

A PortChannel can aggregate multiple physical interfaces into one logical interface to provide higher aggregated bandwidth, load balancing, and link redundancy.

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## PortChannel Overview

A PortChannel has the following functionality:

- Provides a point-to-point connection over ISL (E ports) or EISL (TE ports). Multiple links can be combined into a PortChannel.
- Increases the aggregate bandwidth on an ISL by distributing traffic among all functional links in the channel.
- Load balances across multiple links and maintains optimum bandwidth utilization. Load balancing is based on the source ID, destination ID, and exchange ID (OX ID).
- Provides high availability on an ISL. If one link fails, traffic previously carried on this link is switched to the remaining links. If a link goes down in a PortChannel, the upper protocol is not aware of it. The upper protocol functions as if the link is still there, although the bandwidth is diminished. The routing tables are not affected by link failure. PortChannels can contain up to 16 physical links and can span multiple modules for added high availability.

On switches with Generation 1 switching modules, or a combination of Generation 1 and Generation 2 switching modules, you can configure a maximum of 128 PortChannels. On switches with Generation 2 switching modules only, you can configure a maximum of 265 PortChannels.

A PortChannel number refers to the unique (to each switch) identifier associated with each channel group. This number ranges from of 1 to 256.

## Trunking Overview

Trunking, also known as VSAN trunking, is a feature specific to switches in the Cisco MDS 9000 Family. Trunking enables interconnected ports to transmit and receive frames in more than one VSAN, over the same physical link using extended ISL (EISL) frame format.

Trunking configurations are only applicable to E ports. If trunk mode is enabled in an E port and that port becomes operational as a trunking E port, it is referred to as a TE port. The trunk-allowed VSANs configured

for TE ports are used by the trunking protocol to determine the allowed-active VSANs in which frames can be received or transmitted.

Trunking is a commonly used storage industry term. However, the Cisco SAN-OS software and switches in the Cisco MDS 9000 Family implement trunking and PortChannels as follows:


- PortChannel enables several physical links to be combined into one aggregated logical link.
- Trunking enables link transmitting frames in the EISL format to carry (trunk) multiple VSAN traffic.
- When trunking is operational on an E port, that E port becomes a TE port. A TE port is specific to switches in the Cisco MDS 9000 Family. An industry standard E port can link to other vendor switches and is referred to as a nontrunking interface.

## Initial Troubleshooting Checklist

Begin troubleshooting PortChannel and trunking issues by verifying that you have completed following actions first:

Checklist	Check off
Use the <b>show port-channel compatibility-parameters</b> CLI command to determine PortChannel requirements.	
Ensure that one PortChannel is not connected to different sets of switches. PortChannels require point-to-point connections between the same set of switches.	
Verify that either side of a PortChannel is connected to the same number of interfaces.	
Verify that each interface is connected to the same type of interface on the other side.	
Verify that all required VSANs on a TE port are in the allowed-active VSAN list.	

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 **Note:** Use the **show running interface** CLI command to view the interface configuration in Cisco SAN-OS Release 3.0(1) or later. The interface configuration as seen in the **show running-config** CLI command is no longer consolidated.

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## Common Troubleshooting Tools in Fabric Manager

The following Fabric Manager navigation paths can be useful in troubleshooting any issues with PortChannel and trunking:

- Choose **ISLs > PortChannel** to access the PortChannel configuration.
- Choose **Switches > Interfaces > FC Logical** and click the **Trunk Config** tab to access the trunking configuration.

## Common Troubleshooting Commands in the CLI

The following commands can be useful in troubleshooting PortChannel and trunking:

- **show port-channel compatibility-parameters**
- **show port-channel summary**
- **show port-channel database**
- **show port-channel consistency detail**
- **show port-channel usage**
- **show interface**
- **show interface trunk**
- **show trunk protocol**

## PortChannel Issues

This section describes common PortChannel issues.

### Cannot Configure a PortChannel

**Symptom** Cannot configure a PortChannel

**Table 10-1 Cannot Configure a PortChannel**

Symptom

Possible Cause

Solution

Cannot configure a PortChannel.

PortChannel autocreation is enabled.

Disable autocreation if you want to manually configure PortChannels. In Device Manager, select **Interfaces > FC ALL...**, click the **Other** tab, uncheck the **AutoChannelCreate** check box, and click **Apply**.

Use the **no channel-group auto** CLI command.

### Newly Added Interface Does Not Come Online In a PortChannel

**Symptom** Newly added interface does not come online in a PortChannel.

**Table 10-2 Newly Added Interface Does Not Come Online in a PortChannel**

Symptom

Possible Cause

Solution

Newly added interface does not come online in a PortChannel.

PortChannel mode is on.

Enable PortChannel manually or change PortChannel mode to active. See the "Configuring Port Channel Modes Using Fabric Manager" section.

Also, use the **no shutdown** CLI command to enable the PortChannel manually or use the **channel-mode active** CLI command in the interface submode for the PortChannel interface.

Interface parameters are not compatible with existing PortChannel.

Use the force option to force the physical interface to take on the parameters of the PortChannel. In Fabric Manager, choose **ISLs > Port Channels**, check the **Force** check box, and click **Apply Changes**.

Also, use the **channel-group x force** CLI command in the interface submode for the physical interface.

## Configuring Port Channel Modes Using Fabric Manager

To configure active mode using Fabric Manager, follow these steps:

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1. Expand **ISLs** and then select **Port Channels** in the Physical Attributes pane. You see the PortChannels configured in the Information pane.
  2. Click the **Protocols** tab and, from the Mode drop-down menu, click the appropriate mode for the PortChannel.
  3. Click **Apply Changes** icon to save any modifications or click **Undo Changes** to discard any changes.
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## Trunking Issues

This section describes common trunking issues.

### Cannot Configure Trunking

**Symptom** Cannot configure trunking.

**Table 10-3 Cannot Configure Trunking**

Symptom

Possible Cause

Solution

Cannot configure trunking.

Trunking protocol is disabled.

Enable trunking. In Fabric Manager, choose **Switches > Interfaces > FC Logical**, select the **Trunk Config** tab, and set the Admin drop-down menu to trunk. Click **Apply Changes**.

Use the **trunk protocol enable** CLI command.

## VSAN Traffic Does Not Traverse Trunk

**Symptom** VSAN traffic does not traverse trunk.

### Table 10-4 VSAN Traffic Does Not Traverse Trunk

Symptom

Possible Cause

Solution

VSAN traffic does not traverse trunk.

VSAN not in allowed-active VSAN list.

Add VSAN to allowed-active list. In Fabric Manager, choose **Switches > Interfaces > FC Logical**, select the Trunk Config tab, and set the Allowed VSANs field. Click **Apply** Changes.

Use the **switchport trunk allowed vsan** CLI command.

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