

Troubleshoot MDS 9000 Trunking/Port-Channel Links that Fail to Come Up

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Introduction

This document describes why a Fibre Channel (FC) link between a Cisco Multilayer Director Switch (MDS) and another Cisco switch doesn't come Up when trunking or in a port-channel, however, the same link might come up when it is not in a port-channel and trunking is disabled.

Background Information

This includes FC links between MDS switches and other MDS switches, Nexus switches, and Unified Computing System (UCS) Fabric Interconnects (FIs).

Tip: For more detailed information about port-channels and trunking, refer to the appropriate port-channel and trunking configuration guides.

Port-channel

Guide: https://www.cisco.com/c/en/us/td/docs/switches/datacenter/mds9000/sw/8_x/config/interfaces/cisco_mds9000_interfaces_config_guide_8x/configuring_portchannels.html

Trunking

Guide: https://www.cisco.com/c/en/us/td/docs/switches/datacenter/mds9000/sw/8_x/config/interfaces/cisco_mds9000_interfaces_config_guide_8x/configuring_trunking.html

All MDS switches can aggregate multiple physical links into a single virtual link via port-channels, as well as transport multiple Virtual Storage Area Networks (VSANs) over a link with the trunking feature when connected with another Cisco device.

In order to negotiate port-channels and trunking links, MDS switches use Exchange Peer

Parameters (EPP) services to communicate across peer ports in an Inter-Switch Link (ISL). Part of the ISL negotiation process verifies that the peer is a Cisco device with the peer's Organizational Unique Identifier (OUI).

If a Cisco switch's OUI is not listed in the peer's OUI database as a Cisco OUI, the link fails to come up when added to a port-channel or if trunking is enabled on the interface.

Troubleshoot MDS Trunking/Port-Channel Links that Fail to Come Up

If the link is in a port-channel, check the port-channel interface has **channel mode active** configured.

```
MDSswitch# show run interface port-channel 1
...
interface port-channell
channel mode active <<<<
```

If the link is connected to a N_Port Virtualization (NPV) switch, like a FI, check the NPIV and fport-channel-trunk features are enabled.

```
MDSswitch# show feature | include npiv
npiv 1 enabled
MDSswitch# show feature | include fport
fport-channel-trunk 1 enabled
```

If the link is trunking, check the trunking protocol is enabled globally.

```
MDSswitch# show trunk protocol
Trunk Protocol is enabled
```

Check trunking is enabled on the interface.

```
MDSswitch# show interface port-channel 1
port-channell is down (No operational members)
Hardware is Fibre Channel
Port WWN is xx:xx:00:2a:6a:xx:xx:xx
Admin port mode is auto, trunk mode is on <<<<
```

If the link is connected at 8Gbps, ensure the fill pattern, or fill word, must be configured the same for both sides of the link. By default, the MDS, N5K/N6K, and UCS FI 6300 series devices use ARBFF. N9K and UCS FI 6400 series only support IDLE as the 8G fill pattern.

Use this command to confirm the current fill pattern on MDS/N5K/N6K interfaces fc x/y:

slot x show hardware internal fcmac port y port-info | i FILL

```
MDSswitch# slot 1 show hardware internal fcmac port 2 port-info | i FILL
FILL_WORD(raw) : ARBFF (0xbc94ffff)
```

Note: The output on Nexus switches can be 0x0 (interface not up at 8Gbps), 0xBC94FFFF (ARBFF), or 0xBC95B5B5 (IDLE).

When an N9K or UCS FI 6400 is connected to a device that uses ARBFF by default, you must configure the interface on the connected device to use IDLE.

```
MDSswitch# conf t
```

```
Enter configuration commands, one per line. End with CNTL/Z.
```

```
MDSswitch(config)# interface fc1/2MDSswitch(config-if)# switchport fill-pattern IDLE speed 8000
```

On UCS FI 6300 series, you see FC uplinks' fill pattern and configured in the UCS Manager (UCSM) at **SAN > SAN Cloud > Fabric > Uplink FC Interfaces > FC Interface x/y** in the General tab.

Verify

Symptoms

- Interfaces come up as single ports with trunking disabled, but not in a port-channel.
- A Single interface fails to come up with trunking enabled.
- When in a port-channel or added to a port-channel, interfaces become error-disabled immediately.

Log Messages

Note: It is possible for the switch OUI to be absent from the peer's OUI database on one or both sides of a link. Both sides must be investigated.

For MDS and Nexus switches:

The switch without the peer's OUI in its OUI database records "physical flogi rejected, waiting for the port mode" and "EPP_SYNC" errors.

```
MDSswitch# show flogi internal event-history errors | include reject previous 1 next 1
```

```
...
```

```
10) Event:E_DEBUG, length:124, at 727676 usecs after Tue May 14 17:44:47 2013
[102] fs_fc2_msg_flogi: ifindex[0x12ae000] pwnn[xx:xx:00:2a:6a:xx:xx:xx] physical flogi
rejected, waiting for the port mode
```

```
11) Event:E_DEBUG, length:124, at 661821 usecs after Tue May 14 17:44:39 2013
[102] fs_fc2_msg_flogi: ifindex[0x12ae000] pwnn[xx:xx:00:2a:6a:xx:xx:xx] physical flogi
rejected, waiting for the port mode
```

```
12) Event:E_DEBUG, length:73, at 772303 usecs after Tue May 14 17:43:11 2013
[102] fs_flogi_send_flogi_reject: mts_q == 0, ifindex 0x12ae000, port 0x0
```

```
MDSswitch# show port internal event-history errors | include EPP previous 1 next 1
```

```
...
```

```
19) Event:E_DEBUG, length:48, at 465145 usecs after Tue May 14 17:44:49 2013
[102] epp_ac_accept_sync: Error sending EPP_SYNC
```

```
...
```

```
27) Event:E_DEBUG, length:48, at 280537 usecs after Tue May 14 17:44:43 2013
[102] epp_ac_accept_sync: Error sending EPP_SYNC
```

To confirm the interface of the errors, translate the index with **show interface snmp-ifindex** and filter by the ifindex in the error message. The example uses the ifindex 12ae000 found in the **show log internal event-history errors**.

```
MDSswitch# show interface snmp-ifindex | include 12ae000
fc6/47 0019587072 (00012ae000)
```

For UCS FIs: The FI without the peer's OUI in its OUI database records "PI_FSM_EV_PORT_CONFIG_FAILURE" and "port fcx/y attempting vf tagging on non-cisco switch" errors.

```
UCS(nxos)# show port internal event-history errors
```

```
1) Event:E_DEBUG, length:117, at 225850 usecs after Wed Aug 1 10:18:26 2018
[102] pi_fsm_port_attr_change_init: Ifindex (fc1/47)0x102e000, Err disabled event
(PI_FSM_EV_PORT_CONFIG_FAILURE)0xd7

2) Event:E_DEBUG, length:100, at 222587 usecs after Wed Aug 1 10:18:26 2018
[102] pm_process_fport_vf_tagging_capability: port fc1/47 attempting vf tagging on non-cisco
switch
```

OUI Database

Extract the OUI from each switch. The OUI is the third, fourth, and fifth octet of the World Wide Name (WWN).

```
peer-switch# show wwn switch
Switch WWN is xx:xx:00:2a:6a:xx:xx:xx
```

In this example, the switch OUI is **0x002A6A**.

Check the switch's OUI database for the peer switch's OUI. If the command has no output, the OUI is absent from the database.

```
MDSswitch# show wwn oui | include 0x002a6a
MDSswitch#
```

Note: UCS FIs don't support the **show wwn oui** command. Refer to Table 1. and Table 2. in order to see when OUIs were added to the FI OUI database.

Work Around

Switch OUI databases are updated through switch software upgrades. Until a switch can be upgraded to a software version with an OUI database that includes the peer switch's OUI, use single links configured outside of port-channels with trunking disabled.

The **wwn oui <hex oui>** command on MDS and Nexus switches can manually add Cisco OUIs to the switch's OUI database.

On MDS switches, this feature is available in NX-OS Version 7.3(0)D1(1) and later.

On Nexus 5K/6K switches, this feature was added in NX-OS Version 7.3(3)N1(1) and later.
 On Nexus 9000 switches on NX-OS 7.x, this feature is available in NX-IS Version 7.3(1)N1(1) and later.

On Nexus 9000 switches on other versions of NX-OS, this feature is available in NX-OS Version 9.3(3) and later.

```
Example: MDSswitch# configure terminal
MDSswitch(config)# wwn oui 0x0000fc
MDSswitch# show wwn oui
OUI Vendor Default/Static
```

```
-----
0x0000fc Cisco Static
```

Nexus 9000 switches on ACI images can add an OUI to the library in run time from the APIC in 15.0(1k) and later.

OUI Database Additions

Table 1.1. MDS OUI Database Additions

OUI	Software that includes OUI	
0x547FEE	All versions of NX-OS 5.0(1) and later.	
0x00351A		
0x003A7D		
0x004268		
0x0062EC		
0x007888		
0x00C164		
0x00C88B		
0x00F28B		
0x00FEC8		
0x046273		
0x188B9D		NX-OS 5.x at 5.2(8h) and later. NX-OS 6.x at 6.2(17) and later. NX-OS 7.x at 7.3(1)D1(1) and later. All versions of NX-OS 8.3(1) and later.
0x5897BD		
0x58AC78		
0x5C838F		
0x64F69D		
0x70E422		
0x80E01D		
0x84B261		
0x84B802		
0xA46C2A		
0xCC167E		
0xCC46D6		
0xD8B190		
0xE00EDA		
0xE4AA5D		
0x0018BA		
0x001B54		
0x002255	All versions of NX-OS 5.2(6) and later.	
0x0023AC		
0x002498		

0x0024F7	
0x002651	
0x002698	
0x002A6A	
0x00DEFB	
0x04C5A4	
0x108CCF	
0x18EF63	
0x1CDF0F	
0x405539	
0x68BDAB	
0x8C604F	
0x8CB64F	
0xA8B1D4	
0xB41489	
0xC0626B	
0xF02572	
0xF866F2	
0x508789	
0x58F39C	
0x7426AC	
0x7C0ECE	
0x881DFC	
0x88F031	
0x8C604F	All versions of NX-OS 6.2(11) and later.
0xA0ECF9	
0xF07F06	
0xF40F1B	
0xF44E05	
0xF8C288	
0xFC5B39	
0x000831	
0x003A9C	NX-OS 5.x at 5.2(8g) and later.
0x74A02F	NX-OS 6.x at 6.2(11c) and later.
0xD0A5A6	All versions of NX-OS 7.3(1)D1(1) and later.
0x70EA1A	
0xC4F7D5	All versions of NX-OS 8.4(2) and later.
0x00FD22	
0x10B3D5	
0x10B3D6	NX-OS 6.x at 6.2(33) and later.
0x4C710D	All versions of NX-OS 8.4(2) and later.
0xC4B239	
0xD4E880	
0xDC774C	NX-OS 8.4(x) at 8.4(2c) and later.
0x3C13CC	NX-OS 9.x at 9.2(1) and later.
0x4CE176	To be determined

Table 1.2. Nexus 5000/5500/5600/6000 OUI Database Additions

OUI	Software that includes OUI
0x002A6A	NX-OS 5.1 at 5.1(3)N2(1) and later.
0x00DEFB	NX-OS 5.2 at 5.2(1)N1(4) and later.

0x8C604F
0x50EB1A
0x9371D5
0x3C13CC
0x4CE176
0xDC774C

All versions of NX-OS 6.0(2)N1(2) and later.

All versions of NX-OS 7.3(7)N1(1) and later.

All versions of NX-OS 7.3(10)N1(1) and later.

Table 1.3. Nexus 9000 OUI Database Additions

OUI			Software that includes OUI
0x000831	0x18E728	0x70DB98	
0x001086	0x1C6A7A	0x70DF2F	0xBADBAD
0x0024FF	0x286F7F	0x70E422	0xBC26C7
0x0027E3	0x28AC9E	0x7426AC	0xC0626B
0x002A10	0x2C27D7	0x74A02F	0xC067AF
0x002CC8	0x2C3311	0x74A2E6	0xC08C60
0x00351A	0x2C44FD	0x780CF0	0xCC167E
0x003A7D	0x2C5A0F	0x78725D	0xCC46D6
0x003A99	0x2CD02D	0x78BAF9	0xCE90D1
0x003A9C	0x380E4D	0x78DA6E	0xD072DC
0x004268	0x3890A5	0x78E3B5	0xD0A5A6
0x005D73	0x3C08F6	0x7C0ECE	0xD46D50
0x0062EC	0x3C4A92	0x7C69F6	0xD867D9
0x006BF1	0x40017A	0x80E01D	0xD8B190
0x007888	0x40CE24	0x843DC6	0xE00EDA
0x0081C4	0x4403A7	0x8478AC	0xE4AA5D
0x0090FA	0x4C776D	0x84B261	0xE4C722
0x00A2EE	0x500F80	0x84B802	0xE86549
0x00A38E	0x502FA8	0x881DFC	0xE8B748
0x00A6CA	0x5061BF	0x885A92	0xE8BA70
0x00A742	0x508789	0x88F031	0xEC3091
0x00B771	0x54A274	0x8CB64F	0xEC4476
0x00BE75	0x58971E	0xA0239F	0xECBD1D
0x00C164	0x5897BD	0xA03D6F	0xECC882
0x00C88B	0x58AC78	0xA09351	0xF02572
0x00D78F	0x58F39C	0xA0E0AF	0xF07F06
0x00EABD	0x5C838F	0xA0ECF9	0xF40F1B
0x00F28B	0x641225	0xA44C11	0xF44E05
0x00F663	0x64A0E7	0xA46C2A	0xF45FD4
0x00FCBA	0x64F69D	0xA80C0D	0xF4ACC1
0x00FEC8	0x68BDAB	0xA89D21	0xF4CFE2
0x043110	0x6C9CED	0xA8B1D4	0xF4DBE6
0x046273	0x6CB2AE	0xB02680	0xF80BCB
0x0896AD	0x700F6A	0xB08BCF	0xF866F2
0x1005CA	0x70695A	0xB0AA77	0xF8C288
0x14F0C5	0x70708B	0xB41489	0xFC5B39
0x188090	0x7079B3	0xB4DE31	0xFCFBFB
0x188B9D	0x707DB9	0xB83861	

All versions of NX-OS9.2(4) and later.

