# Port Channels and Trunking

This chapter describes how to identify and resolve problems that relate to port channels and trunking.

## Port Channel Overview

Port channels aggregate multiple physical interfaces into one logical interface to provide higher bandwidth, load balancing, and link redundancy.

A port channel performs the following functions:

- Increases the aggregate bandwidth on a link by distributing traffic among all functional links in the channel.

- Load balances across multiple links and maintains optimum bandwidth usage.

- Provides high availability. If one link fails, traffic previously carried on this link is switched to the remaining links. If a link goes down in a port channel, the upper protocol is not aware of it. To the upper protocol, the link is still there, although the bandwidth is diminished. The MAC address tables are not affected by link failures.

## Port Channel Restriction

The following are port channel restrictions:

- Port channels do not support access control lists (ACLs).

- Port channels do not support NetFlow.

## Trunking Overview

Trunking, also known as VLAN trunking, enables interconnected ports to transmit and receive frames in more than one VLAN over the same physical link.

Trunking and port channels function as follows:

- Port channels enable several physical links to be combined into one aggregated logical link.

- Trunking enables a link to carry (trunk) multiple VLAN traffic.

# Initial Troubleshooting Checklist

Use the following checklist to begin troubleshooting port channel and trunking issues.

| Checklist | √ |
|---|---|
| To determine port channel requirements, enter the s**how port-channel compatibility-parameters** command. | |
| Ensure that all interfaces in the port channel have the same destination device for Link Aggregation Control Protocol (LACP) channels. By using the Asymmetric Port Channel (APC) feature in the Cisco Nexus 1000V, ports in an ON mode channel can be connected to two different destination devices.<br><br>✎<br>**Note**  APC is supported only in ON mode channels. It is not supported for LACP channels. | |
| To verify that either side of a port channel is connected to the same number of interfaces, enter these commands:<br>•  **show port-channel summary**<br>•  **show ether channel summary** | |
| To verify that each interface is connected to the same type of interface on the other side, enter the **show interface brief** command. | |
| To verify that all required VLANs on a trunk port are in the allowed VLAN list, enter the **show interface switchport** command. | |
| To verify that all the members trying to form a port channel are on the same module, enter the **show port-channel summary** command. | |
| To verify that the port channel configuration is present in the profile used by the physical ports, enter the **show port-channel name** *name* command and check for the **channel-group auto** setting. | |
| Configure APC if the ports are connected to different upstream switches. | |
| If the upstream switch does not support port channels, make sure to configure APC in the profile. | |

The following commands can help you to troubleshoot port channels and trunking:

- **show port-channel summary**
- **show port-channel internal event-history interface port-channel** *channel-number*
- **show port-channel internal event-history interface ethernet** *slot-number/port-number*
- **show system internal ethpm event-history interface port-channel** *channel-number*
- **show system internal ethpm event-history interface ethernet** *slot-number/port-number*
- **show vlan internal trunk interface ethernet** *slot-number/port-number*
- **show vlan internal trunk interface port-channel** *channel-number*
- **debug port-channel error**
- **module vem** *module-number* **execute vemcmd show port**
- **module vem** *module-number* **execute vemcmd show port vlans**
- **module vem** *module-number* **execute vemcmd show pc**
- **module vem** *module-number* **execute vemcmd show trunk**

Example 10-1 shows the output of the **show port-channel summary** command.

***Example 10-1   show port-channel summary Command***

```
n1000v# 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     NONE      Eth3/4(P)
2     Po2(SU)     Eth     NONE      Eth3/2(P)    Eth3/6(P)
```

# Verifying a Port Channel Configuration

You can debug port channels that are configured through a port profile.

**BEFORE YOUR BEGIN**

- Log in to the CLI in global configuration mode.

**DETAILED STEPS**

**Step 1**  Verify that you have configured a port channel in the profile by entering the **show port-profile name** *profile-name* command.

**Step 2**  Verify the port configuration by entering the **show port-channel summary** command.

**Step 3**  Configure debugging of port-channel trace by entering the **debug port-channel trace** command.

# Troubleshooting Asymmetric Port Channels

When troubleshooting asymmetric port channels, follow these guidelines:

- Use APC when you want to configure a port channel whose members are connected to two different upstream switches.

- Ports in APC only come up when they are assigned subgroup IDs.

- For MAC-pinning and MAC-pinning relative APCs, subgroup IDs are automatically assigned based on the vmnic numbers.

- For the Cisco Discovery Protocol (CDP) subgroup APCs, physical ports within an APC get assigned subgroup IDs based on CDP information received from upstream switches. Make sure that CDP is enabled on Virtual Supervisor Modules (VSM) and upstream switches.

- Verify CDP adjacency and subgroup mapping for upstream switches by entering the **show cdp neighbors** and **show port-channel cdp-map** commands on the VSM.

- For manual subgroup APCs, ensure subgroup IDs are manually configured on the physical ports in the interface configuration submode.
- After the ports came up, check that ports are put in the correct subgroups by entering the **module vem** *module-number* **execute vemcmd show pc** command on the VSM.
- Configure debugging of port-channel trace by entering the **debug port-channel trace** command.

# Troubleshooting LACP Port Channels

When troubleshooting LACP port channels, follow these guidelines:

- All physical ports in the port channel should be connected to a single upstream switch.
- The LACP feature should be enabled on both the VSM and the upstream switch.
- The LACP channel group should be configured on all upstream ports and the channel-group ID that is assigned to the upstream ports of a single port channel should be identical.
- At least one end (the Cisco Nexus 1000V or upstream switch) of the port channel should have active LACP mode configured.
- After the ports come up, check that ports are in a LACP port channel by entering the **show lacp port-channel** and **module vem** *module-number* **execute vemcmd show pc** commands on the VSM.

# Cannot Create a Port Channel

| Symptom | Possible Cause | Solution |
|---------|----------------|----------|
| Cannot create a port channel. | A maximum number of port channels has been reached for the system or Virtual Ethernet Module (VEM). | Verify the number of port channels already configured by entering the **show port-channel summary** command. You can have a maximum of 256 port channels on the Cisco Nexus 1000V and 8 port channels per VEM. |

# Newly Added Interface Does Not Come Online in a Port Channel

| Symptom | Possible Cause | Solution |
|---------|----------------|----------|
| A newly added interface does not come online in a port channel. | The port channel has not been configured. | Make sure that you have the port channel configuration in the port profile (port group) used by that interface. |
|  | The interface parameters are not compatible with the parameters of the existing port. | Configure compatible parameters on all physical ports in a port channel. |

# VLAN Traffic Does Not Traverse Trunk

| Symptom | Possible Cause | Solution |
|---|---|---|
| The VLAN traffic does not traverse the trunk. | A VLAN is not in the allowed VLAN list. | Add the VLAN to the allowed VLAN list by entering the **switchport trunk allowed vlan add** *vlan-id* command in the profile that is used by the interface. |