
# Layer 2 Switching

This chapter describes how to identify and resolve problems that relate to Layer 2 switching and includes the following sections:



## Information About Layer 2 Ethernet Switching

The Cisco Nexus1000V is a distributed Layer 2 virtual switch that extends across many virtualized hosts.

It consists of two components:

- The Virtual Supervisor Module (VSM), which is also known as the control plane (CP). The VSM acts as the supervisor and contains the Cisco CLI, configuration, and high-level features.
- The Virtual Ethernet Module (VEM), which is also known as the data plane (DP). The VEM acts as a line card and runs in each virtualized server to handle packet forwarding and other localized functions.

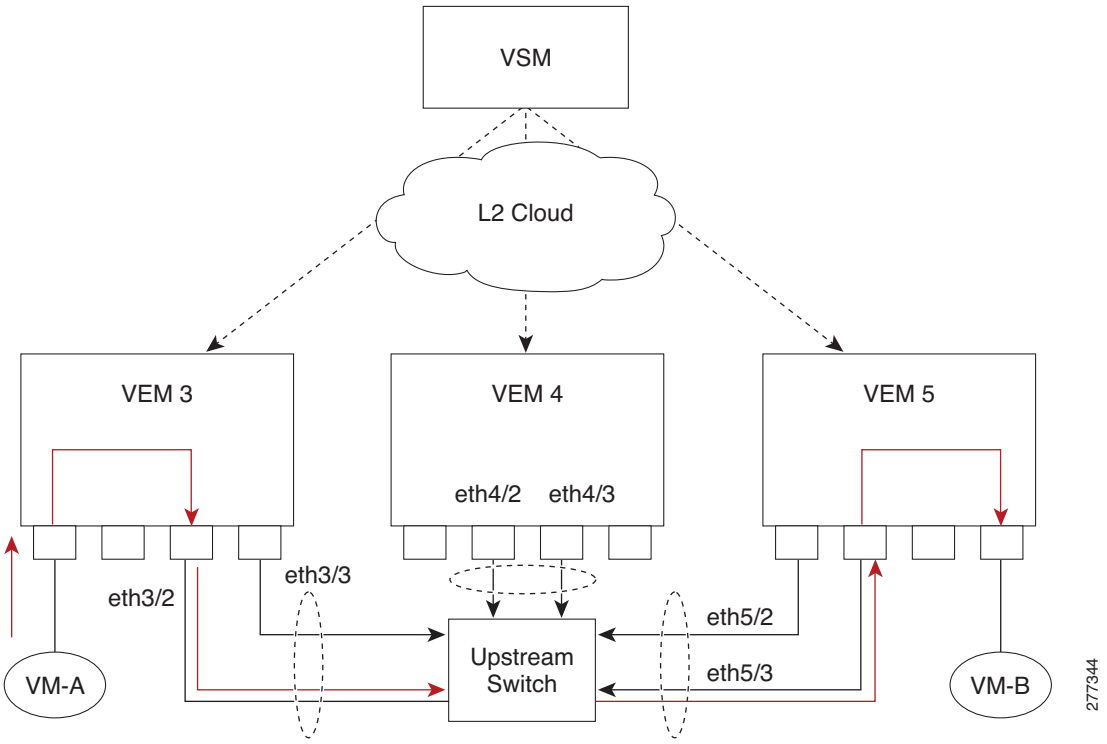
## Port Model

This section includes the following topics:

# Viewing Ports from the VEM

The Cisco Nexus1000V differentiates between virtual and physical ports on each of the VEMs. Figure 12-1 shows how ports on the Cisco Nexus1000V switch are bound to physical and virtual VMware ports within a VEM.

***Figure 12-1 VEM View of Ports***




On the virtual side of the switch, three layers of ports are mapped together:

- Virtual NICs—Three types of Virtual NICs are in VMware. The virtual NIC (vnic) is part of the VM and represents the physical port of the host that is plugged into the switch. The virtual kernel NIC (VTEP) is used by the hypervisor for management, VMotion, iSCSI, network file system (NFS), and other network access needed by the kernel. This interface carries the IP address of the hypervisor itself and is also bound to a virtual Ethernet port. The vswif (not shown) appears only in CoS-based systems and is used as the VMware management port. Each type maps to a virtual Ethernet port within the Cisco Nexus1000V.
- Virtual Ethernet Ports (VEth)—A vEth port is a port on the Cisco Nexus 1000V. The Cisco Nexus 1000V has a flat space of vEth ports 0..N. The virtual cable plugs into these vEth ports that are moved to the host running the VM.

  Virtual Ethernet ports are assigned to port groups.
- Local Virtual Ethernet Ports (lveth)—Each host has a number of local vEth ports. These ports are dynamically selected for vEth ports that are needed on the host.

  These local ports do not move and are addressable by the module/port number method.

On the physical side of the switch, from bottom to top, is the following:

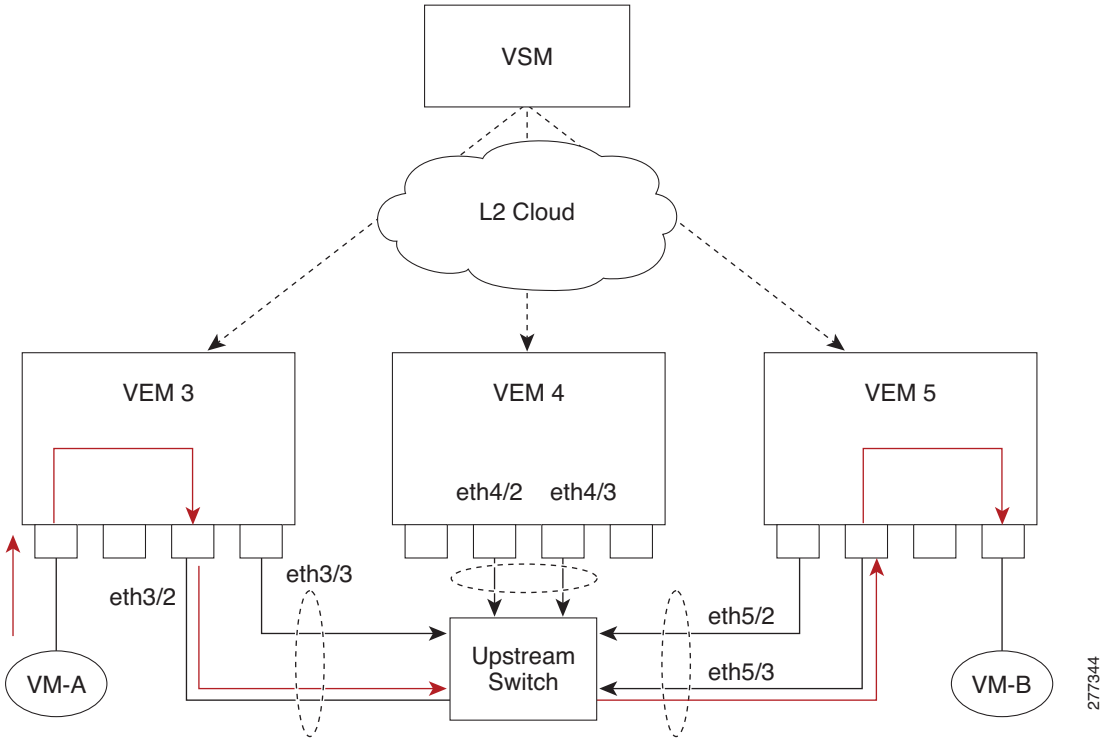
- Each physical NIC in VMware is represented by an interface called a vmnic. The vmnic number is allocated during VMware installation, or when a new physical NIC is installed, and remains the same for the life of the host.
- Each uplink port on the host represents a physical interface. It acts like an lveth port, but because physical ports do not move between hosts, the mapping is 1:1 between an uplink port and a vmnic.
- Each physical port added to the Cisco Nexus1000V switch appears as a physical Ethernet port, just as it would on a hardware-based switch.

  The uplink port concept is handled entirely by VMware and is used to associate port configuration with vmnics. There is no fixed relationship between the uplink number and vmnic number. These can be different on different hosts and can change throughout the life of the host. On the VSM, the Ethernet interface number, such as ethernet 2/4, is derived from the vmnic number, not the uplink number.

# Viewing Ports from the VSM

Figure 12-2 shows the VSM view ports.

***Figure 12-2 VSM View of Ports***



## Port Types

The following types of ports are available:

- vEths can be associated with any one of the following:
  - VNICs of a Virtual Machine on the ESX host.
  - VTEPs of the ESX Host
  - VSWIFs of an ESX COS Host.
- Eths (physical Ethernet interfaces)—Correspond to the Physical NICs on the ESX host.
- Po (port channel interfaces)—The physical NICs of an ESX Host can be bundled into a logical interface. This logical bundle is referred to as a port channel interface.

For more information about Layer 2 switching, see the *Cisco Nexus 1000V Layer 2 Switching Configuration Guide*.

# Layer 2 Switching Problems

This section describes how to troubleshoot Layer 2 problems and lists troubleshooting commands. This section includes the following topics:

- Verifying a Connection Between VEM Ports, page 12-4
- Verifying a Connection Between VEMs, page 12-5
- Isolating Traffic Interruptions, page 12-6

## Verifying a Connection Between VEM Ports

You can verify a connection between two vEth ports on a VEM.

**Step 1** View the state of the VLANs associated with the port. If the VLAN associated with a port is not active, the port may be down. In this case, you must create the VLAN and activate it.

switch# **show vlan** v*lan-id*

**Step 2** View the state of the ports on the VSM.

switch# **show interface brief**

**Step 3** Display the ports that are present on the VEM, their local interface indices, VLAN, type (physical or virtual), port mode and port name.

switch# **module vem** *module-number* **execute vemcmd show port**

The key things to look for in the output are as follows:

- State of the port.
- CBL.
- Mode.
- Attached device name.
- The LTL of the port that you are trying to troubleshoot. It will help you to identify the interface quickly in other VEM commands where the interface name is not displayed.

- Make sure that the state of the port is up. If not, verify the configuration of the port on the VSM.

**Step 4** View the VLANs and port lists on a particular VEM.

switch# **module vem** *module-number* **execute vemcmd show bd**

If you are trying to verify that a port belongs to a particular VLAN, make sure that you see the port name or LTL in the port list of that VLAN.

# Verifying a Connection Between VEMs

You can verify a connection between vEth ports on two separate VEMs.

**Step 1** Check if the VLAN associated with the port is created on the VSM.

switch# **show vlan**

**Step 2** Check if the ports are up in the VSM.

switch# **show interface brief**

**Step 3** On the VEM, check if the CBL state of the two ports is set to the value of 1 for forwarding (active).

switch# **module vem 3 execute vemcmd show port**

**Step 4** On the VEM, check if the two vEth ports are listed in the flood list of the VLAN with which they are trying to communicate.

switch# **module vem 3 execute vemcmd show bd**

**Step 5** Verify that the uplink switch to which the VEMs are connected is carrying the VLAN to which the ports belong.

**Step 6** Find out the port on the upstream switch to which the PNIC (that is supposed to be carrying the VLAN) on the VEM is connected to.

switch# s**how cdp neighbors**

**Example**:

```
switch# show cdp neighbors
Capability Codes: R - Router, T - Trans-Bridge, B - Source-Route-Bridge
                  S - Switch, H - Host, I - IGMP, r - Repeater,
                  V - VoIP-Phone, D - Remotely-Managed-Device,
                  s - Supports-STP-Dispute


Device ID              Local Intrfce   Hldtme Capability  Platform      Port ID
swordfish-6k-2         Eth5/2        168    R S I       WS-C6506-E    Gig1/38
```

The PNIC (Eth 5/2) is connected to swordfish-6k-2 on port Gig1/38.

**Step 7** Log in to the upstream switch and make sure that the port is configured to allow the VLAN that you are looking for.

```
switch# show running-config interface gigabitEthernet 1/38
Building configuration...

Current configuration : 161 bytes
!
interface GigabitEthernet1/38
 description Srvr-100:vmnic1
 switchport
 switchport trunk allowed vlan 1,60-69,231-233
```

```
 switchport mode trunk
end
```

As this output shows, VLANs 1,60-69, 231-233 are allowed on the port. If a particular VLAN is not in the allowed VLAN list, make sure to add it to the allowed VLAN list of the port.

# Isolating Traffic Interruptions

You can isolate the cause for no traffic passing across VMs on different VEMs.

**Step 1** In the output of the **show port-profile name** command, verify the following information:

- The control and packet VLANs that you configured are present (in the example, these are 3002 and 3003).
- If the physical NIC in your configuration carries the VLAN for the VM, that VLAN is also present in the allowed VLAN list.

```
switch# show port-profile name alluplink
    port-profile alluplink
      description:
      status: enabled
      system vlans: 3002,3003
      port-group: alluplink
      config attributes:
        switchport mode trunk
        switchport trunk allowed vlan 1,80,3002,610,620,630-650
        no shutdown
      evaluated config attributes:
        switchport mode trunk
        switchport trunk allowed vlan 1,80,3002,3003,610,620,630-650
        no shutdown
      assigned interfaces:
        Ethernet2/2
```

**Step 2** Inside the VM, verify that the Ethernet interface is up.

**ifconfig –a**

If not, delete that NIC from the VM, and add another NIC.

**Step 3** Using any sniffer tool, verify that ARP requests and responses are received on the VM interface.

**Step 4** On the upstream switch, look for the association between the IP and MAC address:

**debug arp**
**show arp**

**Example**:

```
switch# debug arp
ARP packet debugging is on
11w4d: RARP: Rcvd RARP req for 0050.56b7.3031
11w4d: RARP: Rcvd RARP req for 0050.56b7.3031
11w4d: RARP: Rcvd RARP req for 0050.56b7.4d35
11w4d: RARP: Rcvd RARP req for 0050.56b7.52f4
11w4d: IP ARP: rcvd req src 10.78.1.123 0050.564f.3586, dst 10.78.1.24 Vlan3002
11w4d: RARP: Rcvd RARP req for 0050.56b7.3031
switch#
```

**Example**:

```
switch# show arp
```

```
Protocol  Address          Age (min)  Hardware Addr   Type   Interface
Internet  10.78.1.72               -   001a.6464.2008  ARPA
Internet  7.114.1.100              -   0011.bcac.6c00  ARPA   Vlan140
Internet  41.0.0.1                 -   0011.bcac.6c00  ARPA   Vlan410
Internet  7.61.5.1                 -   0011.bcac.6c00  ARPA   Vlan1161
Internet  10.78.1.5                -   0011.bcac.6c00  ARPA   Vlan3002
Internet  7.70.1.1                 -   0011.bcac.6c00  ARPA   Vlan700
Internet  7.70.3.1                 -   0011.bcac.6c00  ARPA   Vlan703
Internet  7.70.4.1                 -   0011.bcac.6c00  ARPA   Vlan704
Internet  10.78.1.1                0   0011.bc7c.9c0a  ARPA   Vlan3002
Internet  10.78.1.15               0   0050.56b7.52f4  ARPA   Vlan3002
Internet  10.78.1.123              0   0050.564f.3586  ARPA   Vlan3002
```

**Step 5** You have completed this procedure.

# Layer 2 Switching Troubleshooting Commands

You can use the commands in this section to troubleshoot problems related to the Layer 2 MAC address configuration.

| Command | Purpose |
|---|---|
| **show mac address-table** | Displays the MAC address table to verify all MAC addresses on all VEMs controlled by the VSM.<br>See Example 12-1 on page 12-8. |
| **show mac address-table module** *module-number* | Displays all the MAC addresses on the specified VEM. |
| **show mac address-table static** *HHHH.WWWW.HHHH* | Displays the MAC address table static entries.<br>See Example 12-2 on page 12-9. |
| **show mac address-table address** *HHHH.WWWW.HHHH* | Displays the interface on which the MAC address specified is learned or configured.<br>• For dynamic MAC addresses, if the same MAC address appears on multiple interfaces, each of them is displayed separately.<br>• For static MAC addresses, if the same MAC address appears on multiple interfaces, only the entry on the configured interface is displayed. |
| **show mac address-table static \| inc veth** | Displays the static MAC address of vEthernet interfaces in case a VEM physical port learns a dynamic MAC addrress and the packet source is in another VEM on the same VSM.<br>See Example 12-3 on page 12-9. |
| **show running-config vlan** *vlan-id* | Displays VLAN information in the running configuration. |
| **show vlan** [**all-ports** \| **brief** \| **id** *vlan-id* \| **name** *name* \| **dot1q tag native**] | Displays VLAN information as specified. See Example 12-4 on page 12-9. |
| **show vlan summary** | Displays a summary of VLAN information. |

| Command | Purpose |
|---|---|
| **show interface brief** | Displays a table of interface states.<br>See Example 12-5 on page 12-10. |
| **module vem** *module-number* **execute vemcmd show port** | On the VEM, displays the port state on a particular VEM.<br>This command can only be used from the VEM.<br>See Example 12-6 on page 12-10. |
| **module vem** *module-number* **execute vemcmd show bd** | For the specified VEM, displays its VLANs and their port lists.<br>See Example 12-7 on page 12-11. |
| **module vem** *module-number* **execute vemcmd show trunk** | For the specified VEM, displays the VLAN state on a trunk port**.**<br>• If a VLAN is forwarding (active) on a port, its CBL state should be 1.<br>• If a VLAN is blocked, its CBL state is 0.<br>See Example 12-8 on page 12-11. |
| **module vem** *module-number* **execute vemcmd show l2** *vlan-id* | For the specified VEM, displays the VLAN forwarding table for a specified VLAN**.**<br>See Example 12-9 on page 12-11. |
| **show interface** *interface_id* **mac** | Displays the MAC addresses and the burn-in MAC address for an interface. |

***Example 12-1 show mac address-table Command***

**Note** The Cisco Nexus 1000V MAC address table does not display multicast MAC addresses.

**Tip** The “Module” indicates the VEM on which this MAC address is seen.

The “N1KV Internal Port” refers to an internal port created on the VEM. This port is used for control and management of the VEM and is not used for forwarding packets.

```
switch# show mac address-table
VLAN      MAC Address       Type    Age       Port                            Module
---------+-----------------+-------+---------+-------------------------------+---------
1         0002.3d11.5502    static  0         N1KV Internal Port              3
1         0002.3d21.5500    static  0         N1KV Internal Port              3
1         0002.3d21.5502    static  0         N1KV Internal Port              3
1         0002.3d31.5502    static  0         N1KV Internal Port              3
1         0002.3d41.5502    static  0         N1KV Internal Port              3
1         0002.3d61.5500    static  0         N1KV Internal Port              3
1         0002.3d61.5502    static  0         N1KV Internal Port              3
1         0002.3d81.5502    static  0         N1KV Internal Port              3
3         12ab.47dd.ff89    static  0         Eth3/3                          3
342       0002.3d41.5502    static  0         N1KV Internal Port              3
342       0050.568d.5a3f    dynamic 0         Eth3/3                          3
343       0002.3d21.5502    static  0         N1KV Internal Port              3
```

```
343       0050.568d.2aa0    dynamic 9         Eth3/3                          3
Total MAC Addresses: 13
switch#
```

***Example 12-2 show mac address-table address Command***

**Tip** This command shows all interfaces on which a MAC is learned dynamically. In this example, the same MAC appears on Eth3/3 and Eth4/3.

```
switch# show mac address-table address 0050.568d.5a3f
VLAN      MAC Address       Type    Age       Port                            Module
---------+-----------------+-------+---------+-------------------------------+---------
342       0050.568d.5a3f    dynamic 0         Eth3/3                          3
342       0050.568d.5a3f    dynamic 0         Eth4/3                          4
Total MAC Addresses: 1
switch#
```

***Example 12-3 show mac address-table static | inc veth Command***

```
switch# show mac address-table static | inc veth
460       0050.5678.ed16    static  0         Veth2                           3
460       0050.567b.1864    static  0         Veth1                           4
switch#
```

***Example 12-4 show vlan Command***

**Tip** This command shows the state of each VLAN created on the VSM.

```
switch# show vlan

VLAN Name                             Status    Ports
---- -------------------------------- --------- -------------------------------
1    default                          active    Eth3/3, Eth3/4, Eth4/2, Eth4/3
110  VLAN0110                         active
111  VLAN0111                         active
112  VLAN0112                         active
113  VLAN0113                         active
114  VLAN0114                         active
115  VLAN0115                         active
116  VLAN0116                         active
117  VLAN0117                         active
118  VLAN0118                         active
119  VLAN0119                         active
800  VLAN0800                         active
801  VLAN0801                         active
802  VLAN0802                         active
803  VLAN0803                         active
804  VLAN0804                         active
805  VLAN0805                         active
806  VLAN0806                         active
807  VLAN0807                         active
808  VLAN0808                         active
809  VLAN0809                         active
810  VLAN0810                         active
811  VLAN0811                         active
812  VLAN0812                         active
```

```
813  VLAN0813                         active
814  VLAN0814                         active
815  VLAN0815                         active
816  VLAN0816                         active
817  VLAN0817                         active
818  VLAN0818                         active
819  VLAN0819                         active
820  VLAN0820                         active
VLAN Name                             Status    Ports
---- -------------------------------- --------- -------------------------------
---- -------------------------------- --------- -------------------------------

Remote SPAN VLANs
------------------------------------------------------------------------------

Primary  Secondary  Type             Ports
-------  ---------  ---------------  ------------------------------------------
```

***Example 12-5 show interface brief Command***

```
switch# show interface brief

--------------------------------------------------------------------------------
Port     VRF          Status IP Address                       Speed    MTU
--------------------------------------------------------------------------------
mgmt0     --           up     172.23.232.143                    1000     1500

--------------------------------------------------------------------------------
Ethernet      VLAN   Type Mode   Status  Reason                   Speed     Port
Interface                                                                   Ch #
--------------------------------------------------------------------------------
Eth3/4        1      eth  trunk  up      none                      1000(D) --
Eth4/2        1      eth  trunk  up      none                      1000(D) --
Eth4/3        1      eth  trunk  up      none                      1000(D) --
```

***Example 12-6 module vem** module-number **execute vemcmd show port Command***

**Tip** Look for the state of the port.

```
~ # module vem 3 execute vemcmd show port
  LTL    IfIndex   Vlan    Bndl  SG_ID Pinned_SGID  Type  Admin State  CBL Mode   Name
    8          0   3969       0      2           2  VIRT     UP    UP    1 Access 120
    9          0   3969       0      2           2  VIRT     UP    UP    1 Access 121
   10          0    115       0      2           0  VIRT     UP    UP    1 Access 122
   11          0   3968       0      2           2  VIRT     UP    UP    1 Access 123
   12          0    116       0      2           0  VIRT     UP    UP    1 Access 124
   13          0      1       0      2           2  VIRT     UP    UP    0 Access 125
   14          0   3967       0      2           2  VIRT     UP    UP    1 Access 126
   16   1a030100      1 T     0      0           2  PHYS     UP    UP    1 Trunk
vmnic1
   17   1a030200      1 T     0      2           2  PHYS     UP    UP    1 Trunk
vmnic2
```

***Example 12-7 module vem** module-number **execute vemcmd show bd Command***

**Tip** If a port belongs to a particular VLAN, the port name or LTL should be in the port list for the VLAN.

```
~ # module vem 5 execute vemcmd show bd
Number of valid BDS: 8
BD 1, vdc 1, vlan 1, 2 ports
Portlist:
16 vmnic1
17 vmnic2
BD 100, vdc 1, vlan 100, 0 ports
Portlist:
BD 110, vdc 1, vlan 110, 1 ports
Portlist:
16 vmnic1
BD 111, vdc 1, vlan 111, 1 ports
Portlist:
16 vmnic1
BD 112, vdc 1, vlan 112, 1 ports
Portlist:
16 vmnic1
BD 113, vdc 1, vlan 113, 1 ports
Portlist:
16 vmnic1
BD 114, vdc 1, vlan 114, 1 ports
Portlist:
16 vmnic1
BD 115, vdc 1, vlan 115, 2 ports
Portlist:
10 l22
16 vmnic1
```

***Example 12-8 module vem** module-number **execute vemcmd show trunk Command***

**Tip** If a VLAN is active on a port, its CBL state should be 1.
If a VLAN is blocked, its CBL state is 0.

```
~ # module vem 5 execute vemcmd show trunk
Trunk port 16 native_vlan 1 CBL 1
vlan(1) cbl 1, vlan(110) cbl 1, vlan(111) cbl 1, vlan(112) cbl 1, vlan(113) cbl 1,
vlan(114) cbl 1,vlan(115) cbl 1, vlan(116) cbl 1, vlan(117) cbl 1, vlan(118) cbl 1,
vlan(119) cbl 1,
Trunk port 17 native_vlan 1 CBL 0
vlan(1) cbl 1, vlan(117) cbl 1,
~ #
```

***Example 12-9 module vem** module-number **execute vemcmd show l2 Command***

```
~ # module vem 5 execute vemcmd show l2
Bridge domain 115 brtmax 1024, brtcnt 2, timeout 300
Dynamic MAC 00:50:56:bb:49:d9 LTL 16 timeout 0
Dynamic MAC 00:02:3d:42:e3:03 LTL 10 timeout 0
```

# Troubleshooting Microsoft NLB Unicast Mode

Microsoft Network Load Balancing (MS-NLB) is a clustering technology offered by Microsoft as part of the Windows server operating systems. Clustering enables a group of independent servers to be managed as a single system for higher availability, easier manageability, and greater scalability.

For more information about Microsoft Network Load Balancing, see this URL:

http://technet.microsoft.com/en-us/library/bb742455.aspx

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## Limitations and Restrictions

A syslog is generated if one of the following configurations exists when you try to disable automatic static MAC learning for MS-NLB because they do not support this feature:

- PVLAN port
- Ports configured with unknown unicast flood blocking (UUFB)
- Ports configured with switchport port-security mac-address sticky

## Disabling Automatic Static MAC Learning on a vEthernet Interface

You must disable automatic static MAC learning before you can successfully configure NLB on a vEthernet (vEth) interface.

In interface configuration mode enter the following commands:

```
switch(config)# int veth 1
switch(config-if)# no mac auto-static-learn
```

In port profile configuration mode enter the following commands:

```
switch(config)# port-profile type vethernet ms-nlb
switch(config-port-prof)# no mac auto-static-learn
```

## Checking Status on a VSM

If the NLB unicast mode configuration does not function, check the status of the Virtual Supervisor Module (VSM).

Confirm that the **no mac auto-static-learn** command is listed in the vEth and/or port profile configurations.

**Step 1** In interface configuration mode, generate the VSM status.

```
switch(config-if)# show running-config int veth1
interface Vethernet1
  inherit port-profile vm59
  description Fedora117, Network Adapter 2
  no mac auto-static-learn
  vmware dvport 32 dvswitch uuid "ea 5c 3b 50 cd 00 9f 55-41 a3 2d 61 84 9e 0e c4"
```

**Step 2** In port profile configuration mode, generate the VSM status.

```
switch(config-if)# show running-config port-profile ms-nlb
port-profile type vethernet ms-nlb
  vmware port-group
  switchport mode access
  switchport access vlan 59
  no mac auto-static-learn
  no shutdown
  state enabled
```

# Checking the Status on a VEM

If the NLB unicast mode configuration does not function, check the status of the Virtual Ethernet Module (VEM). Check the following:

- Confirm that the MS-NLB vEths are disabled.
- Confirm that the MS-NLB shared-MAC (starting with 02:BF) is not listed in the Layer 2 (L2) MAC table.

**Step 1** Generate the VEM status.

```
~ # vemcmd show port auto-smac-learning
  LTL   VSM Port  Auto Static MAC Learning
   49      Veth4   DISABLED
   50      Veth5   DISABLED
   51      Veth6   DISABLED
```

**Step 2** Generate the Layer 2 MAC address table for VLAN 59.

```
~ # vemcmd show l2 59
Bridge domain   15 brtmax 4096, brtcnt 6, timeout 300
VLAN 59, swbd 59, ""
Flags:  P - PVLAN  S - Secure  D - Drop
       Type          MAC Address   LTL   timeout   Flags    PVLAN
    Dynamic   00:15:5d:b4:d7:02   305         4
    Dynamic   00:15:5d:b4:d7:04   305        25
    Dynamic   00:50:56:b3:00:96    51         4
    Dynamic   00:50:56:b3:00:94   305         5
    Dynamic   00:0b:45:b6:e4:00   305         5
    Dynamic   00:00:5e:00:01:0a    51         0
```

# Configuring MS NLB for Multiple VM NICs in the Same Subnet

When MS NLB VMs have more than one port on the same subnet, a request is flooded, which causes both ports to receive it. The server cannot manage this situation.

As a workaround for this situation, enable Unknown Unicast Flood Blocking (UUFB).

### Enabling UUFB

To enable UUFB, enter these configuration commands, one on each line. At the end, press **Cntl-Z**.

```
switch# configure terminal
switch (config)# uufb enable
switch (config)#
```

This configuration conceals the requests from the non-NLB ports and allows the system to function as it expected.

### Disabling UUFB for VMs That Use Dynamic MAC Addresses

Issues might occur for VMs that use dynamic MAC addresses, other than those MAC addresses assigned by VMware. For ports that host these types of VMs, disable UUFB. To disable UUFB, enter the following commands:

```
switch(config)# int veth3
switch(config-if)# switchport uufb disable
switch(config-if)#
```

# Troubleshooting BPDU Guard

BPDU Guard is one of the Spanning Tree Protocol (STP) enhancements. This feature enhances switch network reliability, manageability, and security. It prevent loops and broadcast radiation. We recommend that you enable BPDU guard on access ports so that any end user devices on these ports that have BPDU guard enabled cannot influence the topology. Any malfunctioning device connected to a virtual Ethernet port can flood the Layer 2 network with unwanted BPDUs and causes STP to break down. When you enable BPDU guard on the access-ports, it shuts down the port in the event that it receives a BPDU. To bring up a port disabled by BDPU guard, you must remove the device from the network and then restart the port by entering the **shut/no shut** command.

## BPDU Guard Troubleshooting Commands

You can use the commands in this section to troubleshoot problems related to the Layer 2 MAC address configuration.

| Command | Purpose |
|---|---|
| **show switch edition** | Displays the license edition. You must have the ADVANCED 3.0 license for BPDU guard to be enabled in DAOX.<br><br>See Example 12-10 on page 12-15. |
| **show spanning-tree bpdu guard info** | Displays the switch edition and license information.<br><br>See Example 12-11 on page 12-15. |
| **show run interface** *name* | Displays the BPDU guard status on a port profile.<br><br>See Example 12-12 on page 12-15. |

| Command | Purpose |
|---|---|
| **show interface virtual spanning-tree bpduguard status** | Displays the status or BPDU guard status on vEths.<br>See Example 12-13 on page 12-15. |
| **show system internal cdm info port-profile name** *vm* | Displays the status of CDM push for port profile.<br>See Example 12-14 on page 12-15 |
| **show system internal cdm info interface** *name* | Displays the status of CDM push for a vEth.<br>See Example 12-15 on page 12-16. |
| **vemcmd show card** | Displays the global status of BPDU guard on a VEM.<br>See Example 12-16 on page 12-16. |
| **vemcmd show port bpduguard** | Displays the status of BPDU guard on a VSM.<br>See Example 12-17 on page 12-16. |

***Example 12-10 show switch edition Command***

```
switch(config)# show switch edition
Switch Edition: ADVANCED (3.0)
Feature Status
Name            State           Licensed    In version
------------------------------------------------------
bpduguard       enabled         Y           3.0
    Dynamic   00:00:5e:00:01:0a    51          0
```

***Example 12-11 show spanning-tree bpduguard info Command***

```
switch(config)# show spanning-tree bpduguard info
Global spanning-tree bpduguard status: Enabled
```

***Example 12-12 show run interface** name **Command***

```
switch(config-if)# show run interface veth77
interface 77
  inherit port-profile vm
  description fedora20-i386-70, Network Adapter 2
  spanning-tree bpduguard enable
```

***Example 12-13 show interface virtual spanning-tree bpduguard status Command***

```
switch(config)# show interface virtual spanning-tree bpduguard status
49  Veth36 Enabled
50  Veth68 Enabled
51  Veth73 Enabled
52  Veth77 Enabled
```

***Example 12-14 show system internal cdm info port-profile** name **Command***

```
switch(config-if)# show system internal cdm info port-profile name vm
port-profile vm
```

```
  ppid: 4
  eval config:
    spanning-tree bpduguard enable
    no shutdown
    switchport access vlan 59
    switchport mode access
```

### *Example 12-15 show system internal cdm info interface name Command*

```
switch(config-if)# show system internal cdm info interface vethernet 77
interface Veth77
  if_index: 0x1c0004a0
  attached: vem 4
  profile: vm (4)
  network: none
  config:
    spanning-tree bpduguard enable
```

### *Example 12-16 vemcmd show card Command*

```
switch# vemcmd show card
Card UUID type  2: 35958c78-bce9-11e0-bd1d-30e4dbc2c276
Card name:
Switch name: switch
…
Licensed: Yes
Global BPDU Guard: Disabled
```

### *Example 12-17 vemcmd show port bpdugard Command*

```
switch# vemcmd show port bpduguard
  LTL   VSM Port  BPDU-Guard
   49     Veth36          -
   50     Veth68          -
   51     Veth73    Enabled
   52     Veth77    Enabled
   53      Veth9    Disabled

   Debugs

vemlogs & DPA logs
Config related:


~ # vemlog debug sfport_orch all
~ # echo "debug sfcdmagent all" > /tmp/dpafifo
~ # echo "debug sfportagent all" > /tmp/dpafifo


Packet path:

# vemlog debug sflayer2 all
~ # echo "debug sfportagent all" > /tmp/dpafifo
```