Cisco UCS

- Overview
- Physical Setup
- Software Setup
- Configuration
- Path Tracing
- Maintenance
- Key Takeaways
- Q & A

Overview

UCS Building Blocks

UCS Manager
Embedded– manages entire system

UCS Fabric Interconnect
Nexus Switch

UCS Fabric Extender
Remote line card

UCS Blade Server Chassis
Flexible bay configurations

UCS Blade Server
Industry-standard architecture

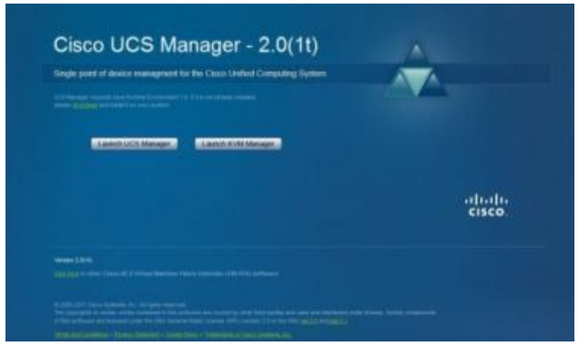
UCS Virtual Adapters
Choice of multiple adapters

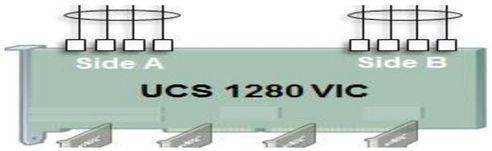
UCS Manager 2.0 Release

New and Updated Features

- Hardware
  - UCS 6248/96UP Fabric Interconnect
  - UCS 2208XP IOM
  - UCS 2204XP IOM
  - UCS 1280 VIC
  - UCS 1240 VIC (mLOM)

- Features
  - Unified Ports
  - 80 Gb Host connectivity
  - Fabric port-channelling
  - L2 disjoint upstream in EHM
  - VM-FEX for Red Hat KVM
  - iSCSI Boot

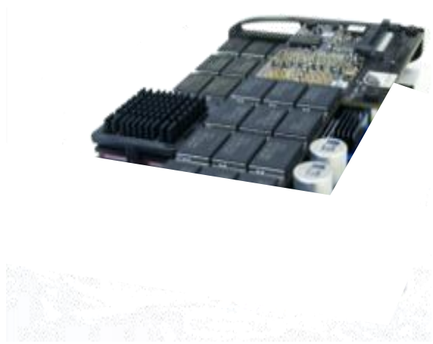




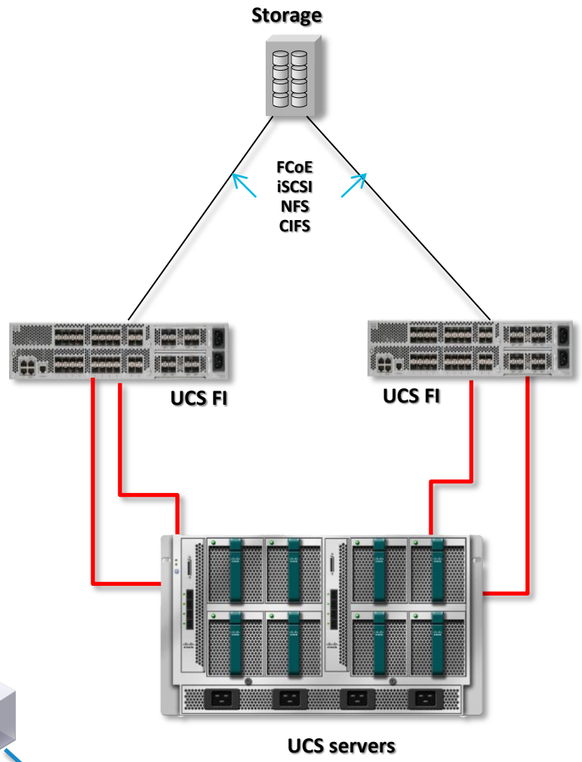
UCS Manager 2.1 Release

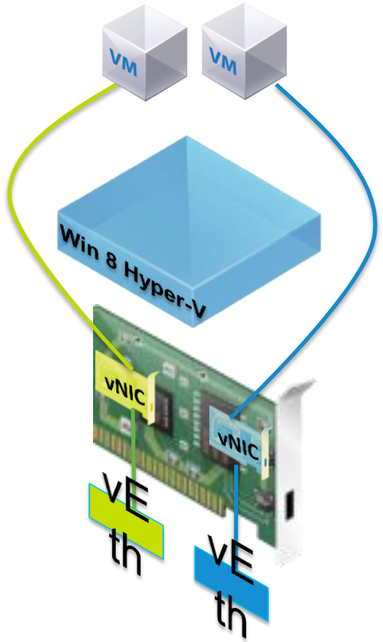
New and Updated Features

- Hardware
  - PCIe Flash
  - C-Series Single Wire
- Storage
  - Multi-Hop FCoE
  - Zoning Configuration
  - Unified Appliance Ports



- Operations
  - Firmware Auto Install
  - Fault Suppression
  - UCS Central (MoM)
  - Improved firmware compatibility
- Networking
  - VM-FEX for Windows
  - VLAN Grouping
  - IGMP Configuration
  - Increased ‘logical’ ports



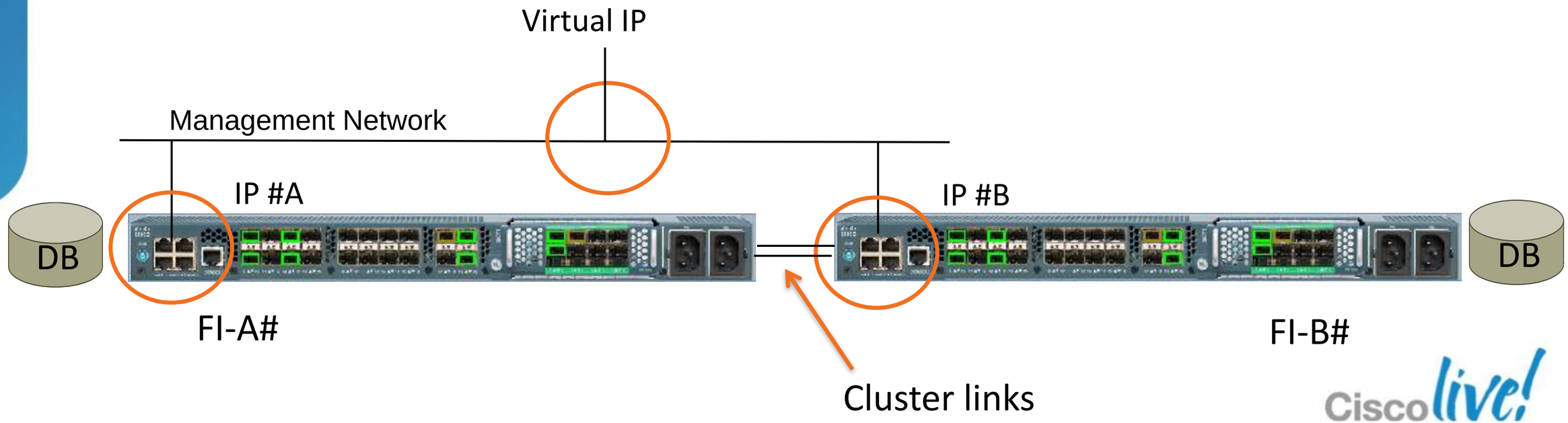


Physical Setup

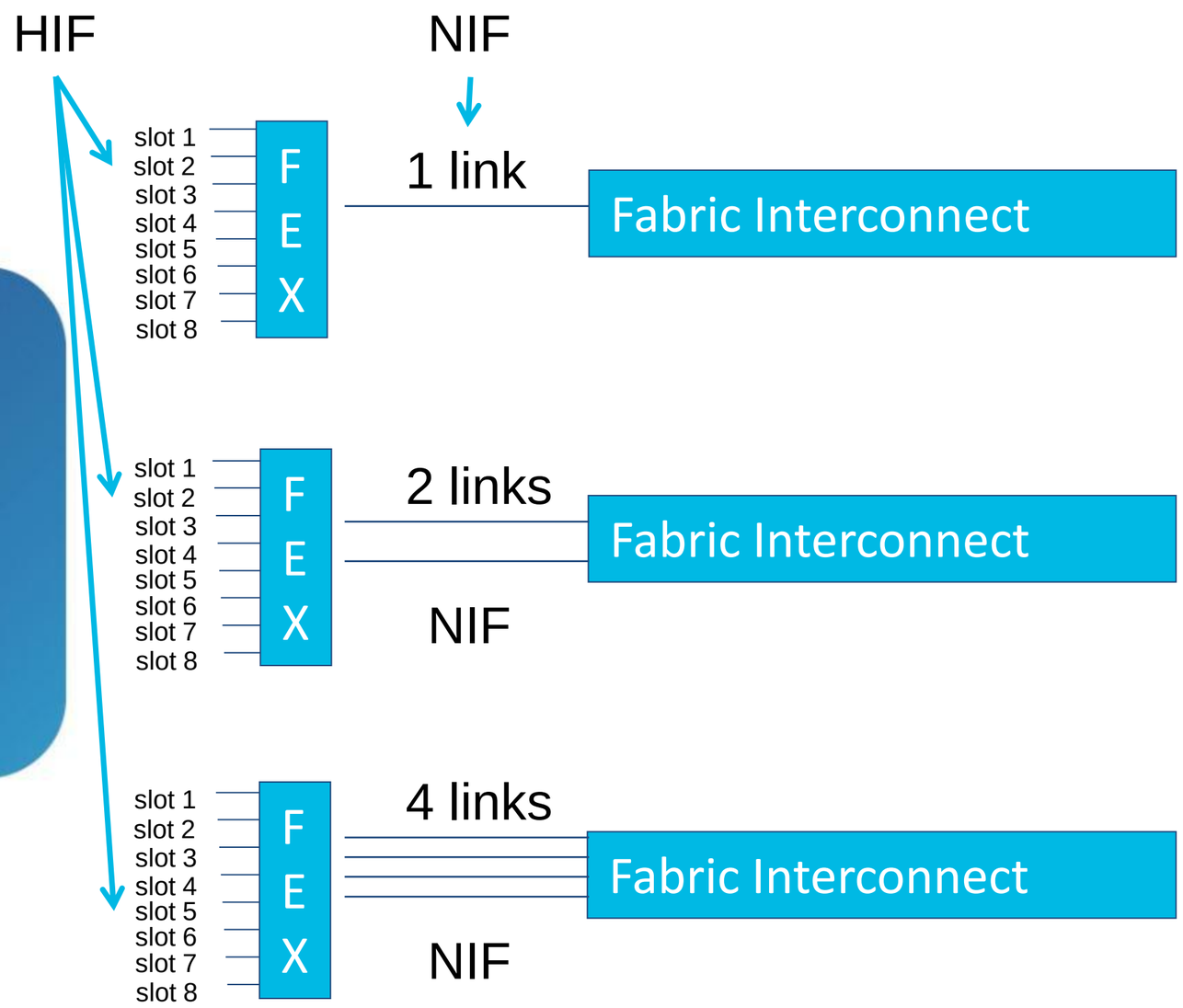
UCS Fabric Interconnect

6100, 6200 Hardware

- Standalone or Clustered
  - Primary / Subordinate
  - Data Management Engine (DME)



IO Module HIF to NIF Pinning (2104XP)



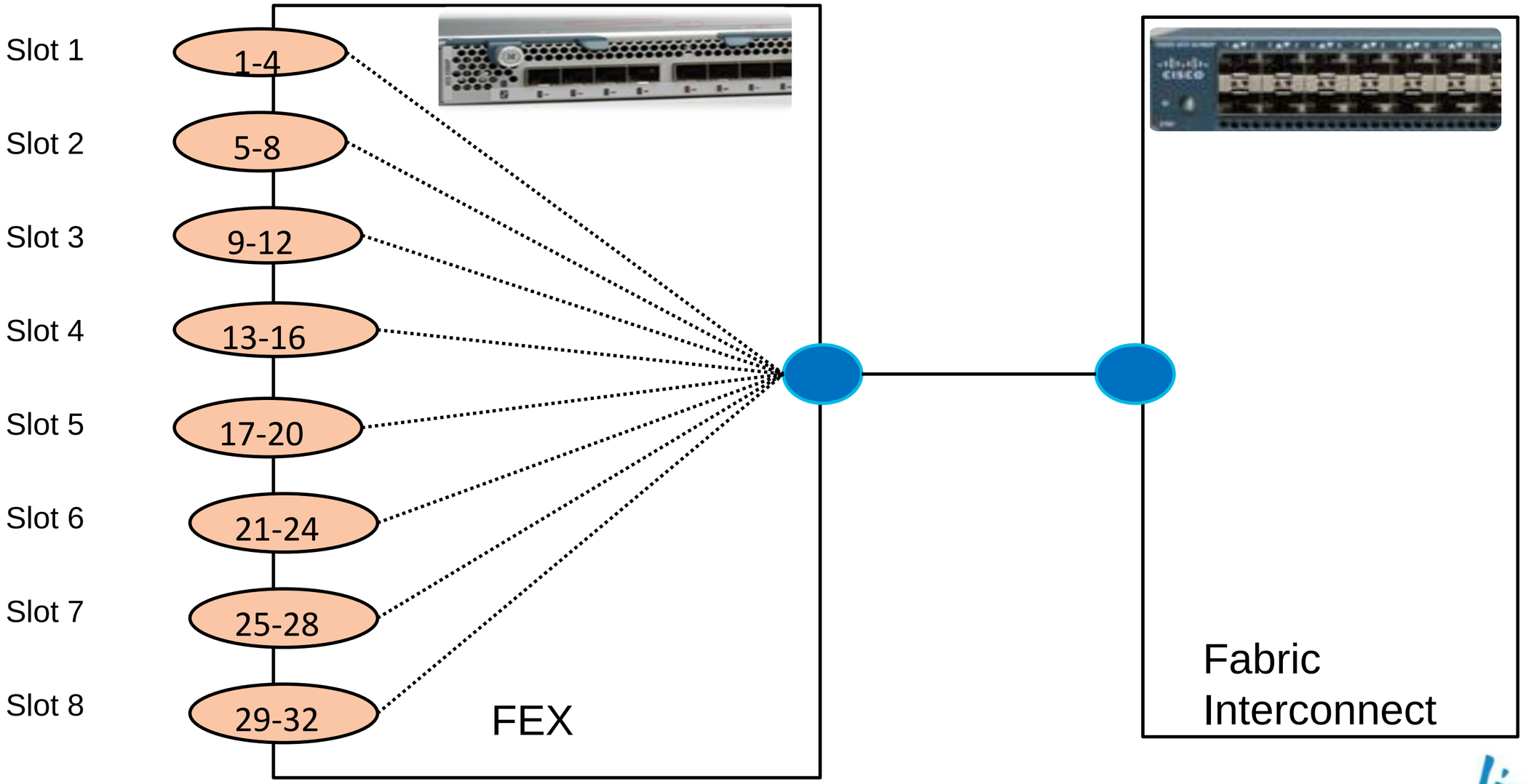
Server slots pinned to uplink

Uplink: slots 1,2,3,4,5,6,7,8

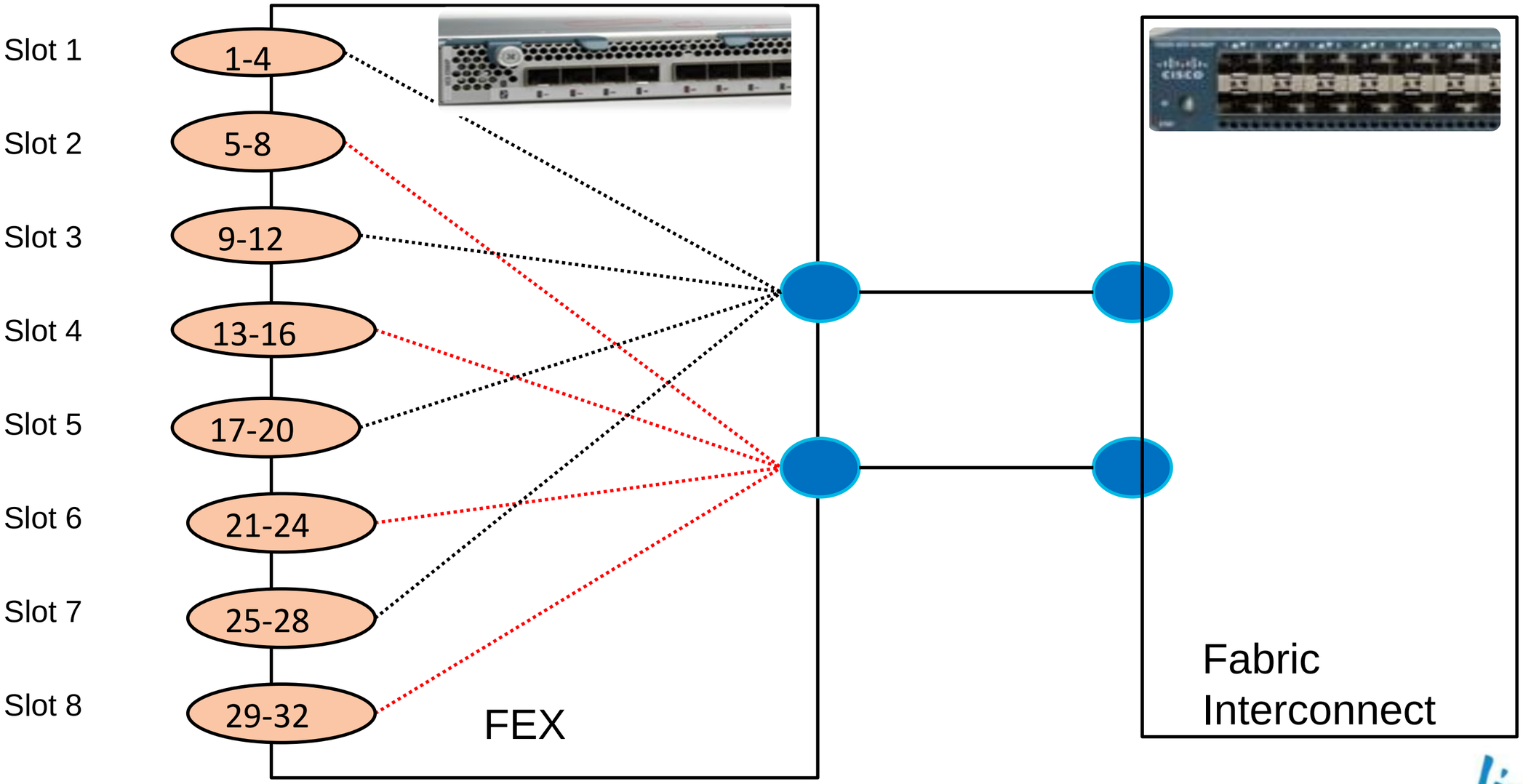
Uplink 1: slots 1,3,5,7
Uplink 2: slots 2,4,6,8

Uplink 1: slots 1,5
Uplink 2: slots 2,6
Uplink 3: slots 3,7
Uplink 4: slots 4,8

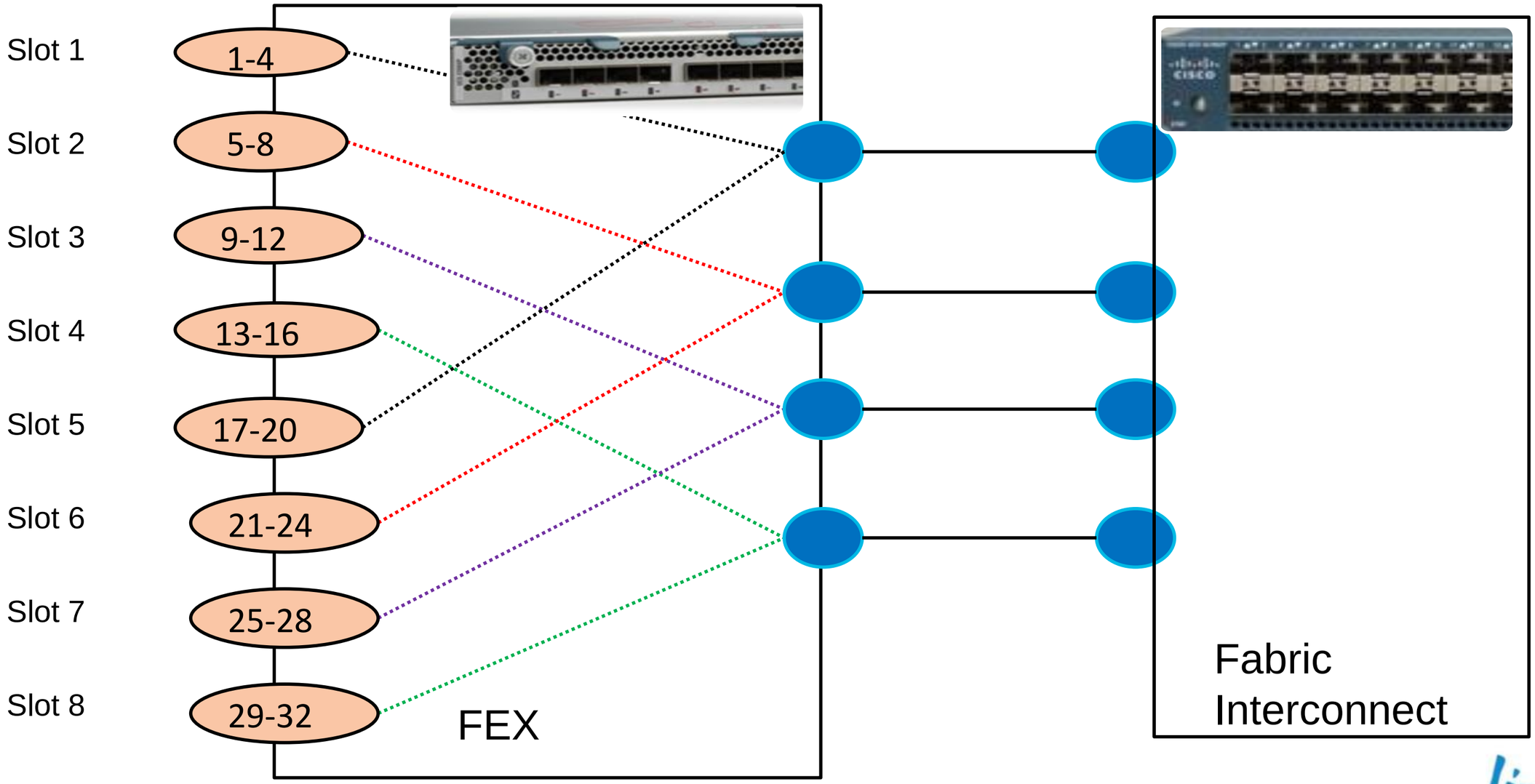
IO Module HIF to NIF Pinning (2208XP)



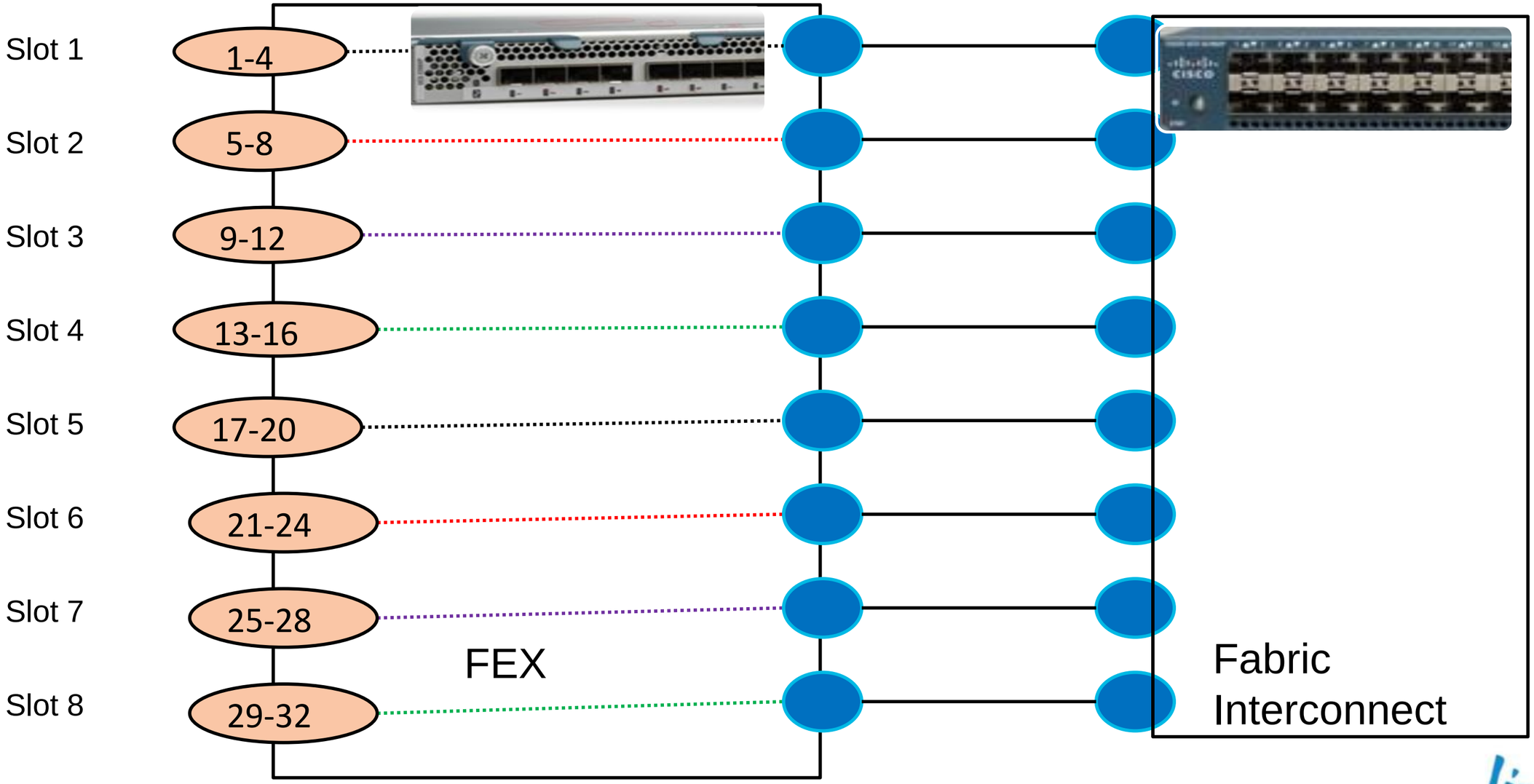
IO Module HIF to NIF Pinning (2208XP)



IO Module HIF to NIF Pinning (2208XP)

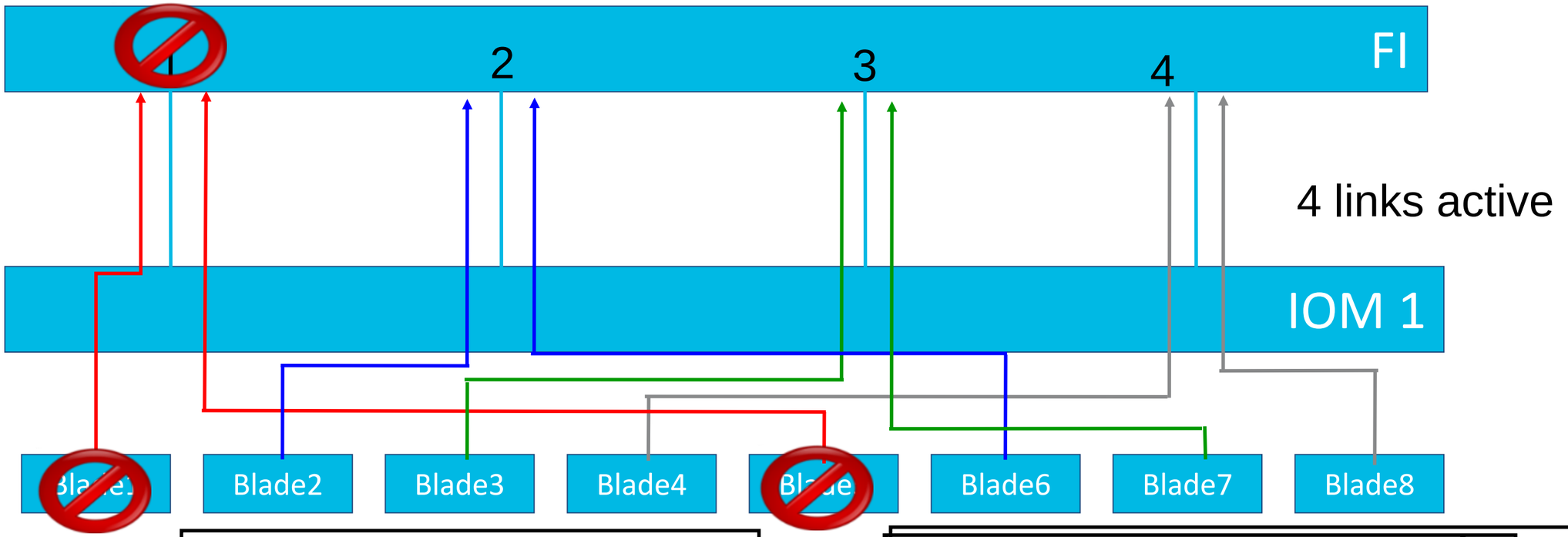


IO Module HIF to NIF Pinning (2208XP)



IO Module and Failover

Lose IOM link 1

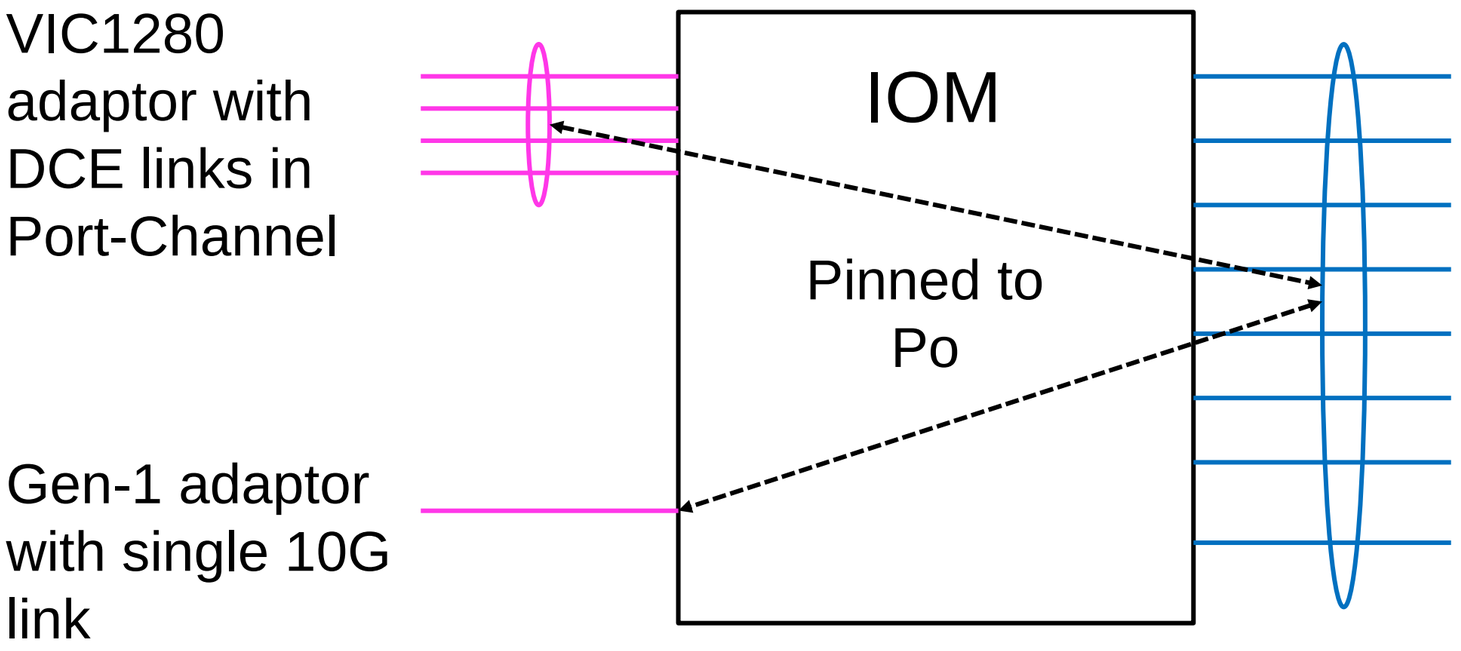


Lose connectivity on mezzanine port mapped to IOM 1 for blades 1 and 5

If you re-acknowledge the chassis, we will fall back to a 2 link topology, and blades 1,3,5,7 will use one uplink, and blades 2,4,6,8 will use a different uplink

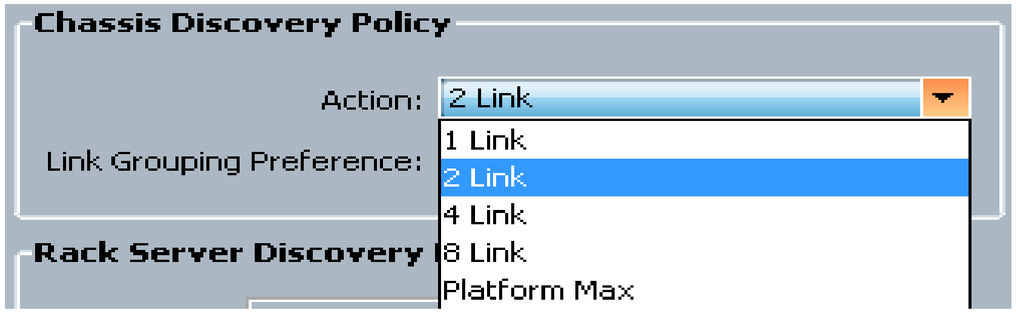
Port-Channel Pinning

- No slot based pinning
- No invalid link count for NIF ports



Chassis Discovery Policy

- Discovery policy only defines the minimum number of links necessary before a chassis can be discovered and NOT how many links will be utilised



Software Setup

Upgrades

Upgrade Considerations

Pre-Checks and Avoiding Issues

- Release Notes will cover pre-requisites and concerns in the upgrade process
- Schedule an outage window
  - FI and IOM will reboot during upgrade
  - Make sure network and storage fabric are redundant
- Highly recommended to backup UCSM configuration
- Upgrade process is not quick so be patient
- Follow the upgrade procedure for each version

Upgrade Process

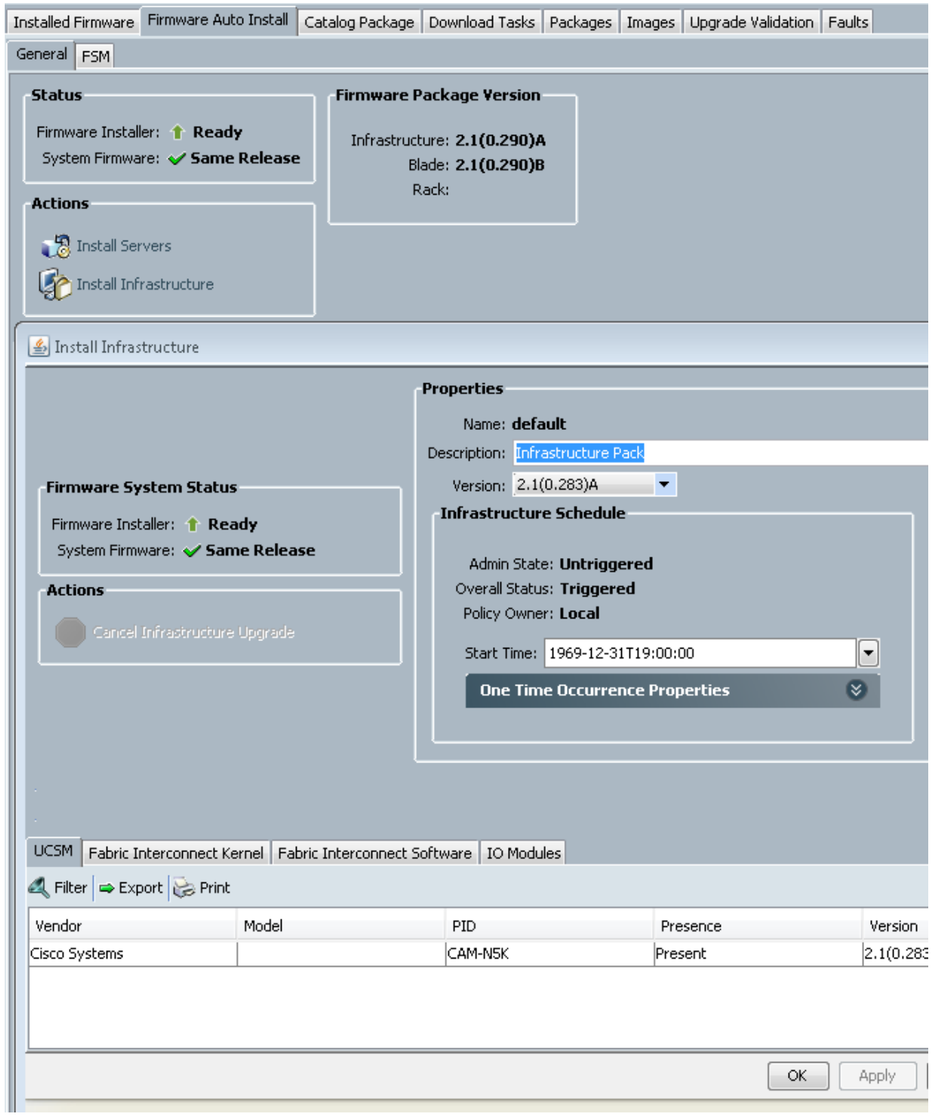
Order of Operations

- Backup UCS Config (Full & All Config)
- Download firmware
- Update components (adapters, CIMC, IOMs)
- Activate components in order of:
  - Adapter cards – Set Startup Only
  - CIMC
  - UCSM
  - IOM – Set Startup Only
  - Fabric Interconnect
  - BIOS/Storage Controller/etc (through firmware package)

Upgrade Process

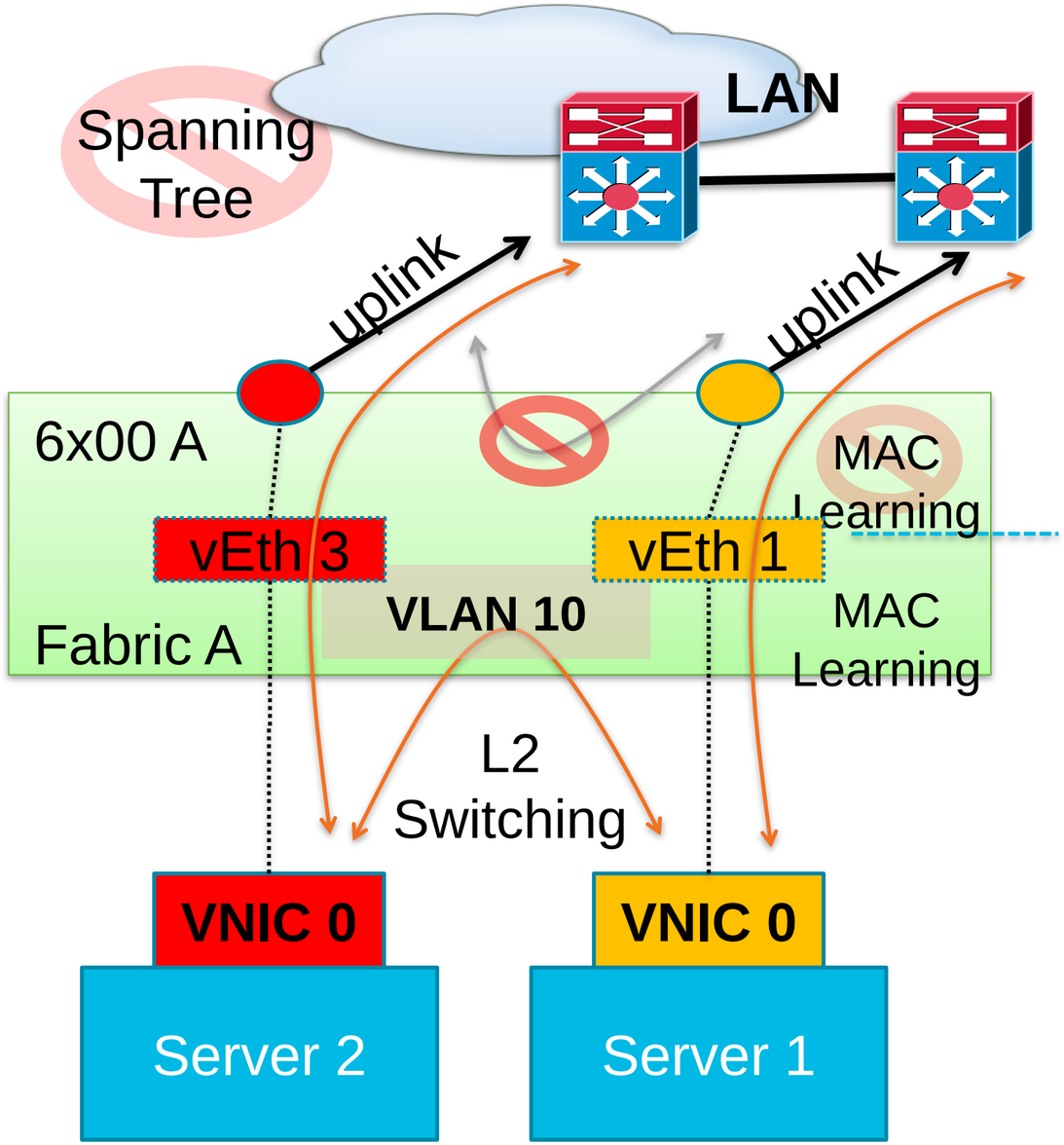
UCS 2.1 New Features

- **UCS 2.1 Firmware Auto Install**
- Reduces complexity
- Better troubleshooting
- Better compatibility
- Infrastructure and Blade/Racks



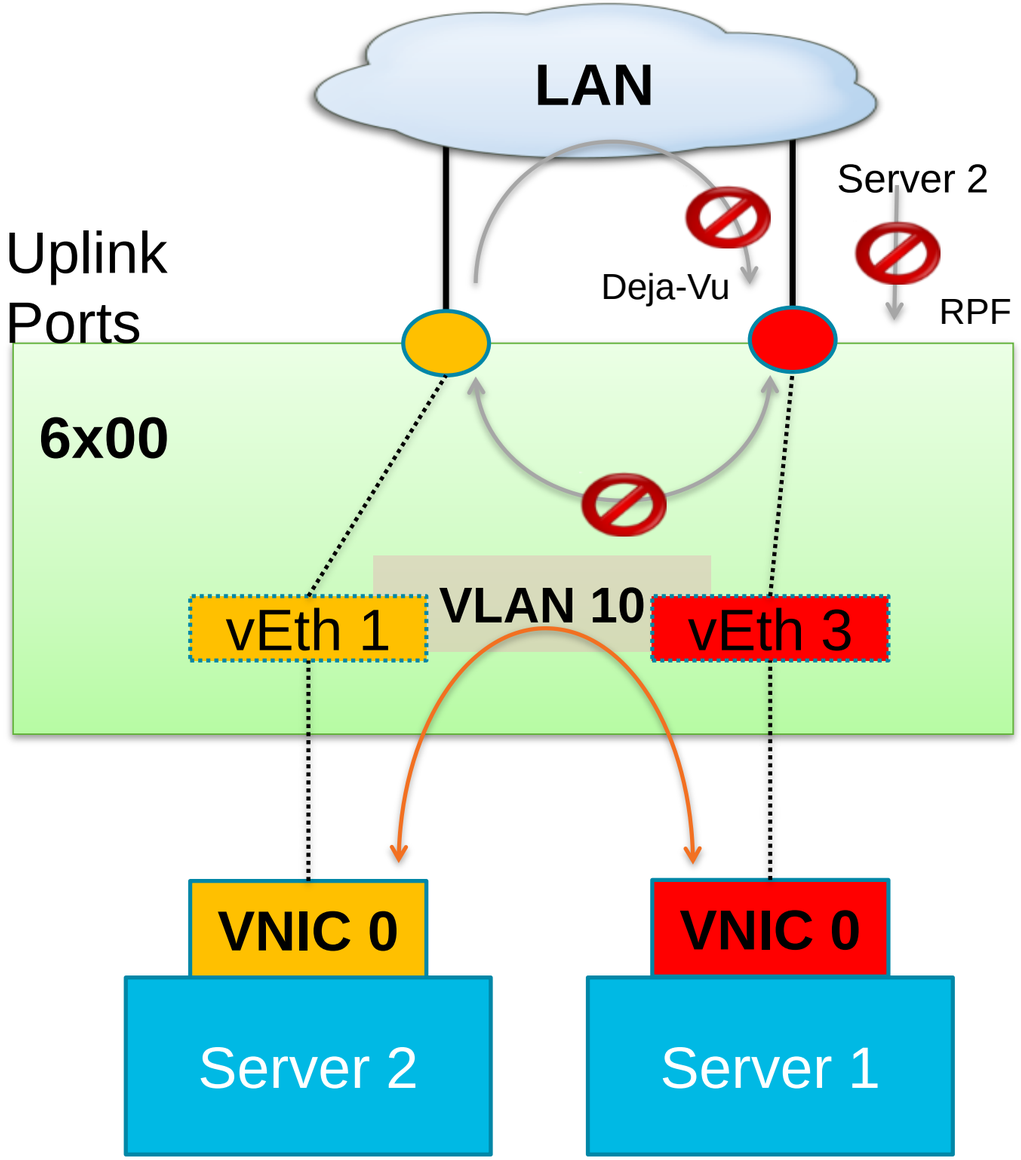
Fabric Interconnect Modes

FI Ethernet Modes: End Host



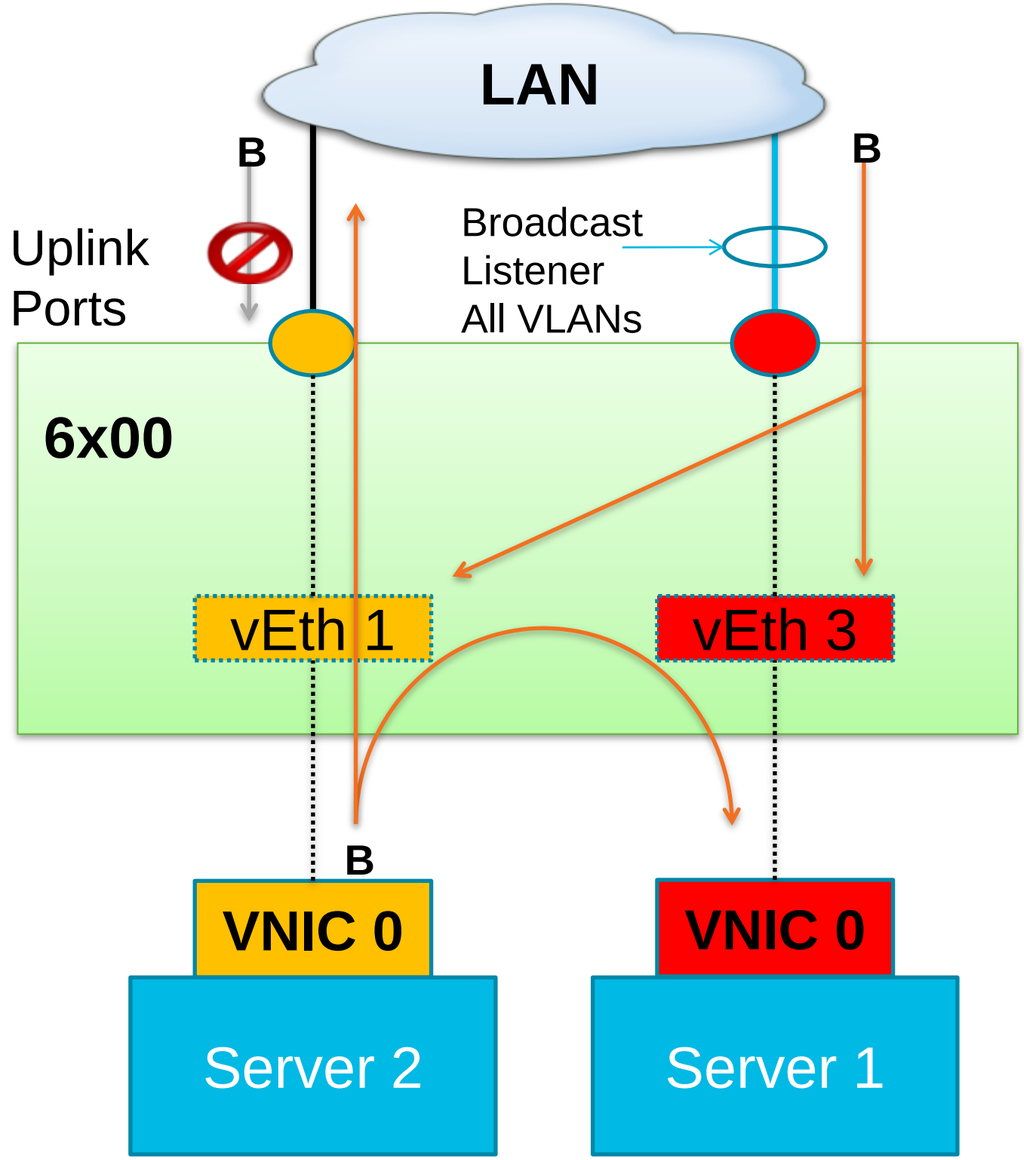
- No Spanning Tree Protocol
- Maintains MAC table for Servers only
- Allows Multiple Active Uplinks per VLAN
- Prevents Loops by preventing Uplink-to-Uplink switching

End Host Mode Unicast Forwarding



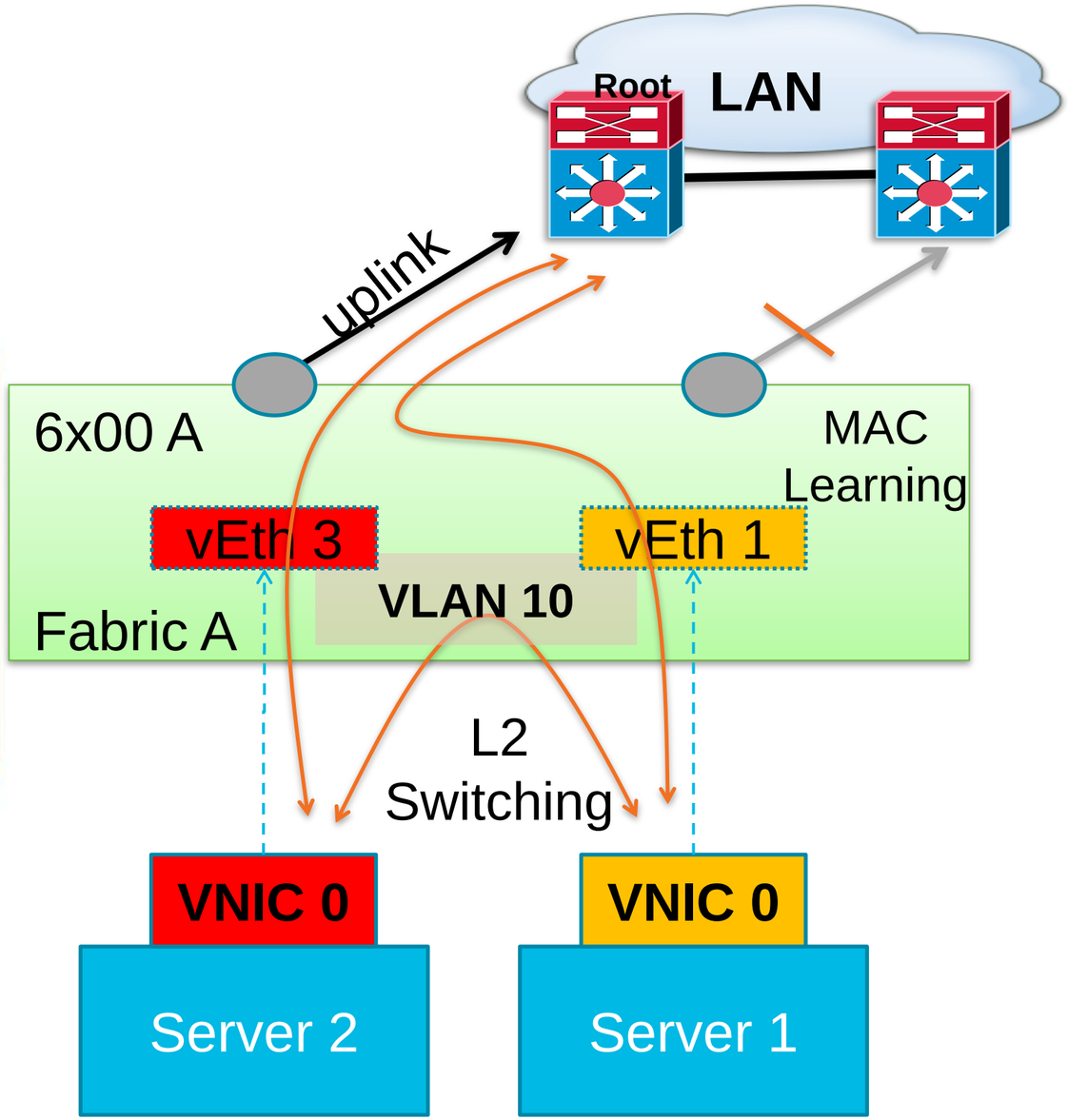
- Server to server traffic on the same VLAN is locally switched
- Each server link is pinned to an uplink port / port-channel
- Network to server unicast traffic is forwarded to server only if it arrives on pinned uplink port. This is termed as the Reverse Path Forwarding—(RPF) check
- Packet with source MAC belonging to a server received on an uplink port is dropped (Deja-Vu Check)
- Unknown unicast traffic is dropped

EHM Broadcast/Multicast Forwarding



- **Pre 2.0 - Broadcast traffic is pinned on exactly one uplink port** (or port-channel) i.e., it is dropped when received on other uplinks
- All multicast groups are pinned to same uplink port
- Server to server multicast traffic is locally switched
- RPF and deja-vu check also applies for multicast traffic

UCS Switch Mode

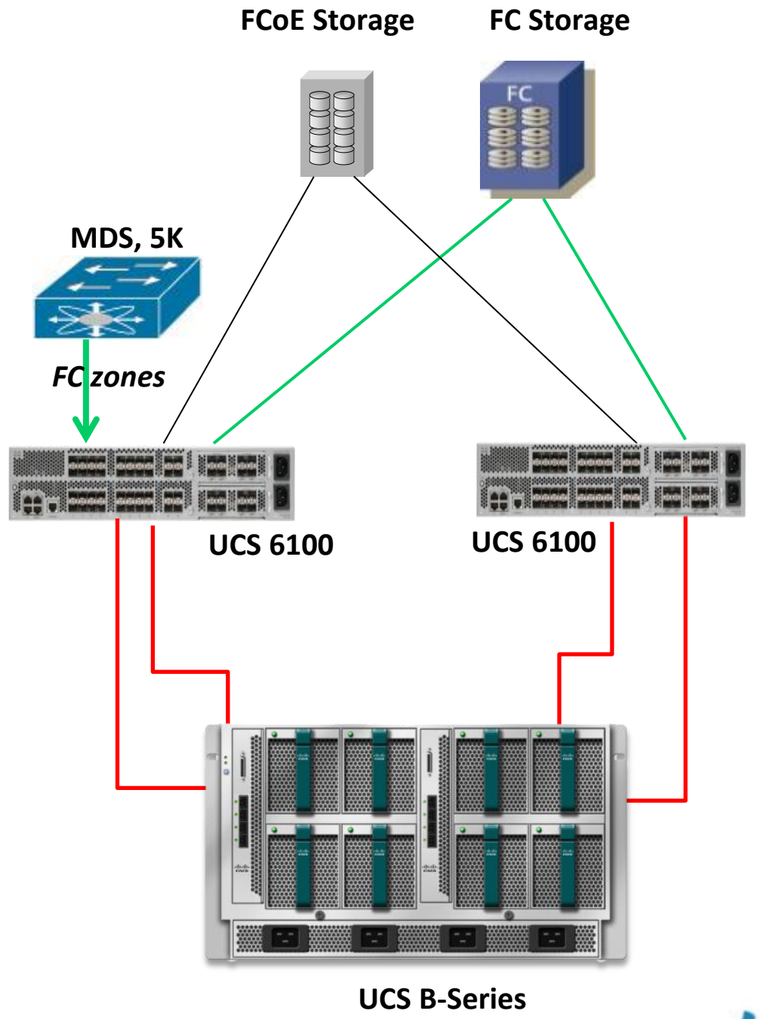


- FI acts as L2 switch
- Server vNIC traffic follows VLAN forwarding
- Rapid PVST+ is used
- Configuration of STP parameters (bridge priority, Hello Timers etc) or VTP is not supported
- MAC learning/aging happens on both the server and uplink ports like in a typical Layer 2 switch

UCS Direct Attach Storage

UCS 1.4 and 2.0

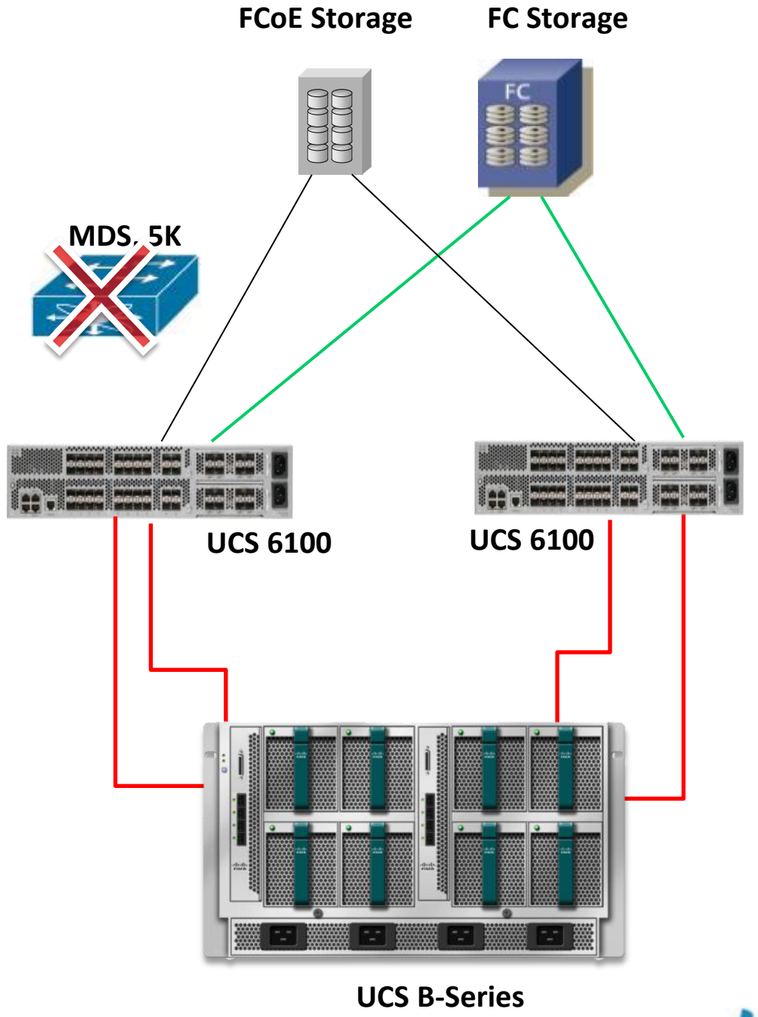
- Upstream MDS/5k for Zoning
  - Default Zoning
  - FC Switching Mode
  - Security via Zoneset Merge
  - Security via LUN Masking
- No Multi-Hop FCoE
- Individual FC and Appliance Ports



UCS Direct Attach Storage 2.1

UCSM Zoning

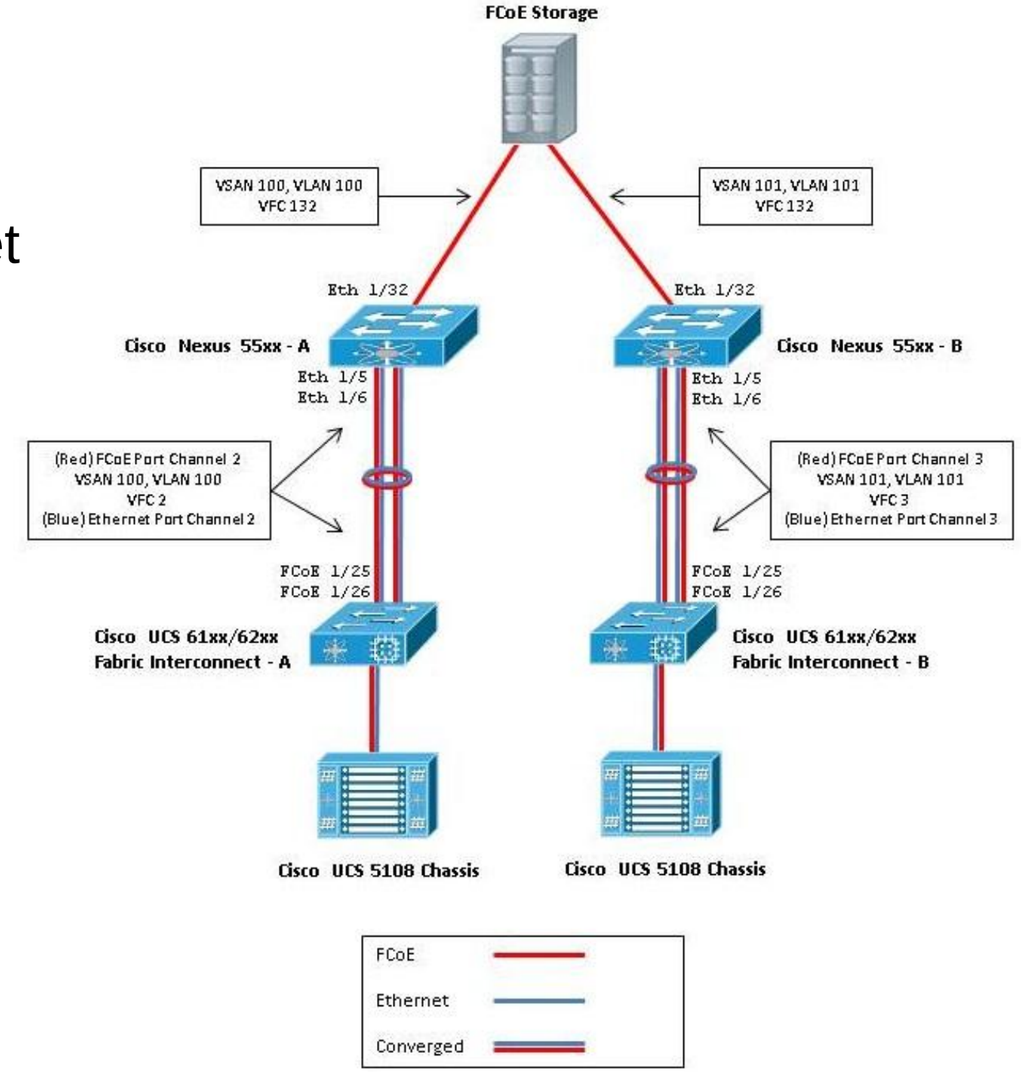
- Default Disabled
- Service Profile Configuration
- Storage Connection Policies
  - Enable per VSAN
  - Identify group of Service Profiles
  - Identify Targets via WWN
  - ‘Group’ Profiles to Targets
- Zones Automatically computed
- ‘Default Zoning’ deprecated



UCS Direct Attach Storage 2.1

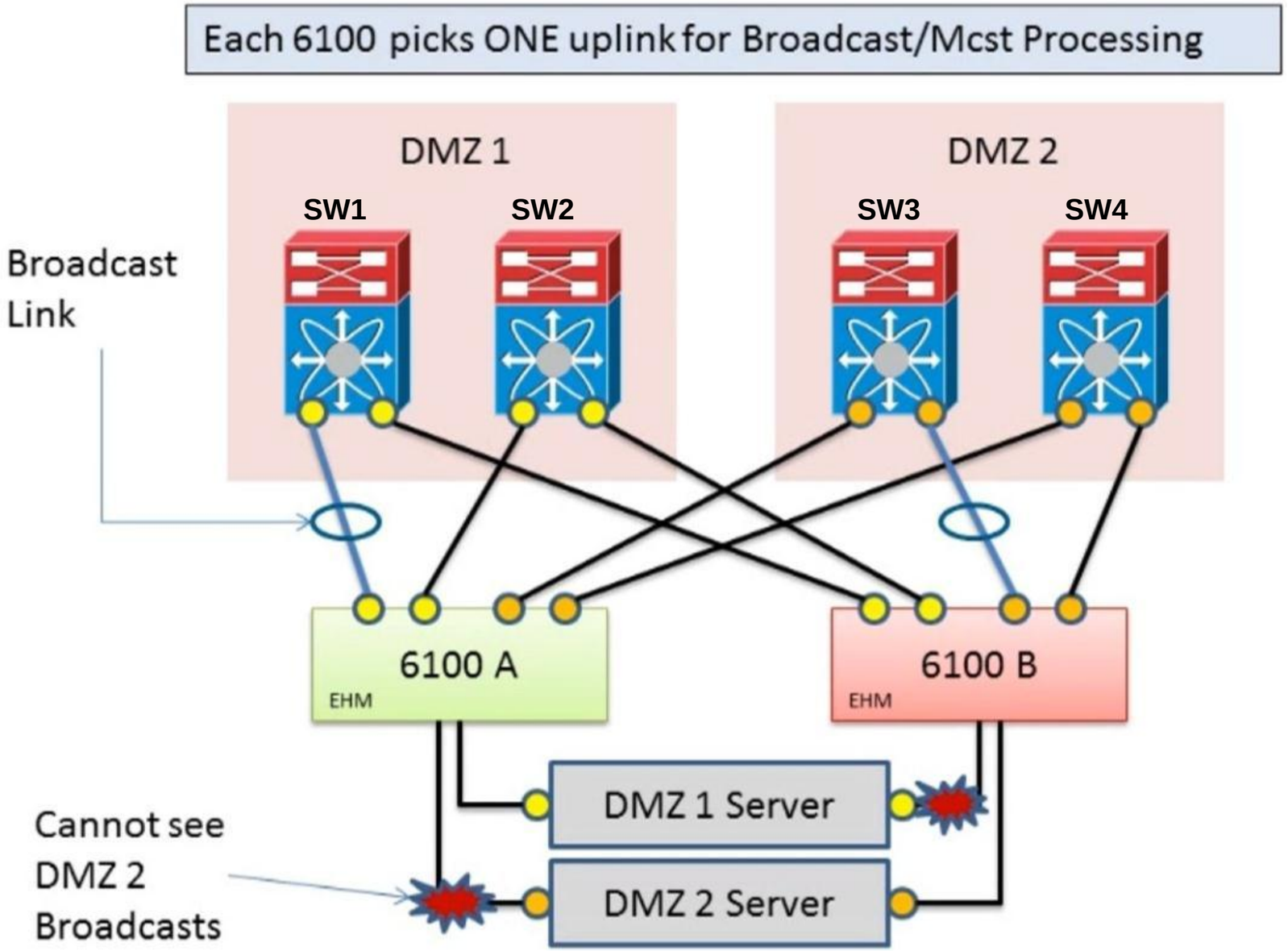
Multi-Hop FCoE and Unified Uplinks

- FCoE Uplink Port
  - vfc created and bound to physical Ethernet
  - Logically the same as ‘fc’ ports
  - Port Channels Supported
- Unified Uplink Port
  - FcoE and Ethernet
  - ‘Network Port’ and FCoE Port
- Unified Storage Port
  - Appliance Port and FCoE DAS

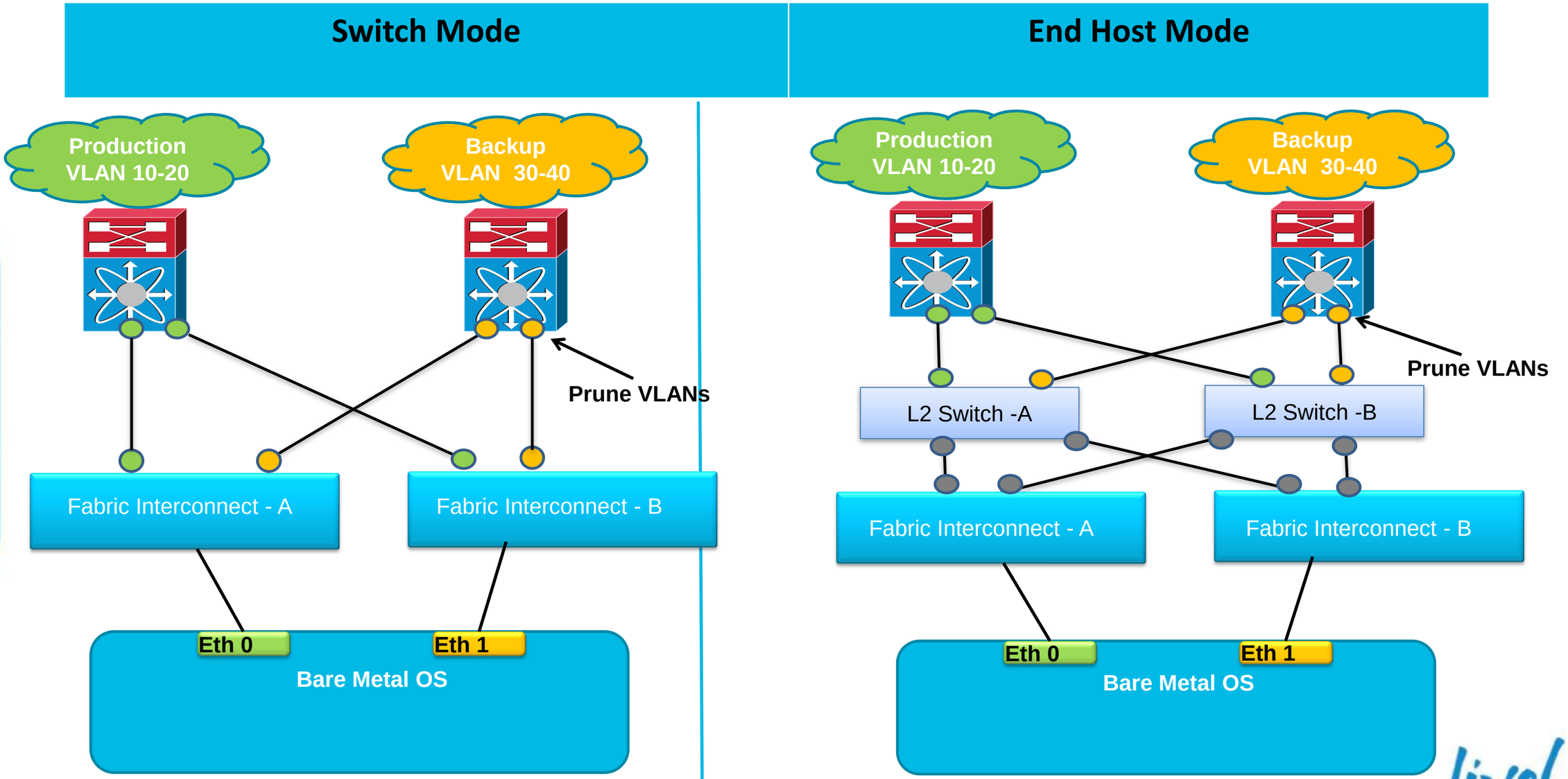


Disjoint L2 Mode

End Host Mode – Disjoint L2



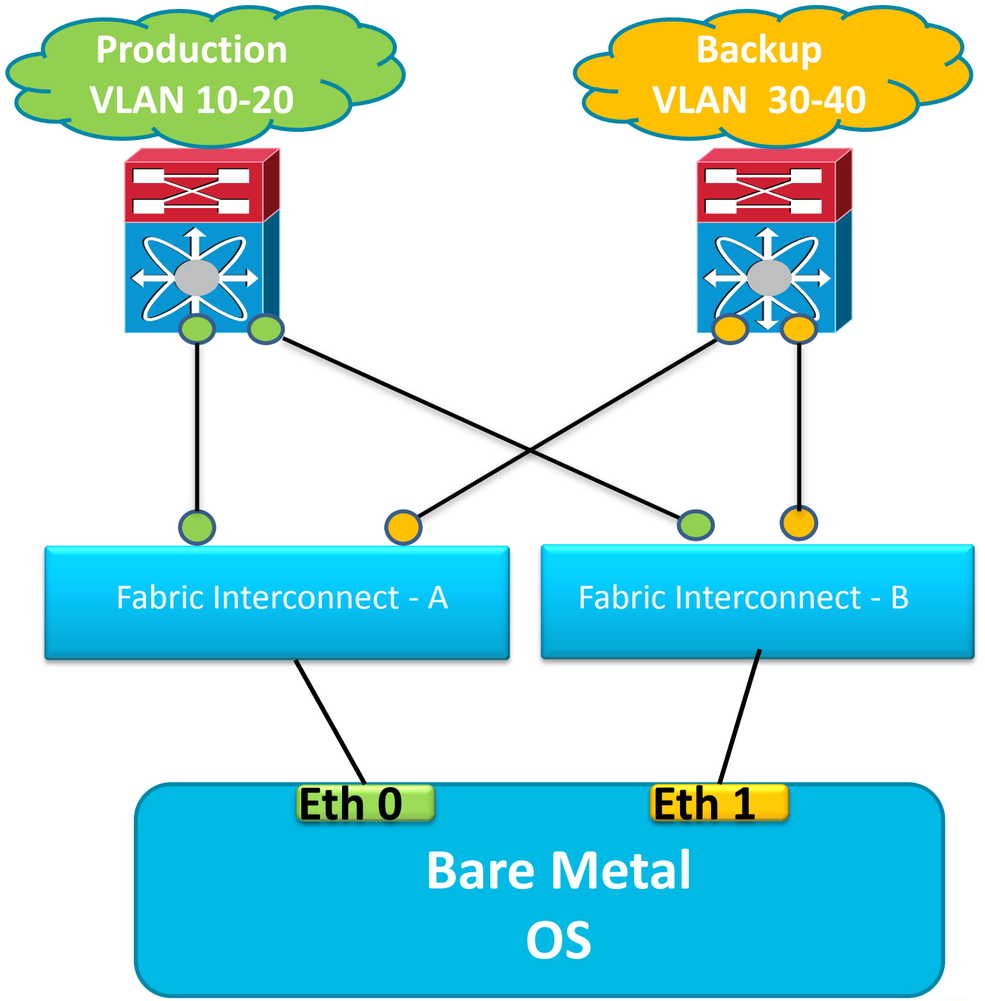
Disjoint L2 – Pre 2.0 Workarounds



EHM Disjoint L2 Upstream > 2.0

2.0 Changes

- Hardware independent: UCS 2.0 and above
- Selectively Assign VLANs to uplinks
- vNIC pinning decision based on VLAN membership on uplink ports
- Per VLAN Designated Receiver

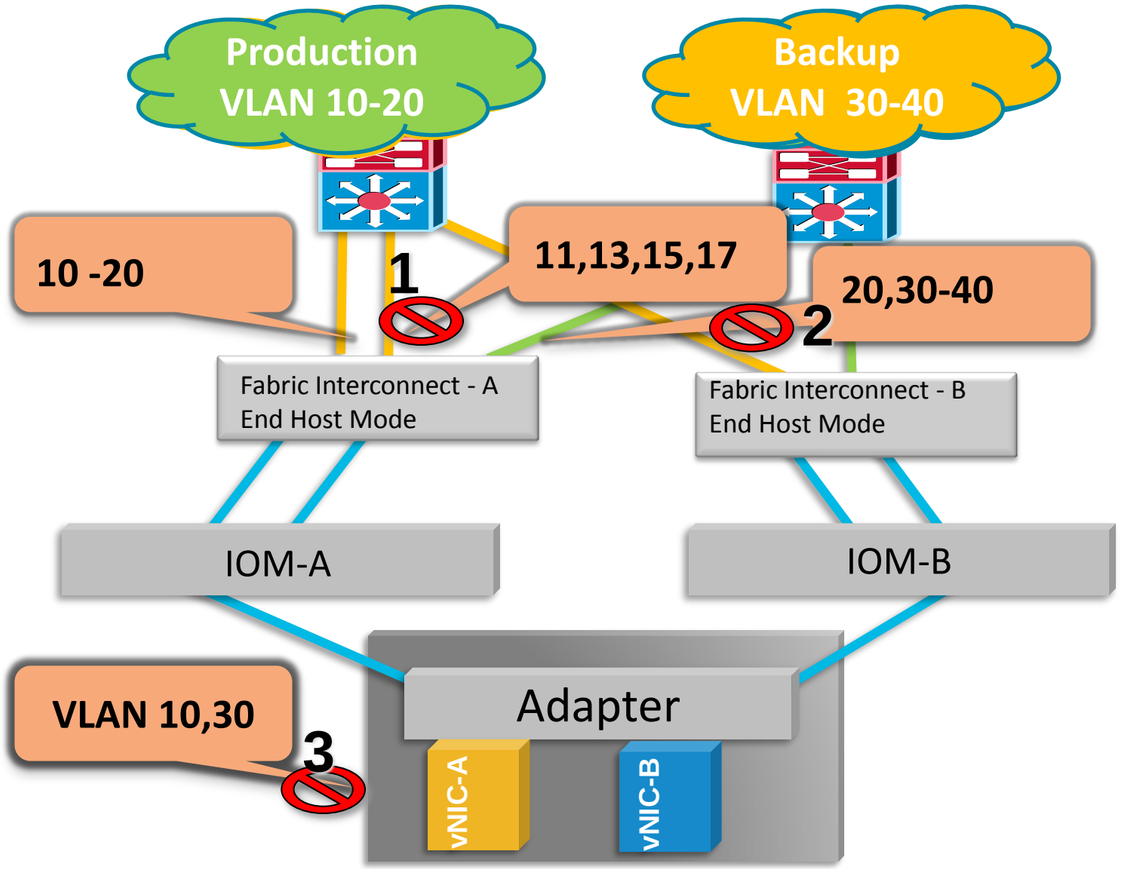


Disjoint L2

Unsupported/Non-Working

Do Not

1. Configure different range of VLANs across uplinks of a disjoint network
2. Overlap VLANs across L2 networks
3. Configure vNIC with VLANs across multiple L2 networks. vNIC does not get pinned if the uplink vlan membership is partial, vNIC stays down



EHM: Designated Receiver

Checking Per VLAN DR

- 2.0 = Connect nxos : show platform software enm internal info vlandb id <vlanID>

```
UCS-250-A(nxos)# show platform software enm internal info vlandb id 25

vlan_id 25
----------
Designated receiver: Po1
Membership:
Po1
UCS-250-A(nxos)#
```

- show interface trunk

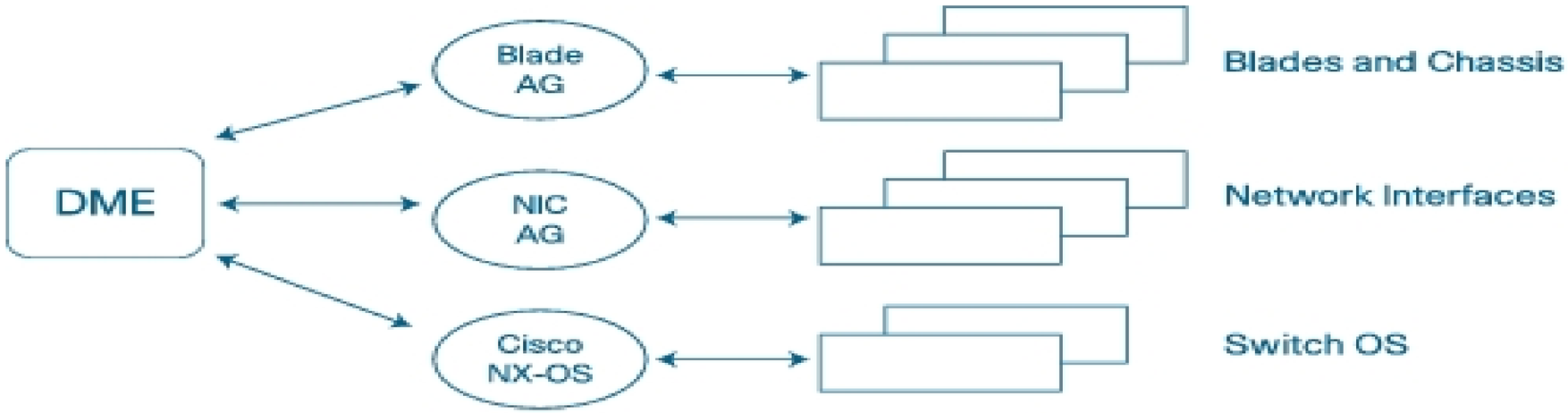
```
UCS(nxos)# show interface trunk
Port          Vlans Allowed on Trunk
----------------------------------------------------------
Eth1/16       1,5-7,1000,3000  ←Only Eth1/16 allows VLAN 5
Eth1/17       1,6-7,1000,3000
<snip>
```

Blade Issues

Finite State Machine (FSM)

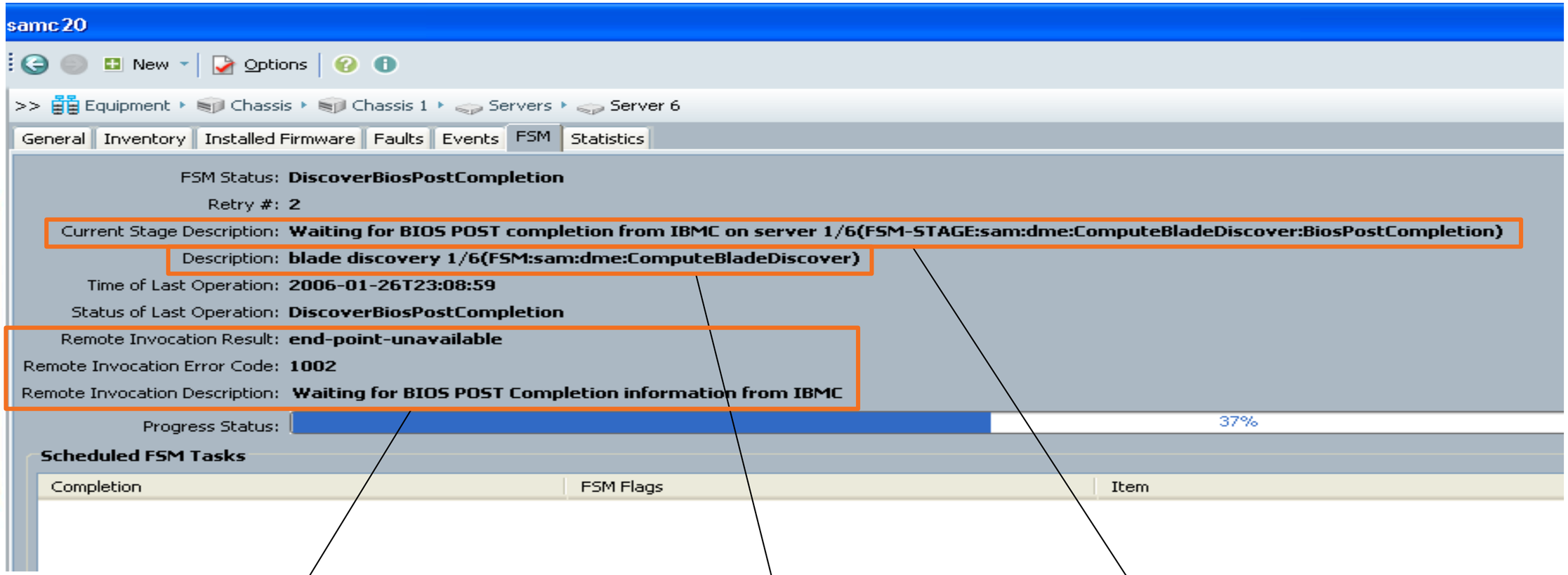
Monitoring Object Tasks

- FSM runs as a workflow
- Workflows are predefined. Stages can be skipped if:
  - Not Needed
  - FSM Flags (shallow discovery vs deep discovery)
- Each stage is an interaction between DME > Application Gateware > End Point



FSM Details

UCS 1.4 and 2.0



Error Description for that stage

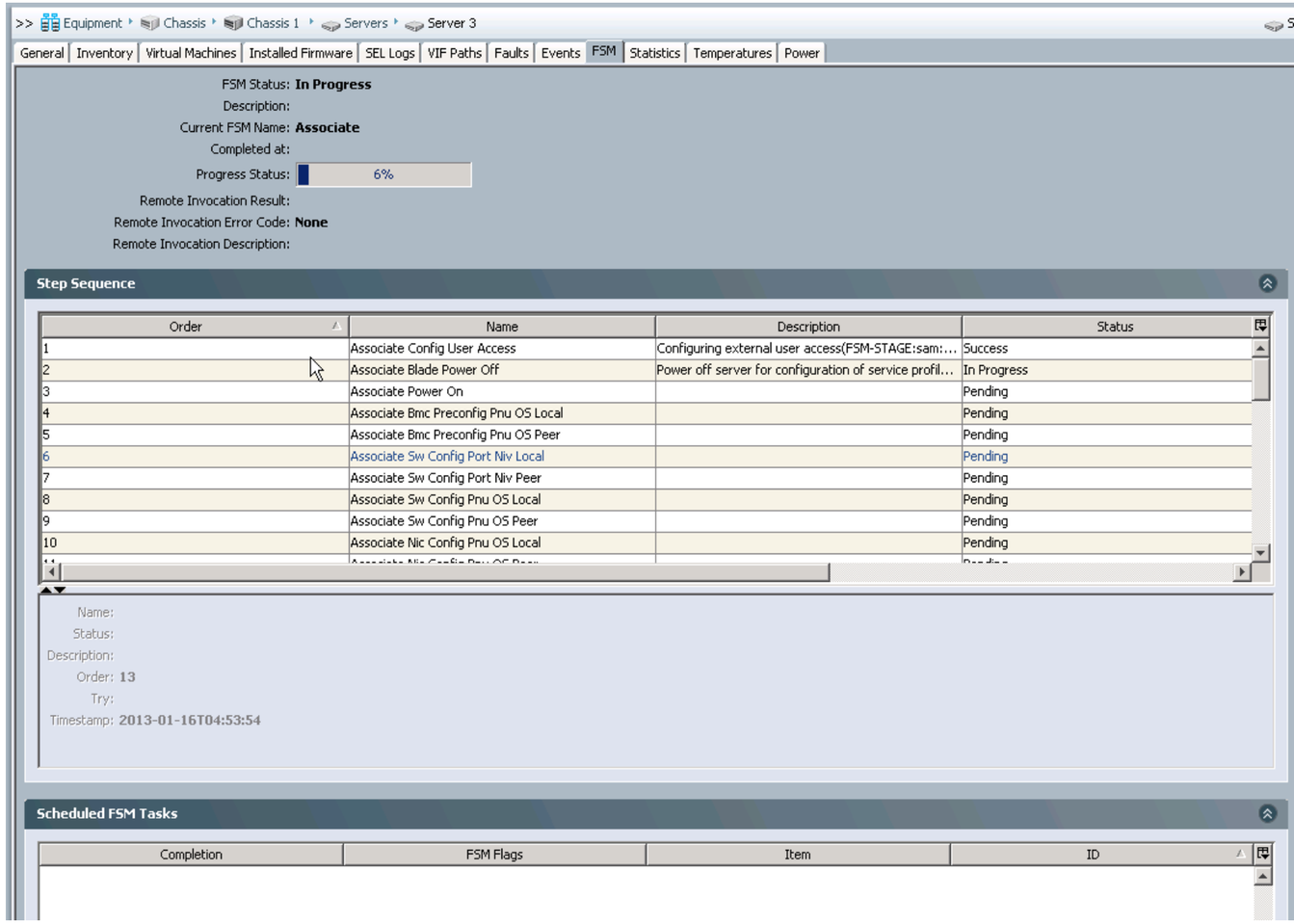
Operation (workflow)

Stage Description

FSM Details

UCS 2.1 New Features

- Improved Task Details
  - Complete rewrite of task descriptions
- Improved Step Visibility
  - All FSM steps listed including status
- Displays Scheduled Tasks



Common Blade Issues

Hardware and Management Problems

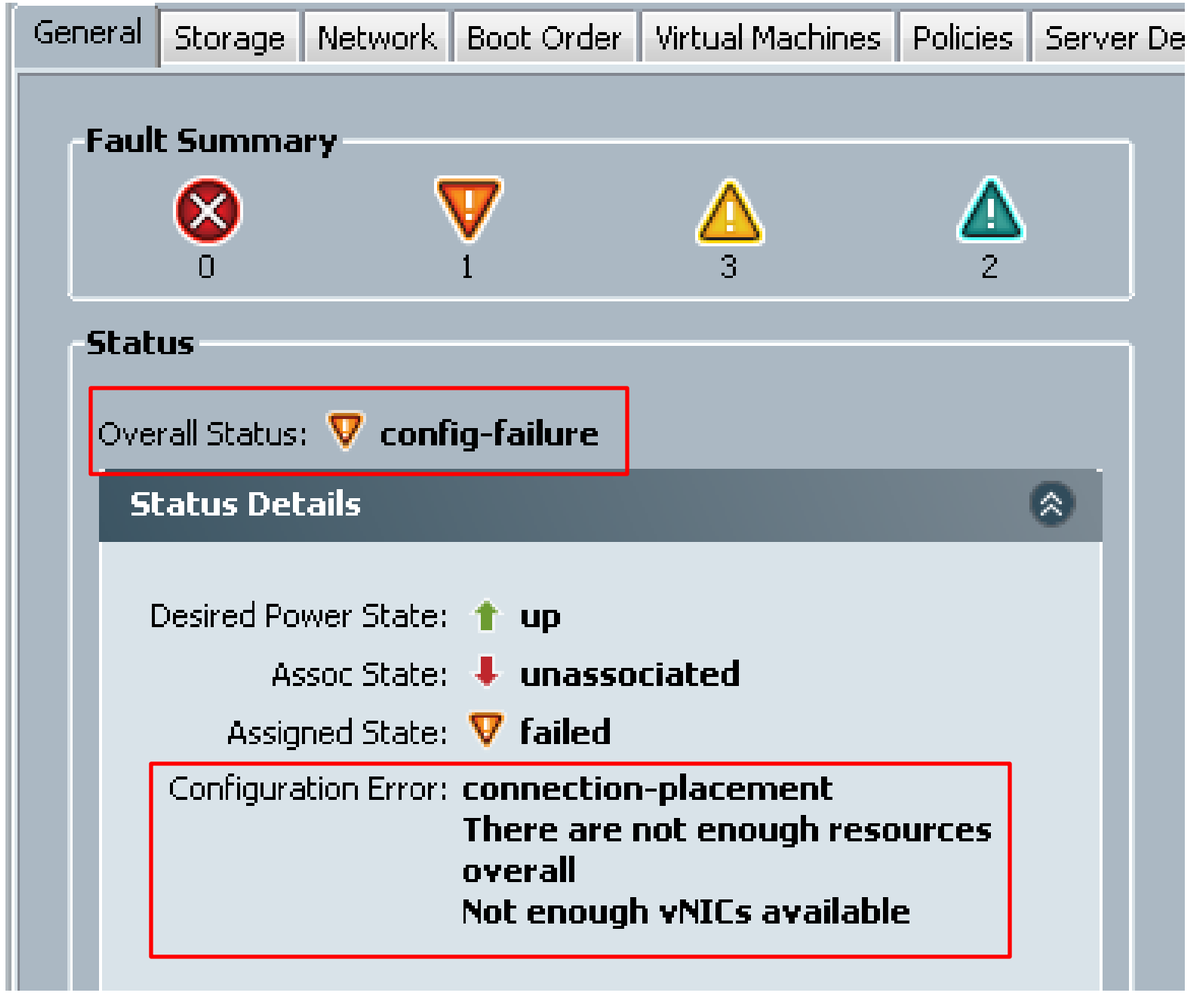
- Blade Discovery failed
  - Typically Hardware
  - UCSM Logs/Faults
- KVM Connectivity
  - Duplicate IP
  - IP Requirements
- Hardware Problems
  - SEL
  - OS Logs
- Adapter Issues
  - Card Requirements

Configuration

Configuration Validation and Errors

Profile assignment and Policy Problems

- Blade/Profile Status
  - Provides overview of failure
- FSM
  - May display more details about problem.
- Faults
  - Service Profile fault will display configuration problems



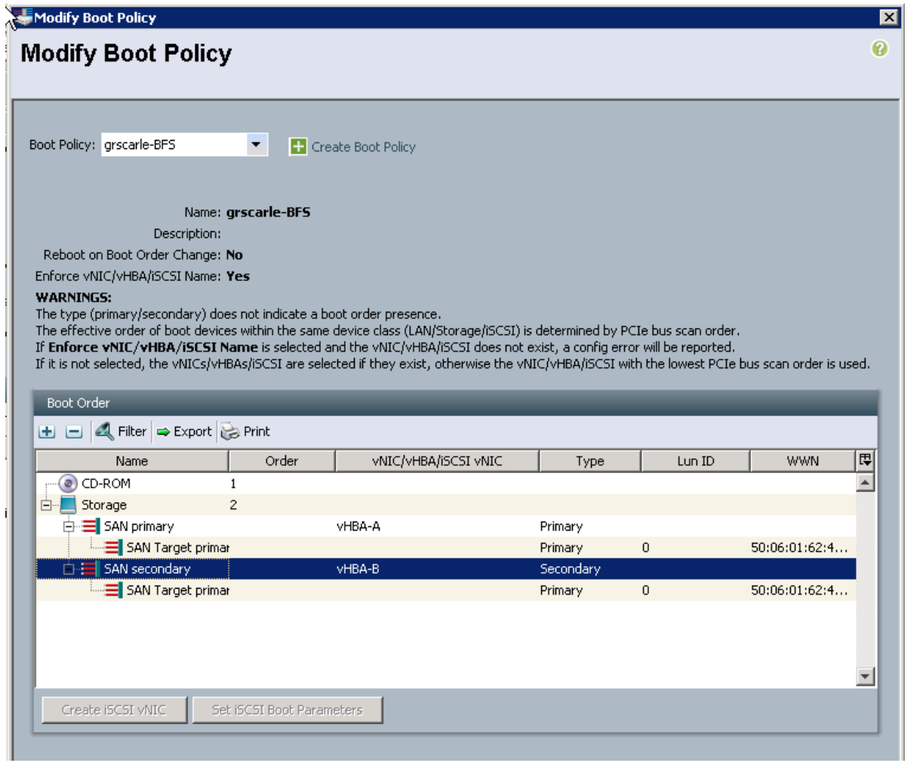
Configuration Boot Issues

Boot from SAN

UCS SAN Boot

Configuration/Installation

- Defined in Service Profile Boot Policy
- SAN Boot and Local HDD boot are mutually exclusive
  - Local HDD Boot ROM is disabled in SAN Boot
- Check OS multipathing requirements
  - Some Operating Systems require additional configuration, or a single path
  - e.g. Windows 2008 single path. RHEL multipath driver



UCS SAN Boot

Checklists and Verification

- Zoning and Zoneset Active
- Target Login (FLOGI)
- LUN Masking

SAN Admin

- NPV/NPIV configuration
- FC Uplinks
- FC VSAN Membership

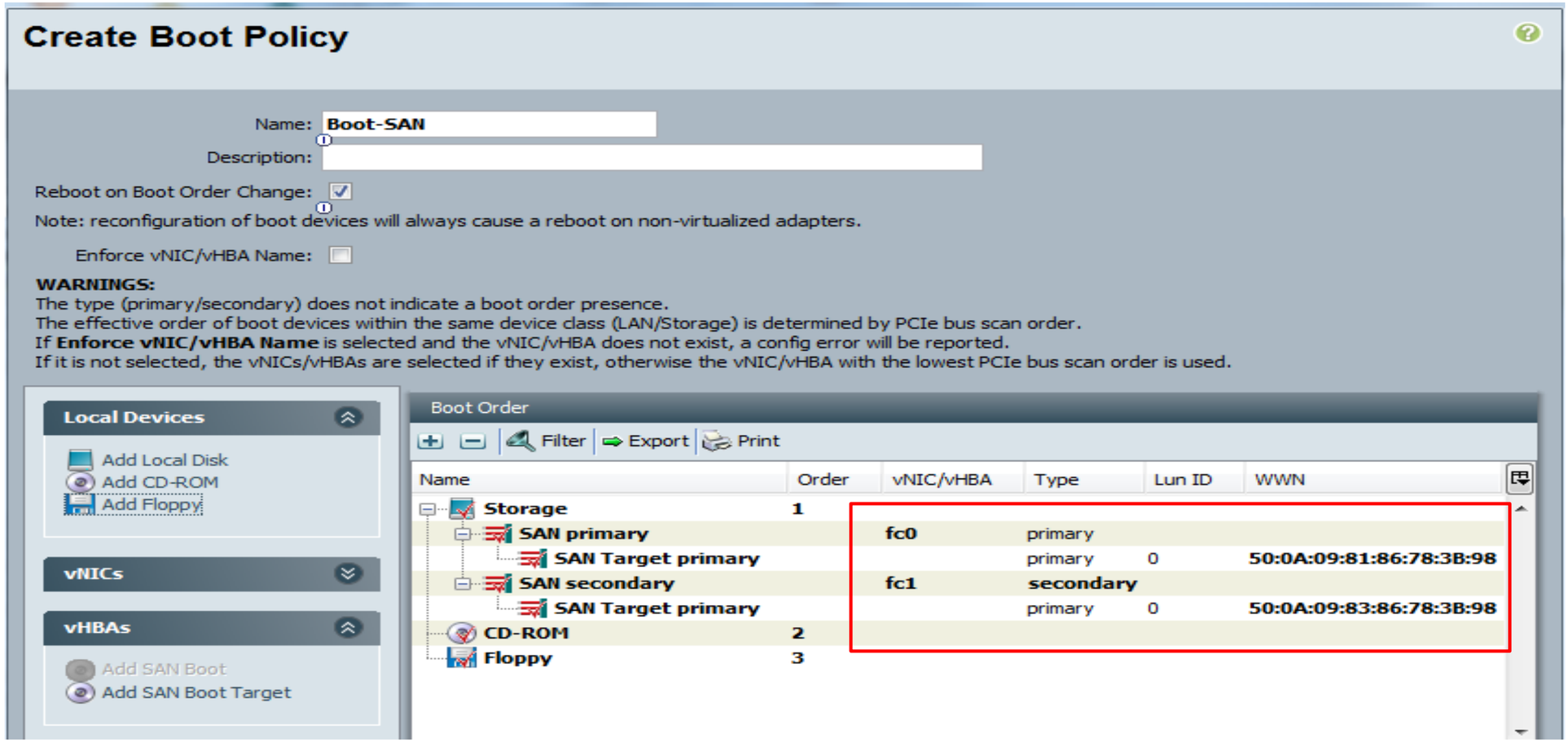
SAN+UCS Admin

- Service Profile
- Boot Policy

UCS Admin

UCS SAN Boot Policy

Configuration Example



UCS SAN Boot Policy

Verification

- Verify Boot ROM is Active during Blade boot:

```
0 Virtual Drive(s) found on the host adapter.

Adapter BIOS Disabled. No Logical Drive Handled by BIOS on HA - 0
0 Virtual Drive(s) handled by BIOS
Press <Ctrl><H> to Enable BIOS


Cisco VIC FC, Boot Driver Version 2.1(1a)
(C) 2010 Cisco Systems, Inc.
  DGC      50060162446044fa:000
Option ROM installed successfully
```

Boot Order

Filter | Export | Print

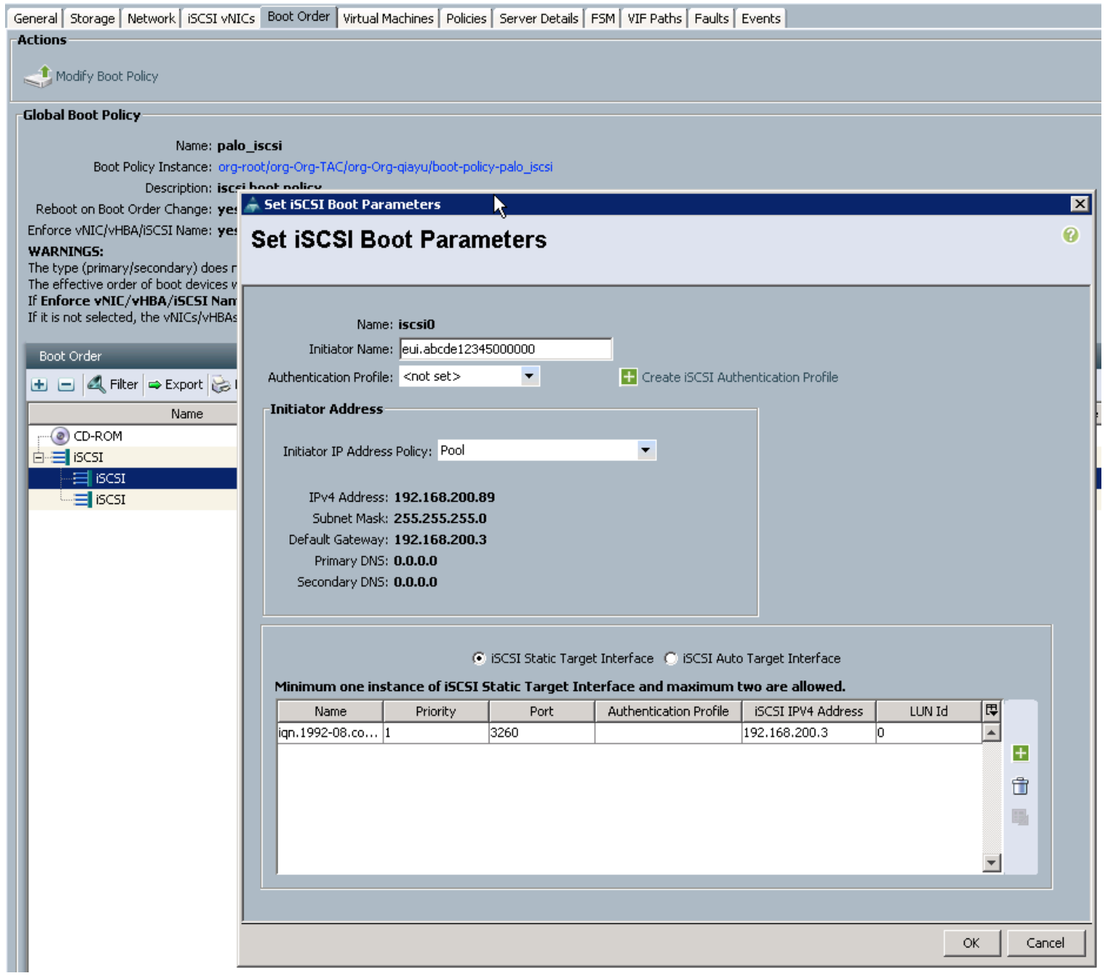
Name	Order	vNIC/vHBA/iSCSI...	Type	Lun ID	WWN
CD-ROM	1				
Storage	2				
SAN primary		vHBA-A	Primary		
SAN Target primary			Primary	0	50:06:01:62:44:60:44:FA
SAN secondary		vHBA-B	Secondary		
SAN Target primary			Primary	0	50:06:01:62:44:60:44:FA

iSCSI Boot

UCS iSCSI Boot Support

Overview and Requirements

- iSCSI boot from UCSM 2.0
- Adapter Support
  - Cisco VIC (no offload)
  - Broadcom 57711 M51KR-B (Full Offload, iSCSI HBA)
- Operating System Support
  - ESXi 4.1U1,U2, 5.0
  - Windows 2008R2
  - RHEL 5.6,6.0,6.1
- Check Support Matrix



UCS iSCSI Setup

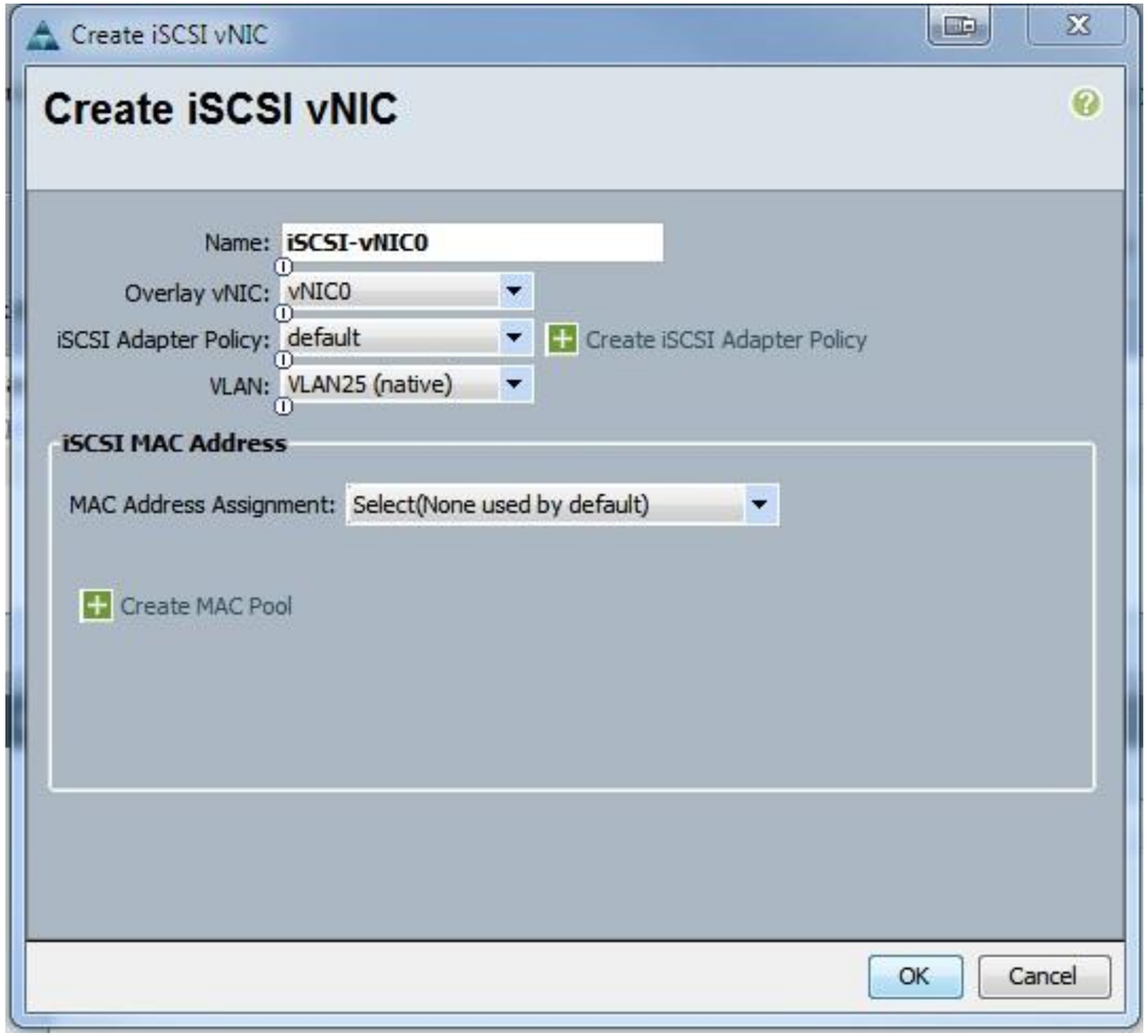
Configuration Flow

- Create iSCSI vNIC and Boot Policy
- Configure Boot Information
  - Target IP, IQN
  - Initiator IP, IQN
- Modify Adapter Policy for install (Broadcom)
- Install OS
  - OS Media
  - OS Drivers
- Modify Adapter Policy for Boot (Broadcom)

UCS iSCSI Boot Policy

iSCSI vNIC

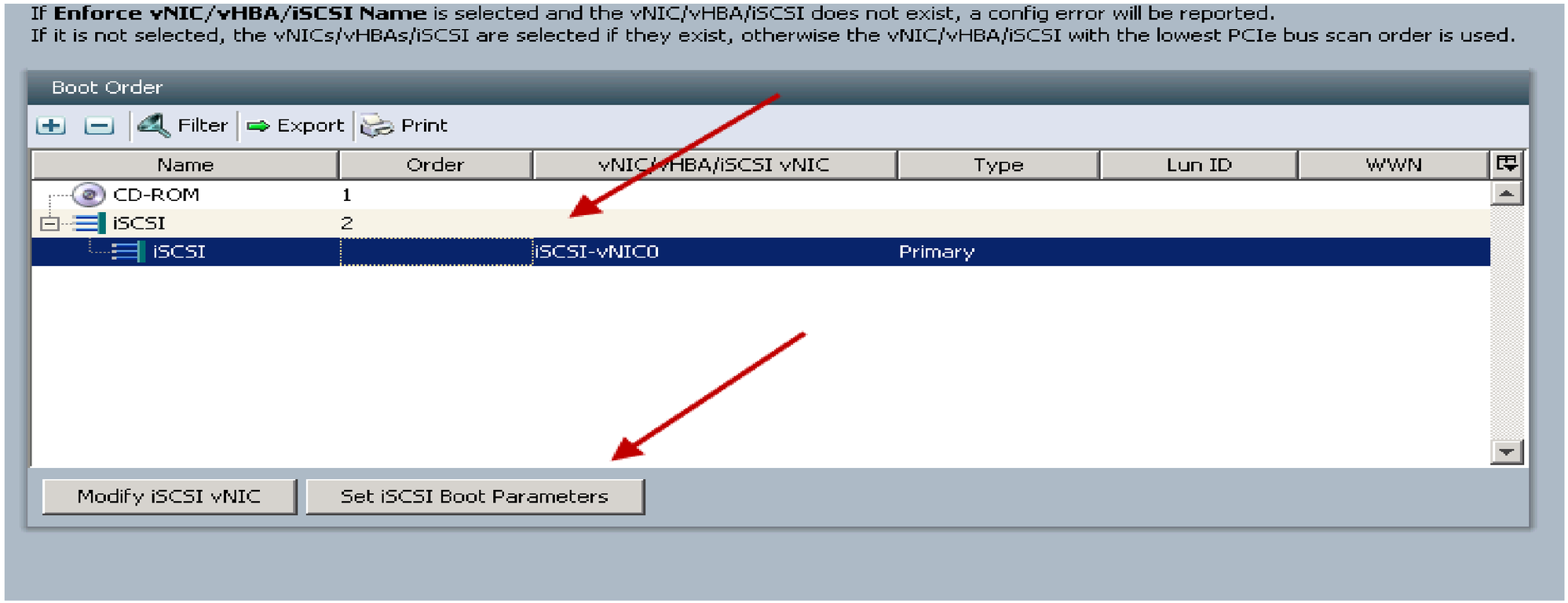
- Overlay vNIC
- iSCSI Adapter Policy
- Identify native VLAN
- MAC Address
  - VIC – Do not Set
  - Broadcom – Must be set



UCS iSCSI Boot Policy

iSCSI Boot Parameters

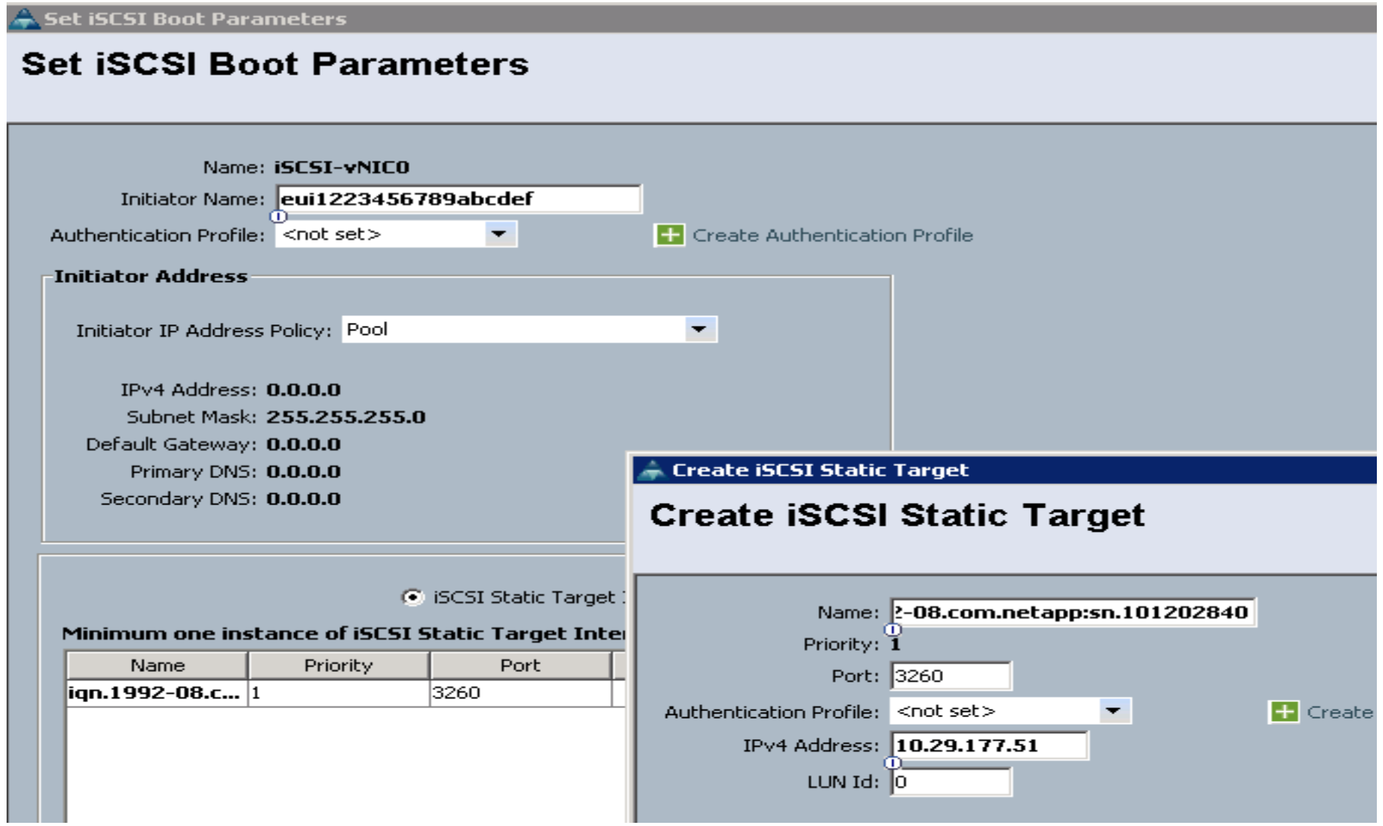
- Set iSCSI Parameters:



UCS iSCSI Boot Policy

iSCSI Boot Parameters

- Initiator name (eui or iqn)
- Initiator IP Address
- Target name
- Target IP and LUN
- Authentication
  - Initiator Auth – to array
  - Target Auth – from array



UCS iSCSI Boot Verification

Cisco VIC M81 and 1280

```
UCS-250-B# connect adapter 1/7/1
adapter 1/7/1 # connect
adapter 1/7/1 (top):1# attach-mcp
adapter 1/7/1 (mcp):1# iscsi_get_config

vnic iSCSI Configuration:
---------------------------


vnic_id: 5
          link_state: Up

        Initiator Cfg:
     initiator_state: ISCSI_INITIATOR_READY
initiator_error_code: ISCSI_BOOT_NIC_NO_ERROR
                vlan: 0
          dhcp status: false
                 IQN: iqn.1991-05.com.microsoft:wshv0011n00
             IP Addr: 192.168.200.88
         Subnet Mask: 255.255.255.0
             Gateway: 192.168.200.3

          Target Cfg:
          Target Idx: 0
               State: ISCSI_TARGET_READY
          Prev State: ISCSI_TARGET_DISABLED
        Target Error: ISCSI_TARGET_NO_ERROR
                 IQN: iqn.1992-08.com.netapp:sn.151750471
             IP Addr: 192.168.200.3
                Port: 3260
            Boot Lun: 0
          Ping Stats: Success (9.524ms)

        Session Info:
          session_id: 0
         host_number: 0
          bus_number: 0
           target_id: 0
```

```
Cisco VIC iSCSI, Boot Driver Version 2.0(0.239)
(C) 2010 Cisco Systems, Inc.
  0025b530300e iSCSI NETAPP  :000
Option ROM installed successfully
```

UCS iSCSI Boot Verification

Broadcom M51KR-B

- Broadcom ROM

```
Copyright (C) 2000-2011 Broadcom Corporation
iSCSI Boot (IPv4) v6.2.6

Initializing interface (00:25:B5:30:30:1A) ... Succeeded

Connecting to iSCSI targets with interface (00:25:B5:30:30:

Initiator Name          : eui.1023456789abcdef
Host IP Address         : 10.29.177.65
MAC Address             : 00:25:B5:30:30:1A
Subnet Mask             : 255.255.255.0
Default Gateway         : 10.29.177.1
1st Target Name         : iqn.1992-08.com.netapp:sn.101202840
1st Target IP Addr      : 10.29.177.51
1st Target TCP Port     : 3260
1st Target Boot LUN     : 0
Logging in the 1st iSCSI Target ... Succeeded

SCSI Target Drive: NETAPP   LUN                  (Rev: 7350)
```

Path Trace

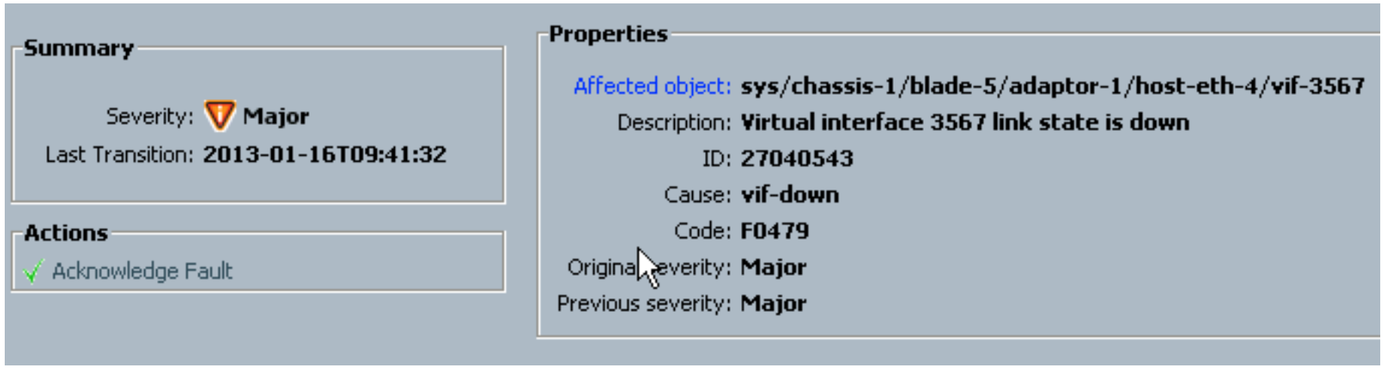
Ethernet Troubleshooting and Tracing

UCS Network Troubleshooting

Blade communication problems

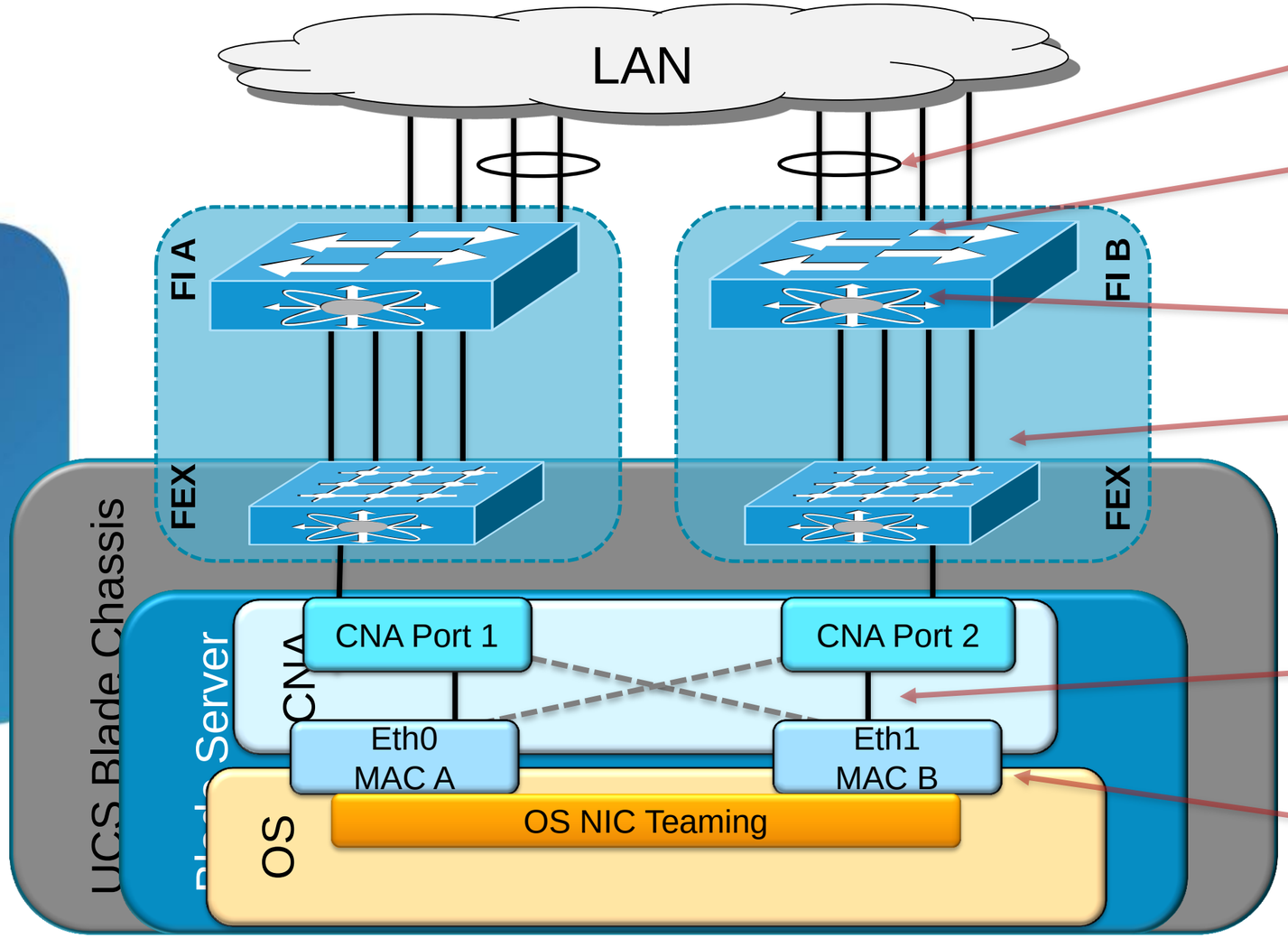
- Are vethernet and uplink interface up?
- Is VLAN tagging correct?
- Is MAC Address being learnt?
- L2/VLAN Connectivity?
- Default Gateway Connectivity?

```
[root@centos ~]# ping 4.2.2.2
PING 4.2.2.2 (4.2.2.2) 56(84) bytes of data.
^C
--- 4.2.2.2 ping statistics ---
7 packets transmitted, 0 received, 100% packet loss

[root@centos ~]# _
```



UCS Network Troubleshooting

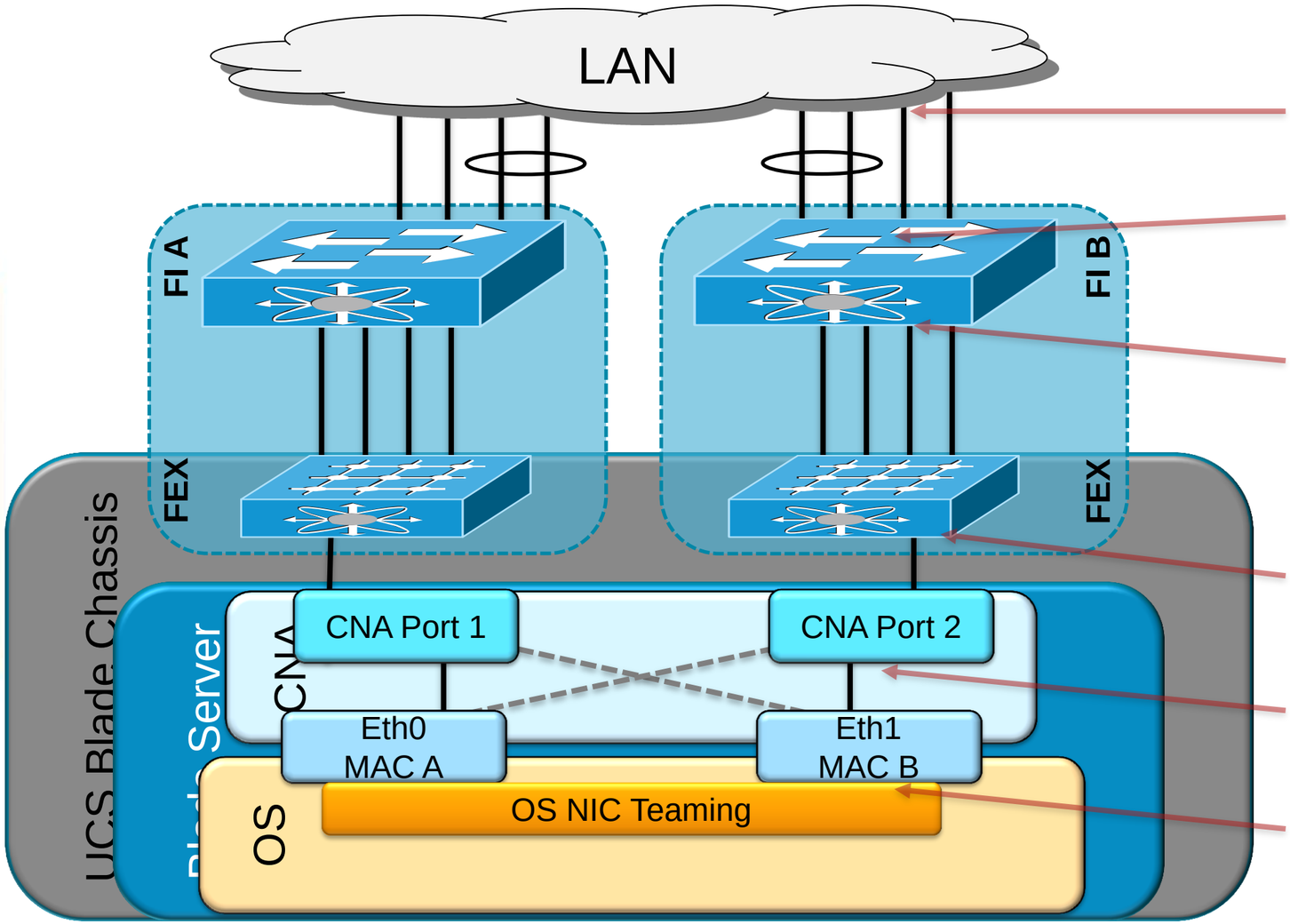
Frame Flow Decisions - Northbound



- Port Channelling Algorithm
- Border Port Pinning
- L2 Switching in FIs
- Fabric Port Pinning
- UCS Fabric Failover
- OS Routing Table or OS NIC Teaming

UCS Network Troubleshooting

Frame Flow Decisions - Southbound



- (Upstream Switch Decides) ?
- Déjà vu, RPF, border port pinning
- Fabric Port Pinning
- VNTag + Offset (MAC Learning on FIs)
- VNTag Identifier
- Dest. MAC and Ethertype binding

UCS Network Troubleshooting

Service Profile Interfaces

- show service-profile circuit server <chassis#>/<slot#>

```
UCS-250-B# show service-profile circuit server 1/5
Service Profile: Org-TAC/Org-mipetrin/CiscoLive
Server: 1/5
    Fabric ID: A
        VIF         vNIC            Link State  Overall Status Prot State    Prot Role   Admin Pin  Oper Pin   Transport
        ----------- --------------- ----------- -------------- ------------- ----------- ---------- ---------- ---------
             11023                  Up          Active         No Protection Unprotected 0/0        0/0        Ether
              2604                  Error       Error                                    0/0        0/0        Unknown
              2829 vNIC1             Up          Active         No Protection Unprotected 0/0        0/1        Ether
              2831 vHBA1             Up          Active         No Protection Unprotected 0/0        2/1        Fc
    Fabric ID: B
        VIF         vNIC            Link State  Overall Status Prot State    Prot Role   Admin Pin  Oper Pin   Transport
        ----------- --------------- ----------- -------------- ------------- ----------- ---------- ---------- ---------
             11024                  Up          Active         No Protection Unprotected 0/0        0/0        Ether
              2605                  Error       Error                                    0/0        0/0        Unknown
              2830 vNIC2             Up          Active         No Protection Unprotected 0/0        0/0        Ether
              2832 vHBA2             Up          Active         No Protection Unprotected 0/0        2/2        Fc
UCS-250-B#
```

UCS Network Troubleshooting

VIF Identities

- show host-eth-if

```
UCS-250-B# scope server 1/5
UCS-250-B /chassis/server # scope adapter 1
UCS-250-B /chassis/server/adapter # show host-eth-if

Eth Interface:
    ID          Dynamic MAC Address Name        Operability
    ----------- ------------------- ----------- -----------
             1  00:25:B5:00:19:2F   vNIC1       Operable
             2  00:25:B5:00:19:7F   vNIC2       Operable
UCS-250-B /chassis/server/adapter #
```

UCS Network Troubleshooting

Port Information. Cisco VIC

- MCP Level - vnic

```
UCS-250-B# connect adapter 1/5/1
adapter 1/5/1 # connect
adapter 1/5/1 (top):1# attach-mcp
adapter 1/5/1 (mcp):1# vnic
vnic id        : internal id of vnic, use for other vnic cmds
vnic name/mac  : ucsm provisioned name (-n) or mac address (-m)
vnic type      : enet=ethernet, enet_pt=dynamic ethernet, fc=fcoe
vnic bb:dd.f   : host pci bus/device/function id
vnic state     : state of vnic
lif            : internal logical if id, use for other lif/vif cmds
lif state      : state of lif
vif uif        : bound uplink 0 or 1, =:primary, -:secondary, >:current
vif ucsm       : ucsm id for this vif
vif idx        : switch id for this vif
vif vlan       : default vlan for traffic
vif state      : state of vif
---------------------------------------- --------- -------------------------
                v n i c                     l i f              v i f
id  name               type    bb:dd.f state lif state uif  ucsm   idx vlan state
--- --------------- ------- ------- ----- --- ----- --- ----- ----- ---- -----
  5 vnic_1             enet    08:00.0 UP      2 UP    =>0  2829   977   25 UP
  6 vnic_2             enet    08:00.1 UP      3 UP    =>1  2830   686   25 UP
  7 vnic_3             fc      08:00.2 UP      4 UP    =>0  2831   976 4051 UP
  8 vnic_4             fc      08:00.3 UP      5 UP    =>1  2832   685 2000 UP
```

UCS Network Troubleshooting

Port Information Cisco VIC

- Find vNIC's using 'vnicfind' command

```
adapter 1/5/1 (mcp):2# vnicfind 00:25:B5:00:19:2F
---------------------------------------- --------- --------------------------
                vnic                      lif                  vif
id  name              type     bb:dd.f state lif state uif   ucsm  idx  vlan state
--- -------------- -------  ------- ----- --- ----- ---  -----  ----- ---- -----
  5 vnic_1            enet     08:00.0 UP      2 UP    =>0   2829  977    25 UP
```

UCS Network Troubleshooting

Port Information Cisco VIC

- MCP Level Statistics: lifstats <lifid>

```
adapter 1/5/1 (mcp):25# lifstats 2
                DELTA                TOTAL DESCRIPTION
                    0                32123 Tx unicast frames without error
                    0                    7 Tx multicast frames without error
                    0                    8 Tx broadcast frames without error
                    0              3276386 Tx unicast bytes without error
                    0                  606 Tx multicast bytes without error
                    0                  512 Tx broadcast bytes without error
                    0                32125 Rx unicast frames without error
                    1                   27 Rx multicast frames without error
                  472                24703 Rx broadcast frames without error
                    0              3405164 Rx unicast bytes without error
                   64                 1728 Rx multicast bytes without error
                50128              2581925 Rx broadcast bytes without error
                    1                   27 Rx frames len == 64
                  386                52565 Rx frames 64 < len <= 127
                   69                 3390 Rx frames 128 <= len <= 255
                    3                  188 Rx frames 256 <= len <= 511
                   14                  685 Rx frames 512 <= len <= 1023
            7.080kbps                      Rx rate
```

UCS Network Troubleshooting

FEX/IOM Port Information

- Connect nxos: show fex <chassis#> detail

```
UCS-250-A(nxos)# show fex 1 detail
FEX: 1 Description: FEX0001   state: Online
  FEX version: 5.0(3)N2(2.1s) [Switch version: 5.0(3)N2(2.1s)]
  FEX Interim version: 5.0(3)N2(2.1s)
  Switch Interim version: 5.0(3)N2(2.1s)
  Chassis Model: N20-C6508,  Chassis Serial: FOX1424G4LT
  Extender Model: N20-I6584,  Extender Serial: QCI1424A5AP
  Part No: 73-11623-05
  Card Id: 67, Mac Addr: c8:4c:75:ed:1c:ba, Num Macs: 10
  Module Sw Gen: 21  [Switch Sw Gen: 21]
  post level: complete
 pinning-mode: static    Max-links: 1
  Fabric port for control traffic: Eth1/3
  Fabric interface state:
    Eth1/1 - Interface Up. State: Active
    Eth1/2 - Interface Up. State: Active
    Eth1/3 - Interface Up. State: Active
    Eth1/4 - Interface Up. State: Active
  Fex Port         State  Fabric Port
        Eth1/1/1    Up       Eth1/1
        Eth1/1/2    Up       Eth1/2
        Eth1/1/3    Up       Eth1/3
        Eth1/1/4  Down         None
        Eth1/1/5    Up       Eth1/1
```

UCS Network Troubleshooting

FEX/IOM Port Information

- show system internal fex info satport ethernet <chassis#>/<adapter#>/<slot#>

```
UCS-250-A(nxos)# show system internal fex info satport ethernet 1/1/5
  Interface-Name  ifindex  State Fabric-if  Pri-fabric Expl-Pinned
          Eth1/1/5 0x1f000100   Up    Eth1/1    Eth1/3    Eth1/1
  Port Phy Up. Port dn req: Not pending
  SDB entry: ifindex(1f000100) fabric if(1a000000)
     Dev: 0 Nif3 Hif3 (Nif:0x20000000 Hif:0x1f000100)
```

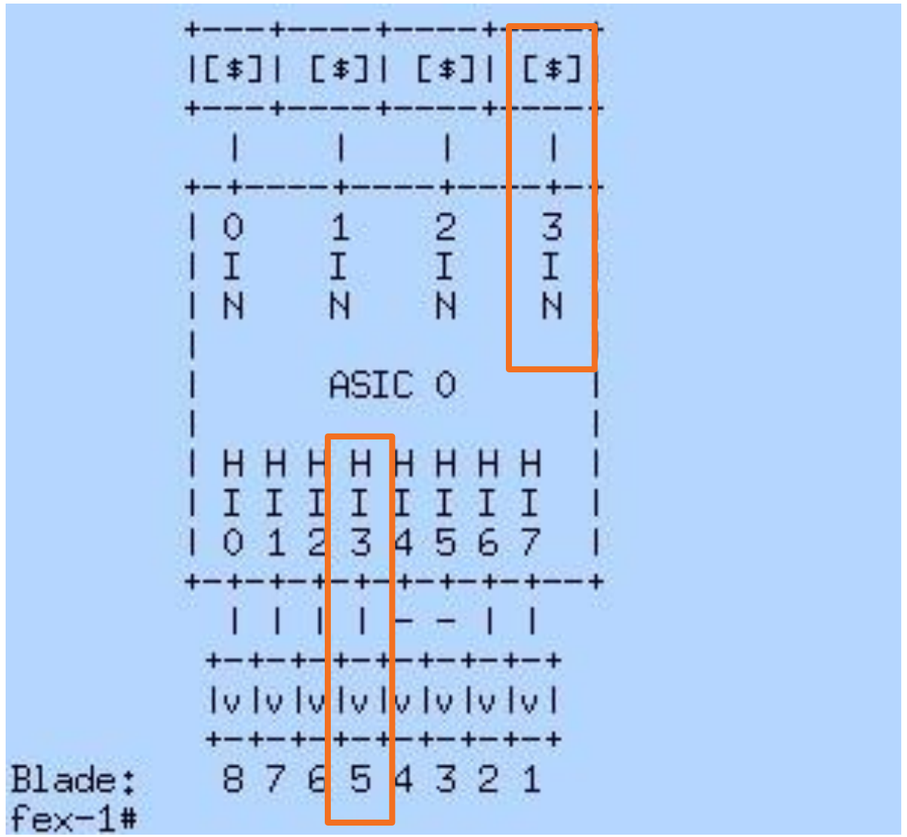
- Record nif (network) and hif (backplane)

UCS Network Troubleshooting

FEX/IOM Port Information

- Connect iom <chassis#>
- Show platform software <redwood|woodside> sts

```
UCS-250-B# connect iom 1
Attaching to FEX 1 ...
To exit type 'exit', to abort type '$.'
fex-1#
fex-1# show platform software redwood sts
Board Status Overview:
 legend:
        ' '= no-connect
        X  = Failed
        -  = Disabled
        :  = Dn
        |  = Up
        ^  = SFP+ present
        v  = Blade Present
------------------------------
```



UCS Network Troubleshooting

FEX/IOM Port Information

- show platform software <redwood|woodside> rate

```
fex-1# show platform software redwood rate
+-------++------------+-----------+------------++------------+-----------+------------+-------+-------+---+
| Port  || Tx Packets | Tx Rate   | Tx Bit     || Rx Packets | Rx Rate   | Rx Bit     |Avg Pkt|Avg Pkt|   |
|       ||            | (pkts/s)  | Rate       ||            | (pkts/s)  | Rate       | (Tx)  | (Rx)  |Err|
+-------++------------+-----------+------------++------------+-----------+------------+-------+-------+---+
| 0-NI3 ||         92 |        18 | 56.90Kbps  ||        198 |        39 | 31.56Kbps  |   386 |    99 |   |
| 0-NI2 ||          1 |         0 | 1.71Kbps   ||          1 |         0 | 1.03Kbps   |  1072 |   648 |   |
| 0-NI1 ||          2 |         0 | 3.42Kbps   ||          1 |         0 | 1.03Kbps   |  1072 |   648 |   |
| 0-NI0 ||          1 |         0 | 1.71Kbps   ||        105 |        21 | 21.82Kbps  |  1072 |   129 |   |
| 0-HI7 ||        119 |        23 | 15.99Kbps  ||         15 |         3 | 24.05Kbps  |    83 |  1002 |   |
| 0-HI3 ||         18 |         3 | 3.80Kbps   ||         17 |         3 | 28.68Kbps  |   132 |  1054 |   |
| 0-HI0 ||        107 |        21 | 19.62Kbps  ||          0 |         0 | 0.00 bps   |   114 |     0 |   |
| 0-BI  ||         47 |         9 | 6.76Kbps   ||         51 |        10 | 11.13Kbps  |    90 |   136 |   |
| 0-CI  ||         34 |         6 | 11.60Kbps  ||         20 |         4 | 9.63Kbps   |   213 |   301 |   |
+-------++------------+-----------+------------++------------+-----------+------------+-------+-------+---+
```

UCS Network Troubleshooting

FEX/IOM Port Information

- show platform software <redwood|woodside> rmon 0 <interface>

```
fex-1# show platform software redwood rmon 0 hif3
HI3 RMON:
+--------------+---------------------+----------------+--------------+---------------------+----------------+
| RMON TX      |       Current       |      Diff      |  RMON RX     |      Current        |      Diff      |
+--------------+---------------------+----------------+--------------+---------------------+----------------+
| TX_PKT_LT64  |                   0 |              0 | RX_PKT_LT64  |                   0 |              0 |
| TX_PKT_64    |              181780 |         181780 | RX_PKT_64    |               37944 |          37944 |
| TX_PKT_65    |              962472 |         962472 | RX_PKT_65    |              215061 |         215061 |
| TX_PKT_128   |              107022 |         107022 | RX_PKT_128   |              158795 |         158795 |
| TX_PKT_256   |              158915 |         158915 | RX_PKT_256   |               14472 |          14472 |
| TX_PKT_512   |               30374 |          30374 | RX_PKT_512   |                3039 |           3039 |
| TX_PKT_1024  |                9607 |           9607 | RX_PKT_1024  |                1748 |           1748 |
| TX_PKT_1519  |              154008 |         154008 | RX_PKT_1519  |                 914 |            914 |
| TX_PKT_2048  |              503704 |         503704 | RX_PKT_2048  |             1821488 |         1821488 |
| TX_PKT_4096  |                   0 |              0 | RX_PKT_4096  |                   0 |              0 |
| TX_PKT_8192  |                   0 |              0 | RX_PKT_8192  |                   0 |              0 |
| TX_PKT_GT9216|                   0 |              0 | RX_PKT_GT9216|                   0 |              0 |
| TX_PKTTOTAL  |             2107882 |        2107882 | RX_PKTTOTAL  |             2253461 |         2253461 |
| TX_OCTETS    |          1500548811 |     1500548811 | RX_OCTETS    |          3923548829 |      3923548829 |
| TX_PKTOK     |             2107882 |        2107882 | RX_PKTOK     |             2253461 |         2253461 |
| TX_UCAST     |             1011887 |        1011887 | RX_UCAST     |             2118639 |         2118639 |
| TX_MCAST     |              808102 |         808102 | RX_MCAST     |              131308 |          131308 |
| TX_BCAST     |              287893 |         287893 | RX_BCAST     |                7514 |            7514 |
```

UCS Network Troubleshooting

VIF/Vethernet Information

- NXOS: show interface brief

```
UCS-250-A(nxos)# show interface brief | grep 2829
Veth2829      25     eth  trunk  up      none                           auto
UCS-250-A(nxos)#
```

- show interface <id>

```
UCS-250-A(nxos)# show int vethernet 2829
Vethernet2829 is up
    Bound Interface is Ethernet1/1/5
  Hardware: Virtual, address: 000d.ecd3.5c00 (bia 000d.ecd3.5c00)
  Description: server 1/5, VNIC vNIC1
  Encapsulation ARPA
  Port mode is trunk
  EtherType is 0x8100
  Rx
    32124 unicast packets  7 multicast packets  8 broadcast packets
    32139 input packets  3277568 bytes
    0 input packet drops
  Tx
    32125 unicast packets  32 multicast packets  29318 broadcast packets
    61475 output packets  6473510 bytes
    0 flood packets
    0 output packet drops
```

UCS Network Troubleshooting

MAC Address Information

- show mac address-table

```
UCS-250-A(nxos)# show mac address-table
Legend:
        * - primary entry, G - Gateway MAC, (R) - Routed MAC, O - Overlay MAC
        age - seconds since last seen,+ - primary entry using vPC Peer-Link
   VLAN     MAC Address      Type      age     Secure NTFY    Ports
---------+-----------------+--------+---------+------+----+------------------
* 4051      0025.b5b0.19bf    dynamic   4020        F    F  Veth11023
* 3001      0050.5680.2efb    dynamic   0           F    F  Veth2529
* 200       0025.b500.282d    static    0           F    F  Veth2819
* 183       000c.29ce.e5a8    dynamic   0           F    F  Veth2640
* 183       0025.b500.330f    dynamic   10          F    F  Eth3/1/2
* 183       0025.b500.352f    dynamic   2240        F    F  Veth2640
* 25        0025.b500.050d    dynamic   0           F    F  Veth2719
* 25        0025.b500.050e    dynamic   0           F    F  Veth2724
* 25        0025.b500.192f    static    0           F    F  Veth2829
* 25        0025.b5de.fa0f    static    0           F    F  Veth2736
```

UCS Network Troubleshooting

VIF/Vethernet Pinning

- show pinning border-interface

```
UCS-250-A(nxos)# show pinning border-interfaces

--------------------+---------+-----------------------------------------
Border Interface     Status    SIFs
--------------------+---------+-----------------------------------------
Po1                  Active    Eth1/1/1 Veth2529 Veth2532 Veth2640
                               Veth2717 Veth2719 Veth2724 Veth2727
                               Veth2736 Veth2739 Veth2742 Veth2769
                               Veth2772 Veth2819 Veth2829 Eth1/1/3
                               Eth1/1/8 Eth3/1/2
Po2                  Down
Eth1/5               Down

Total Interfaces : 3
```

- show pinning server-interfaces

```
UCS-250-A(nxos)# show pinning server-interfaces | grep 2829
Veth2829         No                    Po1                          1:8:38
UCS-250-A(nxos)#
```

UCS Network Troubleshooting

Port Channel Information

- show port-channel summary

```
UCS-250-A(nxos)# show port-channel summary
Flags:  D - Down         P - Up in port-channel (members)
        I - Individual   H - Hot-standby (LACP only)
        s - Suspended    r - Module-removed
        S - Switched     R - Routed
        U - Up (port-channel)
--------------------------------------------------------------------------------
Group Port-       Type     Protocol  Member Ports
      Channel
--------------------------------------------------------------------------------
1     Po1(SU)     Eth      LACP      Eth1/6(P)
2     Po2(SD)     Eth      LACP      Eth1/5(D)
3     Po3(SD)     Eth      NONE      --
```

UCS Network Troubleshooting

Port-Channel Information

- show port-channel load-balance forwarding path interface port-channel <#>

```
UCS-250-A(nxos)# show port-channel load-balance forwarding-path interface port-channel 1 vlan 25 src-mac 0025.b500.192f
Missing params will be substituted by 0's.
Load-balance Algorithm on switch: source-dest-ip
crc8_hash: Not Used     Outgoing port id: Ethernet1/6
Param(s) used to calculate load-balance (Unknown unicast, multicast and broadcast packets):
        dst-mac:  0000.0000.0000
        vlan id:  25
UCS-250-A(nxos)#
```

- Check Upstream for MAC Learning

UCS Network Troubleshooting

VLAN Designated Receiver

- show platform software enm internal info vlandb id <vlanID>

```
UCS-250-A(nxos)# show platform software enm internal info vlandb id 25

vlan_id 25
--------------
Designated receiver: Po1
Membership:
Po1
UCS-250-A(nxos)#
```

SAN Troubleshooting and Tracing

UCS SAN Troubleshooting

Service Profile Interfaces

- show service-profile circuit server <chassis#>/<slot#>

```
UCS-250-B# show service-profile circuit server 1/5
Service Profile: Org-TAC/Org-mipetrin/CiscoLive
Server: 1/5
    Fabric ID: A
        VIF         vNIC            Link State   Overall Status Prot State    Prot Role   Admin Pin  Oper Pin   Transport
        ----------- --------------- ------------ -------------- ------------- ----------- ---------- ---------- ---------
             11023                  Up           Active         No Protection Unprotected 0/0        0/0        Ether
              2604                  Error        Error                                    0/0        0/0        Unknown
              2829 vNIC1            Up           Active         No Protection Unprotected 0/0        0/1        Ether
              2831 vHBA1            Up           Active         No Protection Unprotected 0/0        2/1        Fc
    Fabric ID: B
        VIF         vNIC            Link State   Overall Status Prot State    Prot Role   Admin Pin  Oper Pin   Transport
        ----------- --------------- ------------ -------------- ------------- ----------- ---------- ---------- ---------
             11024                  Up           Active         No Protection Unprotected 0/0        0/0        Ether
              2605                  Error        Error                                    0/0        0/0        Unknown
              2830 vNIC2            Up           Active         No Protection Unprotected 0/0        0/0        Ether
              2832 vHBA2            Up           Active         No Protection Unprotected 0/0        2/2        Fc
UCS-250-B#
```

UCS SAN Troubleshooting

VIF/vHBA Identities

- show host-fc-if

```
UCS-250-B# scope server 1/5
UCS-250-B /chassis/server # scope adapter 1
UCS-250-B /chassis/server/adapter # show host-fc-if

FC Interface:
    Id          Wwn                     Model       Name        Operability
    ----------  ----------------------- ----------- ----------- -----------
             1  20:00:00:25:B5:B0:19:BF N20-AC0002  vHBA1       Operable
             2  20:00:00:25:B5:B0:19:EF N20-AC0002  vHBA2       Operable
```

UCS SAN Troubleshooting

FC Interfaces – Cisco VIC

- Attach to **fls** for the ability to view SAN Boot Attributes
- The **vnic** command shows numbering of fc interfaces

```
UCS-250-B# connect adapter 1/5/1
adapter 1/5/1 # connect
adapter 1/5/1 (top):1# attach-fls
adapter 1/5/1 (fls):1# vnic
---- ---- ---- ------- -------
vnic ecpu type state   lif
---- ---- ---- ------- -------
7    1    fc   active  4
8    2    fc   active  5
adapter 1/5/1 (fls):2#
```

UCS SAN Troubleshooting

FC Login Attributes – Cisco VIC

- Login Information (Target PWWN and FCID) can be obtain with **login <vnicID>** command
- Portname should match Boot Policy Configuration

```
adapter 1/5/1 (fls):20# login 7
lifid: 4
  ID   PORTNAME                  NODENAME                  FID
    1: 50:06:01:6a:44:60:44:fa  00:00:00:00:00:00:00:00  0x5e01ef
    0: 50:06:01:62:44:60:44:fa  00:00:00:00:00:00:00:00  0x5e00ef

adapter 1/5/1 (fls):21# login 8
lifid: 5
  ID   PORTNAME                  NODENAME                  FID
    1: 50:06:01:68:44:60:44:fa  00:00:00:00:00:00:00:00  0x000000
    0: 50:06:01:60:44:60:44:fa  00:00:00:00:00:00:00:00  0x000000
```

UCS SAN Troubleshooting

FC Login Information – Cisco VIC

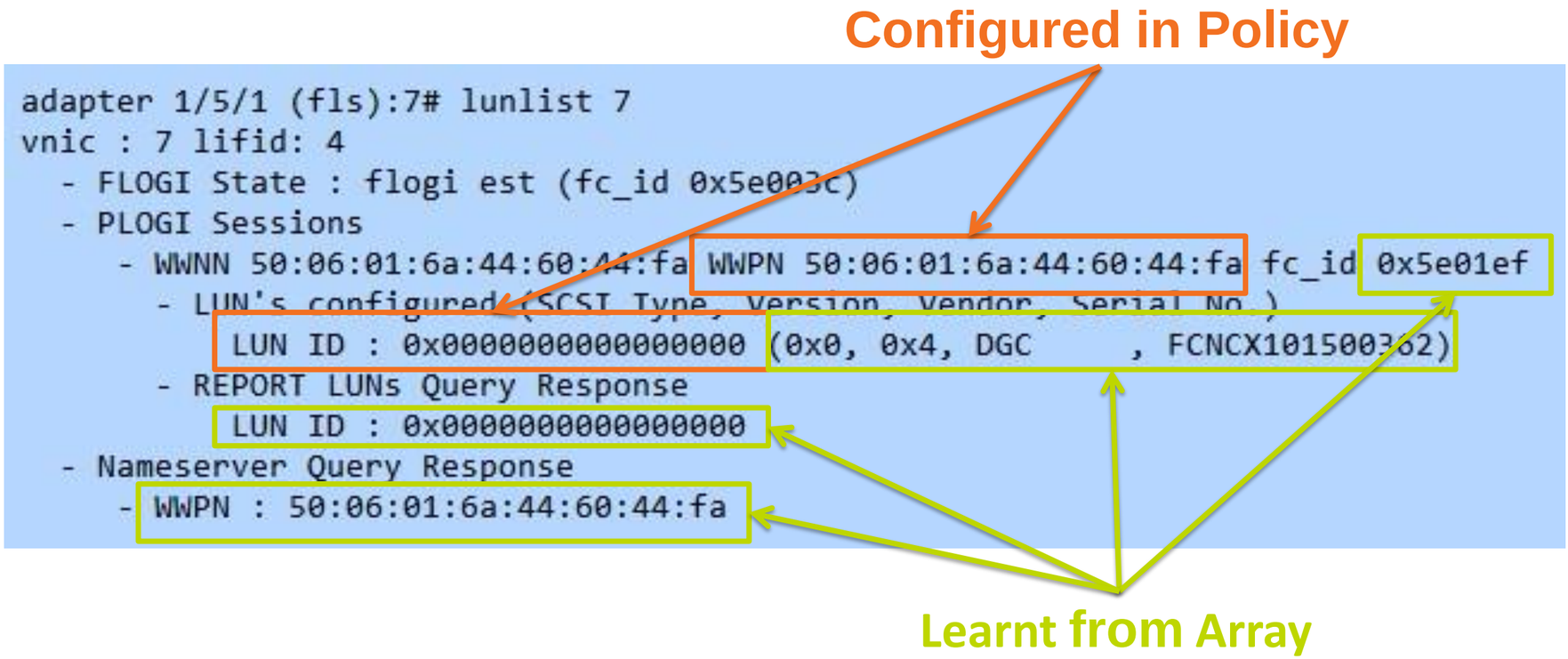
- The lunmap command will confirm SAN Login

```
adapter 1/5/1 (fls):22# lunmap 7
lunmapid: 0  port_cnt: 1
  lif_id: 4
    PORTNAME                 NODENAME                 LUN                PLOGI
    50:06:01:62:44:60:44:fa  00:00:00:00:00:00:00:00  0000000000000000   Y

lunmapid: 1  port_cnt: 1
  lif_id: 4
    PORTNAME                 NODENAME                 LUN                PLOGI
    50:06:01:6a:44:60:44:fa  00:00:00:00:00:00:00:00  0000000000000000   Y

adapter 1/5/1 (fls):23#
adapter 1/5/1 (fls):23# lunmap 8
lunmapid: 0  port_cnt: 1
  lif_id: 5
    PORTNAME                 NODENAME                 LUN                PLOGI
    50:06:01:60:44:60:44:fa  00:00:00:00:00:00:00:00  0000000000000000   N

lunmapid: 1  port_cnt: 1
  lif_id: 5
    PORTNAME                 NODENAME                 LUN                PLOGI
    50:06:01:68:44:60:44:fa  00:00:00:00:00:00:00:00  0000000000000000   N
```

UCS SAN Troubleshooting

FC Login Information – Cisco VIC

- The lunlist <vnicID> command displays LUN level information learnt from Array.



UCS SAN Troubleshooting

FC Interface Statistics

- show stats vnic-stats

```
UCS-250-B# scope server 1/5
UCS-250-B /chassis/server # scope adapter 1
UCS-250-B /chassis/server/adapter # scope host-fc-if 1
UCS-250-B /chassis/server/adapter/host-fc-if # show stats vnic-stats

Vnic Stats:
    Time Collected: 2012-02-12T02:54:11.471
    Monitored Object: sys/chassis-1/blade-5/adaptor-1/host-fc-1
    Suspect: No
    Bytes Rx (bytes): 37528
    Packets Rx (packets): 334
    Bytes Tx (bytes): 22932
    Packets Tx (packets): 226
    Errors Tx (errors): 0
    Errors Rx (errors): 0
    Dropped Tx (packets): 0
    Dropped Rx (packets): 0
    Thresholded: 0
```

UCS SAN Troubleshooting

FC Interface Statistics

- NXOS: show interface brief

```
UCS-250-A(nxos)# show interface brief | grep 2831
vfc2831    1000   F      on      trunking          --     TF      auto --
UCS-250-A(nxos)#
```

- NXOS: show interface vfc <id>

```
UCS-250-A(nxos)# show interface vfc 2831
vfc2831 is trunking
    Bound interface is Vethernet11023
    Port description is server 1/5, VHBA vHBA1
    Hardware is Virtual Fibre Channel
    Port WWN is 2b:0e:00:0d:ec:d3:5c:3f
    Admin port mode is F, trunk mode is on
    snmp link state traps are enabled
    Port mode is TF
    Port vsan is 1000
    Trunk vsans (admin allowed and active) (1000)
    Trunk vsans (up)                       (1000)
    Trunk vsans (isolated)                 ()
    Trunk vsans (initializing)             ()
    1 minute input rate 0 bits/sec, 0 bytes/sec, 0 frames/sec
    1 minute output rate 0 bits/sec, 0 bytes/sec, 0 frames/sec
      253 frames input, 25628 bytes
        3 discards, 0 errors
      360 frames output, 40952 bytes
        0 discards, 0 errors
    last clearing of "show interface" counters never
    Interface last changed at Sun Feb 12 02:58:03 2012
```

UCS SAN Troubleshooting

VFC Membership, Login and Pinning

- show vsan membership

```
UCS-250-A(nxos)# show vsan membership
vsan 1 interfaces:
    fc2/3             fc2/4             san-port-channel 12 vfc2718

vsan 1000 interfaces:
    fc2/1             vfc2533           vfc2642           vfc2689
    vfc2699           vfc2721           vfc2723           vfc2759
    vfc2773           vfc2823           vfc2831
```

- show npv flogi-table

```
UCS-250-A(nxos)# show npv flogi-table
--------------------------------------------------------------------------------
SERVER                                                                 EXTERNAL
INTERFACE VSAN FCID            PORT NAME               NODE NAME       INTERFACE
--------------------------------------------------------------------------------
vfc2533   1000 0x5e0009 20:bb:0a:07:00:00:00:0f 20:aa:0a:07:00:00:00:0f fc2/1
vfc2642   1000 0x5e00a9 20:00:00:25:b5:b0:35:1e 20:00:00:25:b5:a0:35:1f fc2/1
vfc2689   1000 0x5e00ca 20:00:00:25:b5:b0:05:00 20:00:00:25:b5:a0:05:06 fc2/1
vfc2721   1000 0x5e00cb 20:00:00:25:b5:00:05:1f 20:00:00:25:b5:a0:05:05 fc2/1
vfc2759   1000 0x5e0006 20:bb:0a:07:00:00:00:1e 20:aa:0a:07:00:00:00:1f fc2/1
vfc2773   1000 0x5e0012 20:bb:0a:07:00:00:00:2f 20:aa:0a:07:00:00:00:2f fc2/1
vfc2831   1000 0x5e003c 20:00:00:25:b5:b0:19:bf 20:00:00:25:b5:a0:19:9f fc2/1
```

UCS SAN Troubleshooting

Northbound FC Switch

- show flogi database

```
SV-35-06-MDS9222i# show flogi database | grep -i 20:00:00:25:b5:b0:19:bf
fc1/17          1000  0x5e003c  20:00:00:25:b5:b0:19:bf 20:00:00:25:b5:a0:19:9f
SV-35-06-MDS9222i#
```

- show zoneset active

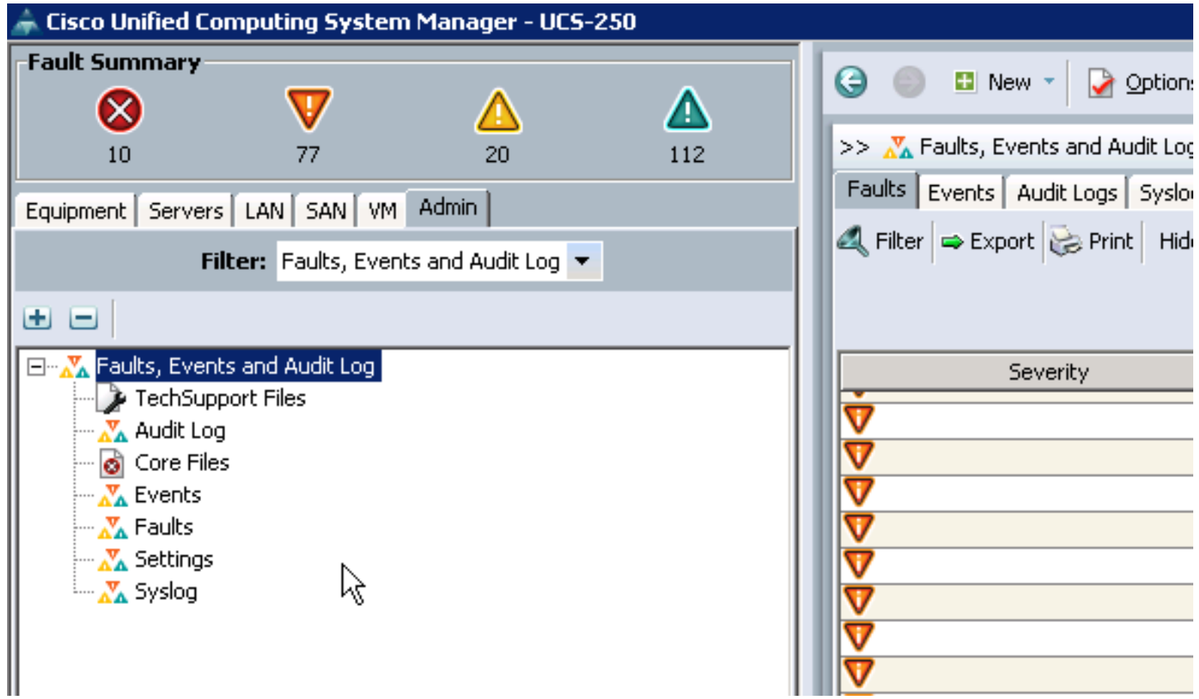
```
SV-35-06-MDS9222i# show zoneset active | grep -A 6 "mipetrin-cisco-live"
  zone name mipetrin-cisco-live vsan 1000
  * fcid 0x5e003c [pwwn 20:00:00:25:b5:b0:19:bf]
  * fcid 0x5e00ef [pwwn 50:06:01:62:44:60:44:fa] [SPA2]
  * fcid 0x5e01ef [pwwn 50:06:01:6a:44:60:44:fa] [SPB2]
```

Maintenance

UCS Troubleshooting

Maintenance and Faults

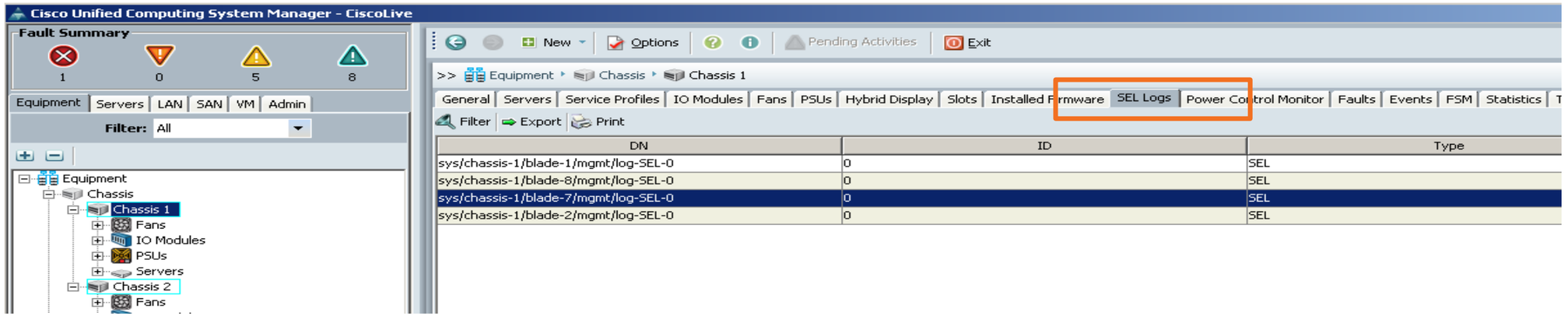
- UCSM contains logs and faults
- Clearing and Log Gathering performed in UCSM

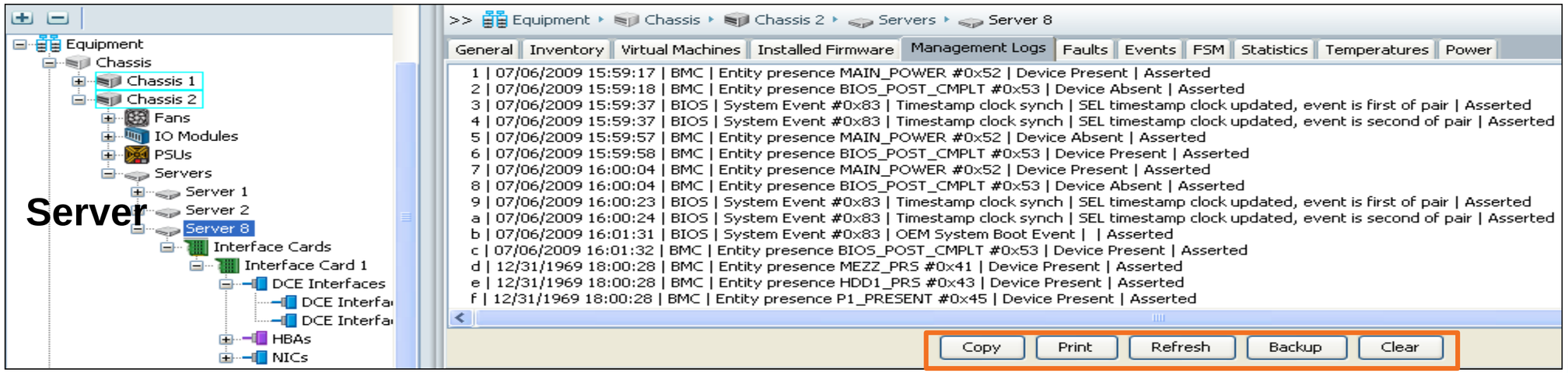


UCS Troubleshooting

System Event Logs - Viewing

- Chassis and Server level

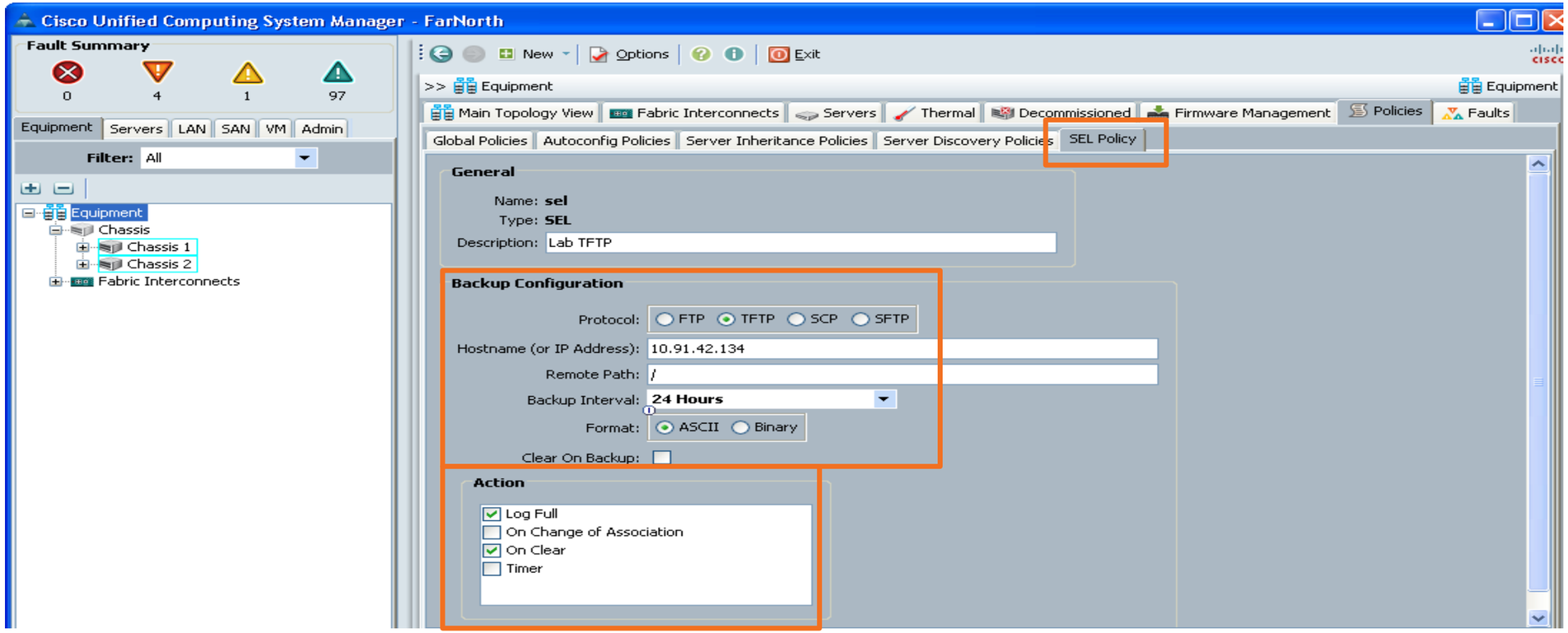




UCS Troubleshooting

System Event Logs - Managing

- Administrators can define rules (policies) for backup and cleaning of SEL across all servers



UCS Troubleshooting

Faults and Events Lifecycle

Faults Lifecycle

Raise Fault

Clear Condition

Clear Fault

Delete Fault

Delete

Clear Action

Retention Interval

or Acknowledged

Retain

Events Lifecycle

Create Event

Delete Event

Log Full

UCS Faults

Examples

Severity	Code	ID	Affected object	Cause	Last Transition	Description
	F0395	5853574	sys/chassis-1/fan-module-1...	performance-problem	2011-09-13T16:27:47	Fan 2 in Fan Module 1/1-1 speed: upper-non-critical
	F0424	6194439	sys/chassis-1/blade-2/board	voltage-problem	2011-09-13T15:57:49	Possible loss of CMOS settings: CMOS battery voltage on server 1/2 is lower-critical
	F0395	6211801	sys/chassis-1/fan-module-1...	performance-problem	2011-09-13T15:56:21	Fan 2 in Fan Module 1/1-3 speed: upper-non-critical
	F0395	5853572	sys/chassis-1/fan-module-1...	performance-problem	2011-09-13T14:53:32	Fan 2 in Fan Module 1/1-5 speed: upper-non-critical
	F0461	5868205	sys/chassis-1/blade-2/mgmt...	log-capacity	2011-08-18T06:03:50	Log capacity on Management Controller on server 1/2 is very-low
	F0411	5853573	sys/chassis-1	thermal-problem	2011-08-17T10:27:40	Temperature on chassis 1 is upper-non-recoverable
	F0461	5579474	sys/chassis-1/blade-5/mgmt...	log-capacity	2011-08-01T12:23:24	Log capacity on Management Controller on server 1/5 is very-low
	F0283	5286292	sys/chassis-1/blade-2/fabri...	link-down	2011-07-19T09:35:59	fc VIF 1 / 2 A-3825 down, reason: None
	F0528	3590157	sys/chassis-1/psu-4	equipment-offline	2011-03-24T19:56:35	Power supply 4 in chassis 1 power: off
	F0528	3444409	sys/chassis-1/psu-3	equipment-offline	2011-02-16T11:49:54	Power supply 3 in chassis 1 power: off
	F0461	3278818	sys/chassis-1/blade-3/mgmt...	log-capacity	2011-01-28T17:41:28	Log capacity on Management Controller on server 1/3 is very-low

Properties for: fault

Summary

Severity: **major**

Last Transition: **2006-01-25T01:27:03**

Actions

Acknowledge Fault

Properties

Affected object: **sys/chassis-1/slot-1/host/port-4**

Description: **IOM dce interface 4 on chassis 1 oper state: link-down, reason: Link failure or not-connected**

ID: **28059**

Type: **network**

Cause: **link-down**

Created at: **2006-01-24T08:02:04**

Code: **F0457**

Tags: **network,server**

Number of Occurrences: **91**

Properties for: fault

Summary

Severity: **info**

Last Transition: **2006-01-24T08:01:43**

Actions

Acknowledge Fault

Properties

Affected object: **sys/chassis-1/blade-5/mgmt/log-SEL-0**

Description: **Log capacity on Management Controller on server 1/5 is very-low**

ID: **27914**

Type: **operational**

Cause: **log-capacity**

Created at: **2006-01-24T08:01:43**

Code: **F0461**

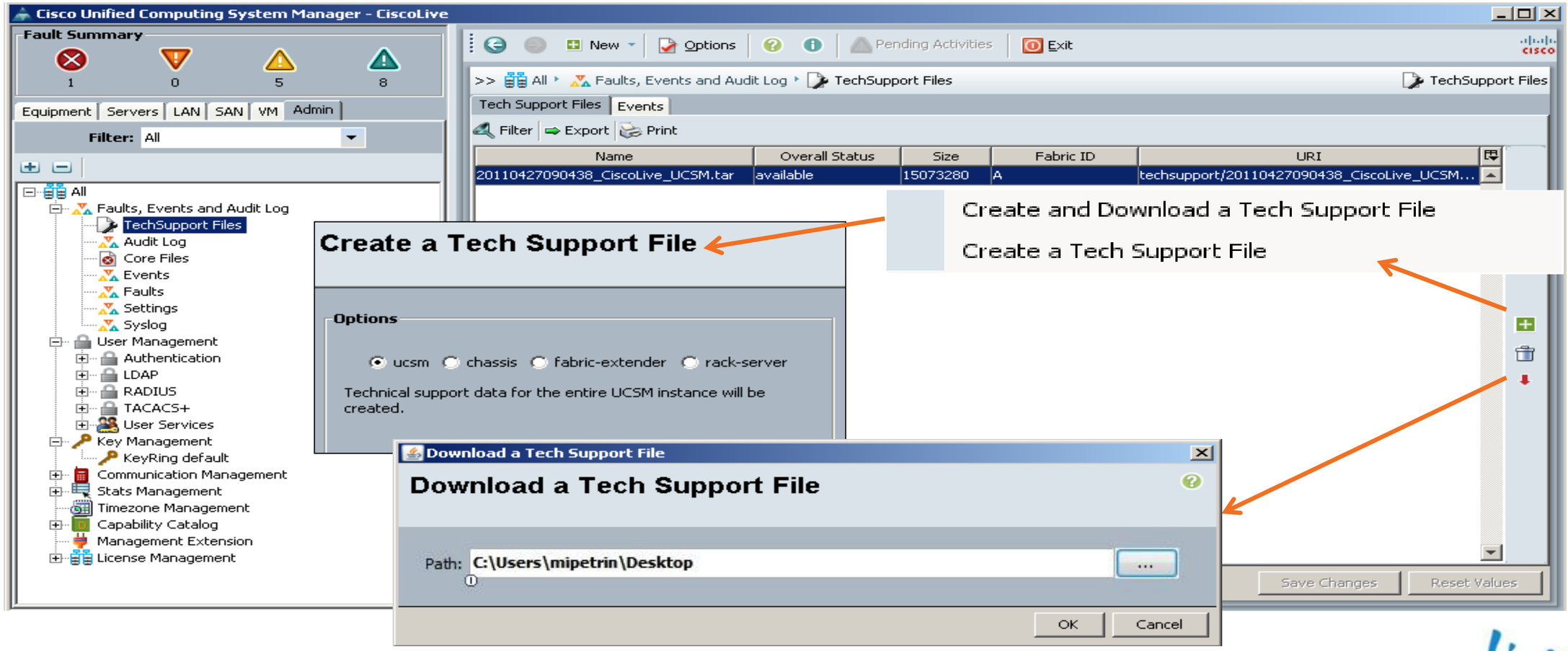
Tags: **server**

Number of Occurrences: **1**

UCS Support

Support Data Gathering – Show Tech

- Show Tech files for sending to TAC



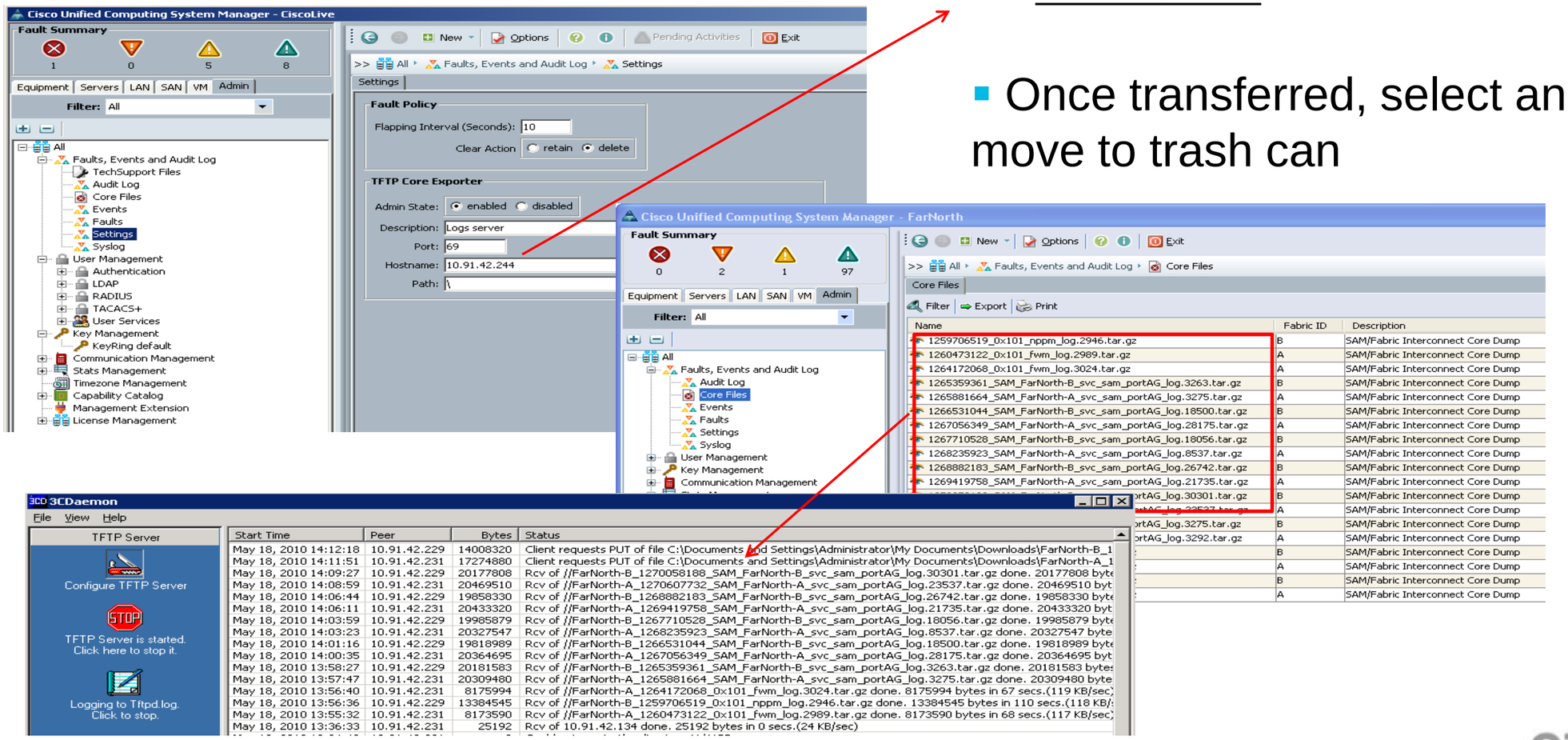
UCS Support

Support Data Gathering – Core Files

- Not included in show tech

- Once TFTP core Exporter is configured and enabled, dumps will be transferred

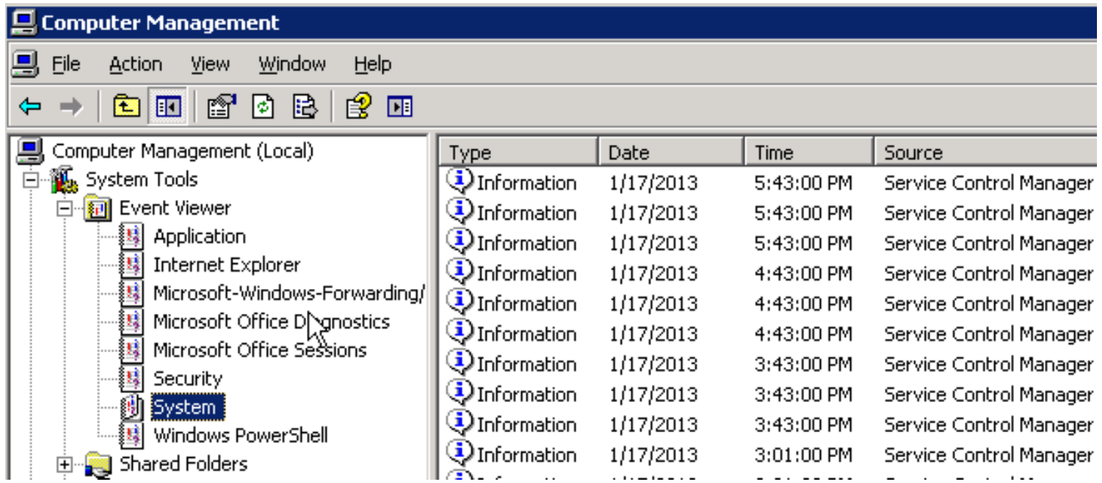
- Once transferred, select and move to trash can



UCS Support

OS Troubleshooting

- Ping, ARP
- esxcfg-nics, esxcfg-vmknic, ifconfig, ipconfig
- ethtool, lsmod, lspci
- top, esxtop (n option)
- tcpdump, Wireshark
- OS Logs
  - Event Viewer, VM-Support, sosreport
  - OS Core Files (PSOD, BSOD)



Key Takeaways

UCS Troubleshooting

Narrowing Down..

- Define the Problem
  - From which point to what point is the problem? (e.g. blade to blade)
  - Do we see the problem in one direction or both?
- Eliminate Variables
  - Is the problem seen on the same Fabric Interconnect?
  - Is just one blade having trouble, or all?
  - Are all Virtual Machines affected? Just one VLAN?
- Define the Topology
  - List all ports in the traffic path
  - VIF's, HIF's, NIF's, Server, Uplinks

UCS Troubleshooting

What Next?

- Cisco Support Community
  - http://supportforums.cisco.com
- Cisco Documentation
  - http://www.cisco.com/go/ucs
- TAC Case
  - http://www.cisco.com/support/

Q & A

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