



Configuring Trunking

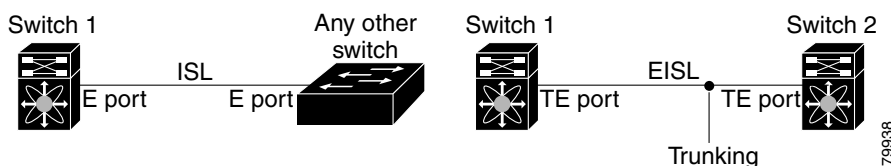
This chapter describes the trunking feature provided in Cisco MDS 9000 switches. It includes the following sections:

- [About Trunking, page 24-1](#)
- [Trunking Protocol, page 24-2](#)
- [Default Settings, page 24-6](#)

About Trunking

Trunking, also known as VSAN trunking, is a feature specific to switches in the Cisco MDS 9000 Family. Trunking enables interconnect ports to transmit and receive frames in more than one VSAN, over the same physical link, using enhanced ISL (EISL) frame format (see [Figure 24-1](#)).

Figure 24-1 Trunking



The trunking feature includes the following restrictions:

- 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.
- If a trunking enabled E port is connected to a third-party switch, the trunking protocol ensures seamless operation as an E port.



Note

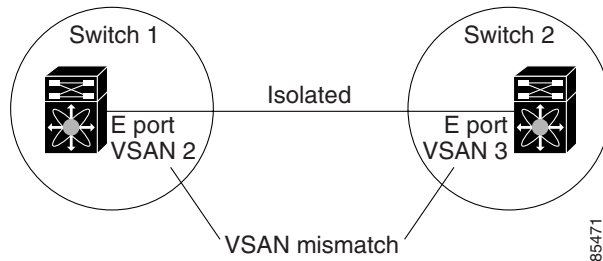
Trunking is not supported by internal ports on both the Cisco Fabric Switch for HP c-Class BladeSystem and the Cisco Fabric Switch for IBM BladeCenter.

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Trunking Configuration Guidelines

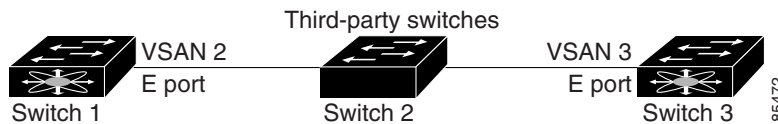
If you misconfigure VSAN configurations across E ports, you could face consequences such as merging the traffic in two VSANs (thus causing both VSANs to mismatch). The trunking protocol validates the VSAN interfaces at both ends of an ISL to avoid merging VSANs (see [Figure 24-2](#)).

Figure 24-2 VSAN Mismatch



In this example, the trunking protocol detects potential VSAN merging and isolates the ports involved. The trunking protocol cannot detect merging of VSANs when a third-party switch is placed in between two Cisco MDS 9000 Family switches (see [Figure 24-3](#)).

Figure 24-3 Third-Party Switch VSAN Mismatch



VSAN 2 and VSAN 3 are effectively merged with overlapping entries in the name server and the zone applications. The Cisco MDS 9000 Fabric Manager helps detect such topologies.

Trunking Protocol

The trunking protocol is important for E-port and TE-port operations. It supports the following:

- Dynamic negotiation of operational trunk mode.
- Selection of a common set of trunk-allowed VSANs.
- Detection of a VSAN mismatch across an ISL.

By default, the trunking protocol is enabled. If the trunking protocol is disabled on a switch, no port on that switch can apply new trunk configurations. Existing trunk configurations are not affected—the TE port continues to function in trunk mode, but only supports traffic in VSANs that it negotiated with previously (when the trunking protocol was enabled). Also, other switches that are directly connected to this switch are similarly affected on the connected interfaces. In some cases, you may need to merge traffic from different port VSANs across a non-trunking ISL. If so, disable the trunking protocol.

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**Note**

We recommend that both ends of a trunking ISL belong to the same port VSAN. On certain platforms or fabric switches where the port VSANs are different, one end returns an error, and the other is not connected.

**Tip**

To avoid inconsistent configurations, shut all E ports before enabling or disabling the trunking protocol.

This section explains how to configure trunking and contains the following topics:

- [About Trunk Mode, page 24-3](#)
- [Configuring Trunk Mode, page 24-3](#)
- [About Trunk-Allowed VSAN Lists, page 24-4](#)
- [Configuring an Allowed-Active List of VSANs, page 24-6](#)

About Trunk Mode

By default, trunk mode is enabled in all Fibre Channel interfaces. However, trunk mode configuration takes effect only in E-port mode. You can configure trunk mode as on (enabled), off (disabled), or auto (automatic). The default trunk mode is on. The trunk mode configuration at the two ends of an ISL, between two switches, determine the trunking state of the link and the port modes at both ends (see [Table 24-1](#)).

Table 24-1 *Trunk Mode Status Between Switches*

Your Trunk Mode Configuration		Resulting State and Port Mode	
Switch 1	Switch 2	Trunking State	Port Mode
On	Auto or on	Trunking (EISL)	TE port
Off	Auto, on, or off	No trunking (ISL)	E port
Auto	Auto	No trunking (ISL)	E port

**Tip**

The preferred configuration on the Cisco MDS 9000 Family switches is one side of the trunk set to auto and the other set to on.

**Note**

When connected to a third-party switch, the trunk mode configuration has no effect—the ISL is always in a trunking disabled state.

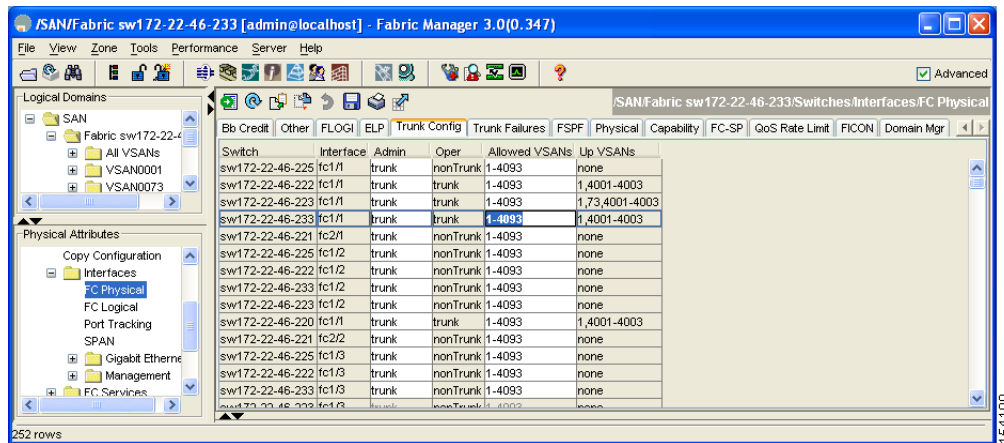
Configuring Trunk Mode

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

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- Step 1** Expand **Interfaces** and then select **FC Physical**. You see the interface configuration in the Information pane.
- Step 2** Click the **Trunk Config** tab to modify the trunking mode for the selected interface. You see the information shown in [Figure 24-4](#).

Figure 24-4 Trunking Configuration



- Step 3** Make changes to the Admin and Allowed VSANs values.
- Step 4** Click the **Trunk Failures** tab to check if an ISL did not come up. You see the reason listed in the FailureCause column (see [Figure 24-5](#)).

Figure 24-5 Trunk Failures Tab

Switch	Interface, VSAN Id	FailureCause
sw172-22-46-174	fc3/2, 4001	vsanMismatchIsolation
sw172-22-46-220	fc3/2, 4001	portBindFailure

- Step 5** Click the **Apply Changes** icon.

About Trunk-Allowed VSAN Lists

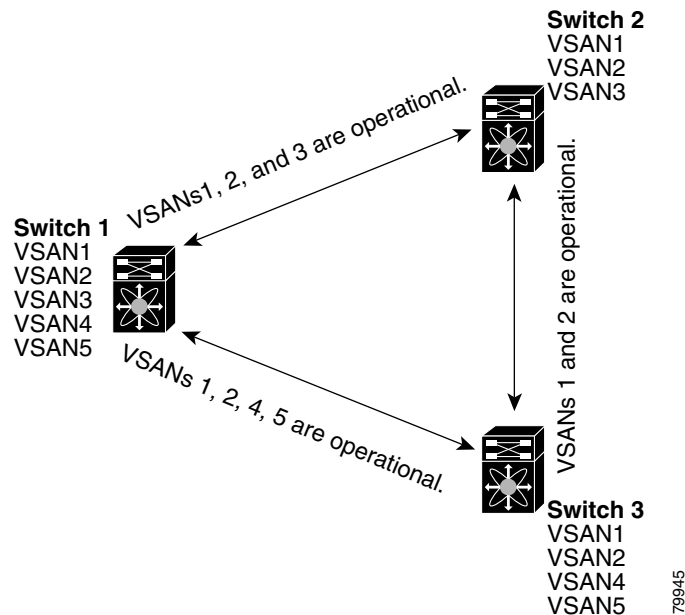
Each Fibre Channel interface has an associated trunk-allowed VSAN list. In TE-port mode, frames are transmitted and received in one or more VSANs specified in this list. By default, the VSAN range (1 through 4093) is included in the trunk-allowed list.

The common set of VSANs that are configured and active in the switch are included in the trunk-allowed VSAN list for an interface, and they are called *allowed-active VSANs*. The trunking protocol uses the list of allowed-active VSANs at the two ends of an ISL to determine the list of operational VSANs in which traffic is allowed.

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In [Figure 24-6](#), switch 1 has VSANs 1 through 5, switch 2 has VSANs 1 through 3, and switch 3 has VSANs 1, 2, 4, and 5 with a default configuration of trunk-allowed VSANs. All VSANs configured in all three switches are allowed-active. However, only the common set of allowed-active VSANs at the ends of the ISL become operational as shown in [Figure 24-6](#).

Figure 24-6 Default Allowed-Active VSAN Configuration



You can configure a select set of VSANs (from the allowed-active list) to control access to the VSANs specified in a trunking ISL.

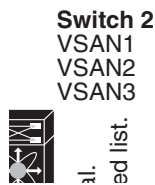
Using [Figure 24-6](#) as an example, you can configure the list of allowed VSANs on a per-interface basis (see [Figure 24-7](#)). For example, if VSANs 2 and 4 are removed from the allowed VSAN list of ISLs connecting to switch 1, the operational allowed list of VSANs for each ISL would be as follows:

- The ISL between switch 1 and switch 2 shall include VSAN 1 and VSAN 3.
- The ISL between switch 2 and switch 3 shall include VSAN 1 and VSAN 2.
- The ISL between switch 3 and switch 1 shall include VSAN 1, 2, and 5.

Consequently, VSAN 2 can only be routed from switch 1 through switch 3 to switch 2.

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Figure 24-7 Operational and Allowed VSAN Configuration



Configuring an Allowed-Active List of VSANs

To configure an allowed-active list of VSANs for an interface using Fabric Manager, follow these steps:

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- Step 1** Expand **Interfaces** and then select **FC Physical**.
You see the interface configuration in the Information pane.
 - Step 2** Click the **Trunk Config** tab.
You see the current trunk configuration.
 - Step 3** Set Allowed VSANs to the list of allowed VSANs for each interface that you want to configure.
 - Step 4** Click **Apply Changes** to save these changes or click **Undo Changes** to discard any unsaved changes.
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Default Settings

Table 24-2 lists the default settings for trunking parameters.

Table 24-2 Default Trunk Configuration Parameters

Parameters	Default
Switch port trunk mode	On.
Allowed VSAN list	1 to 4093 user-defined VSAN IDs.
Trunking protocol	Enabled.

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