CHAPTER 25

Configuring Fabric Binding

This chapter describes the fabric binding feature provided in Cisco Nexus 5000 Series switches. It includes the following sections:

Information About Fabric Binding

The fabric binding feature ensures that ISLs are only enabled between specified switches in the fabric. Fabric binding is configured on a per-VSAN basis.

This feature helps prevent unauthorized switches from joining the fabric or disrupting current fabric operations. It uses the Exchange Fabric Membership Data (EFMD) protocol to ensure that the list of authorized switches is identical in all switches in the fabric.

This section includes the following topics:

Licensing Requirements

Fabric Binding requires the Storage Protocol Services license. For additional information, refer to the *Nexus 5000 Series Switch CLI Software Configuration Guide*.

Port Security Versus Fabric Binding

Port security and fabric binding are two independent features that can be configured to complement each other. Table 25-1 compares the two features.

Table 25-1 Fabric Binding and Port Security Comparison

Fabric Binding	Port Security
Uses a set of sWWNs and a persistent domain ID.	Uses pWWNs/nWWNs or fWWNs/sWWNs.
Binds the fabric at the switch level.	Binds devices at the interface level.
Authorizes only the configured sWWN stored in the fabric binding database to participate in the fabric.	Allows a preconfigured set of Fibre Channel devices to logically connect to a SAN port. The switch port, identified by a WWN or interface number, connects to a Fibre Channel device (a host or another switch), also identified by a WWN. By binding these two devices, you lock these two ports into a group (or list).
Requires activation on a per VSAN basis.	Requires activation on a per VSAN basis.
Allows specific user-defined switches that are allowed to connect to the fabric, regardless of the physical port to which the peer switch is connected.	Allows specific user-defined physical ports to which another device can connect.
Does not learn about switches that are logging in.	Learns about switches or devices that are logging in if learning mode is enabled.
Cannot be distributed by CFS and must be configured manually on each switch in the fabric.	Can be distributed by CFS.

Port-level checking for xE ports is as follows:

- The switch login uses both port security binding and fabric binding for a given VSAN.
- Binding checks are performed on the port VSAN as follows:
  - E port security binding check on port VSAN
  - TE port security binding check on each allowed VSAN

While port security complements fabric binding, they are independent features and can be enabled or disabled separately.

Fabric Binding Enforcement

To enforce fabric binding, configure the switch world wide name (sWWN) to specify the xE port connection for each switch. Enforcement of fabric binding policies are done on every activation and when the port tries to come up. For a Fibre Channel VSAN, the fabric binding feature requires all sWWNs connected to a switch to be part of the fabric binding active database.

Configuring Fabric Binding

The fabric binding feature ensures ISLs are only enabled between specified switches in the fabric binding configuration. Fabric binding is configured on a per-VSAN basis.

This section includes the following topics:

Configuring Fabric Binding

To configure fabric binding in each switch in the fabric, perform this task:

Step 1 Enable the fabric configuration feature.

Step 2 Configure a list of sWWNs and their corresponding domain IDs for devices that are allowed to access the fabric.

Step 3 Activate the fabric binding database.

Step 4 Copy the fabric binding active database to the fabric binding configuration database.

Step 5 Save the fabric binding configuration.

Step 6 Verify the fabric binding configuration.

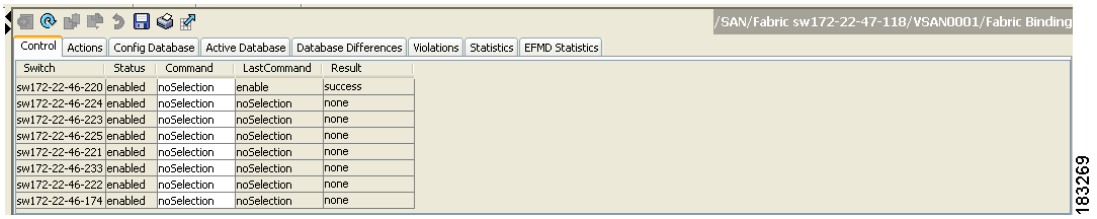
Enabling Fabric Binding

The fabric binding feature must be enabled in each switch in the fabric that participates in the fabric binding. By default, this feature is disabled in Cisco Nexus 5000 Series switches. The configuration and verification commands for the fabric binding feature are only available when fabric binding is enabled on a switch. When you disable this configuration, all related configurations are automatically discarded.

To enable fabric binding on any participating switch using Fabric Manager, perform this task:

Step 1 Expand the VSAN with the switches on which you want to enable fabric binding in the Logical Domains pane. Expand **Fabric Binding** (see Figure 25-1).

Figure 25-1 Fabric Binding Configuration



The **Control** tab is the default tab in the Information pane.

Step 2 From the Command drop-down list, choose **enable or disable** to enable or disable Fabric Binding on the switch.

Step 3 Click the **Apply Changes** icon to save your changes.

About Switch WWN Lists

A user-specified fabric binding list contains a list of switch WWNs (sWWNs) within a fabric. If an sWWN attempts to join the fabric, and that sWWN is not on the list or the sWWN is using a domain ID that differs from the one specified in the allowed list, the ISL between the switch and the fabric is automatically isolated in that VSAN and the switch is denied entry into the fabric.

Configuring Switch WWN List

To configure a list of sWWNs and domain IDs for a FICON VSAN using Fabric Manager, perform this task:

Step 1 Expand a VSAN with fabric binding in the Logical Domains pane. Expand **Fabric Binding** (see Figure 25-1).

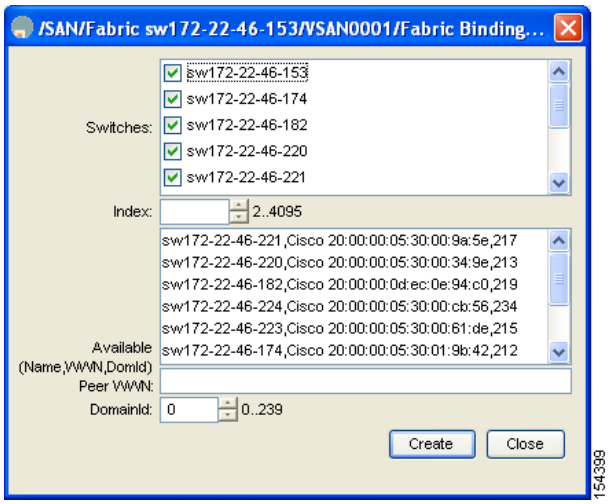
Step 2 Ensure that fabric binding is enabled for the selected VSAN.

Step 3 Click the **Config Database** tab in the Information pane.

Step 4 Click **Create Row**.

You see the Create Config Database dialog box as shown in Figure 25-2.

Figure 25-2 Create Config Database Dialog Box



Step 5 Select the switches that you want to add.

Step 6 Add the sWWN and domain ID of a switch to the configured database list.

You can add the sWWN and the domain ID of more than one switches to the configured database list.

Step 7 Click **Create**.

About Fabric Binding Activation and Deactivation

The fabric binding feature maintains a configuration database (config database) and an active database. The config database is a read-write database that collects the configurations you perform. These configurations are only enforced upon activation. This activation overwrites the active database with the contents of the config database. The active database is read-only and is the database that checks each switch that attempts to log in.

By default, the fabric binding feature is not activated. You cannot activate the fabric binding database on the switch if entries existing in the config database conflict with the current state of the fabric. For example, one of the already logged in switches may be denied login by the config database. You can choose to forcefully override these situations.

Note After activation, any already logged in switch that violates the current active database will be logged out, and all switches that were previously denied login because of fabric binding restrictions are reinitialized.

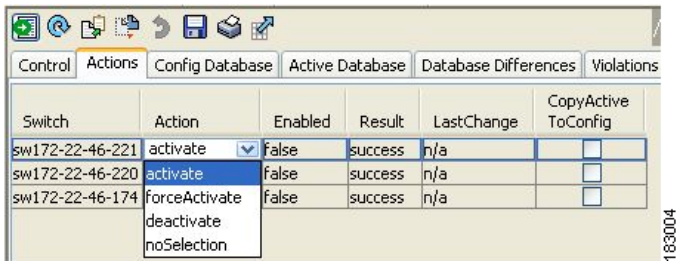
Activating Fabric Binding

To activate, deactivate, or to force fabric bind using Fabric Manager, perform this task:

Step 1 Expand a VSAN with fabric binding in the Logical Domains pane. Expand **Fabric Binding**.

Step 2 Click the **Actions** tab in the Information pane (see Figure 25-3).

Figure 25-3 Fabric Binding Actions Tab



Step 3 In the Action drop-down list, choose **activate** or **deactivate** or **force activate** for the Fabric Binding on the switch.

Step 4 Click the **Apply Changes** icon to save your changes.

The Enabled column for the switch now displays True.

Forcing Fabric Binding Activation

If the database activation is rejected due to one or more conflicts listed in the previous section, you may decide to proceed with the activation by using the force option.

To forcefully activate the fabric binding database using Fabric Manager, perform this task:

Step 1 Expand a VSAN with fabric binding in the Logical Domains pane. Expand **Fabric Binding**.

Step 2 Click the **Actions** tab in the Information pane (see Figure 25-3).

Step 3 In the Action drop-down list, choose **forceActivate** for the VSAN(s) for which you want to activate fabric binding.

Step 4 Click **Apply Changes** to activate fabric binding.

The Enabled column for the switch now displays True.

Copying Fabric Binding Configurations

When you copy the fabric binding configuration, the config database is saved to the running configuration.

To copy the active database to the config database using Fabric Manager, perform this task:

Step 1 Expand a VSAN with fabric binding in the Logical Domains pane. Expand **Fabric Binding**.

Step 2 Click the **Actions** tab in the Information pane.

Step 3 Check the **Copy Active to Config** check box.

Step 4 Click the **Apply Changes** icon to save your changes.

Creating a Fabric Binding Configuration

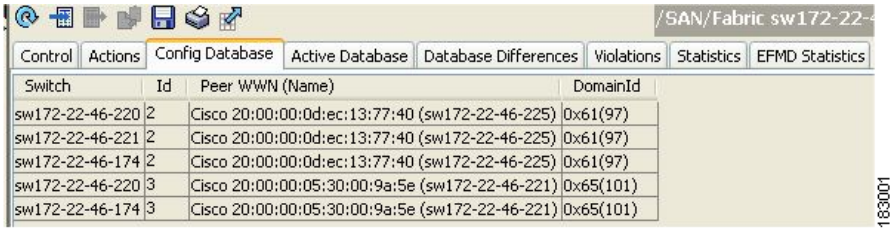
To create a fabric binding configuration using Fabric Manager, perform this task:

Step 1 Expand a VSAN with fabric binding in the Logical Domains pane. Expand **Fabric Binding**.

Step 2 Click the **Config Database** tab in the Information pane.

You see the information as shown in Figure 25-4.

Figure 25-4 Fabric Binding Database Configuration



Step 3 Click **Insert Row**.

You see the Create Config Database dialog box (see Figure 25-2).

Step 4 Select switches, choose an index, and indicate the peer WWN and the Domain ID.

Step 5 Click **Create** to create the fabric binding database configuration.

When you save the fabric binding configuration, the config database and the active database are both saved to the startup configuration and are available after a reboot.

Deleting a Fabric Binding Configuration

To delete a fabric binding configuration using Fabric Manager, perform this task:

Step 1 Expand a VSAN with fabric binding in the Logical Domains pane. Expand **Fabric Binding**.

Step 2 Click the **Config Database** tab in the Information pane.

You see the information shown in Figure 25-4.

Step 3 Click in the row for the VSAN for which you want to delete the fabric binding configuration.

Step 4 Click **Delete Row** to delete the fabric binding configuration.

Copying Fabric Binding to the Configuration File

To copy the active fabric binding to the configuration file using Fabric Manager, perform this task:

Step 1 Expand a VSAN with fabric binding in the Logical Domains pane. Expand **Fabric Binding**.

Step 2 Click the **Actions** tab in the Information pane (see Figure 25-3).

Step 3 Check the **CopyActive ToConfig** check box for the VSAN(s) for which you want to copy fabric binding.

Step 4 Click the **Apply Changes** icon to copy the fabric binding.

Caution You cannot deactivate or disable fabric binding in a FICON-enabled VSAN.

Viewing EFMD Statistics

To view EFMD statistics using Fabric Manager, perform this task:

Step 1 Expand a VSAN with fabric binding in the Logical Domains pane. Expand **Fabric Binding**.

Step 2 Click the **EFMD Statistics** tab.

You see the statistics information.

Viewing Fabric Binding Violations

To view fabric binding violations using Fabric Manager, perform this task:

Step 1 Expand a VSAN with fabric binding in the Logical Domains pane. Expand **Fabric Binding**.

Step 2 Click the **Violations** tab.

You see the violations information.

Viewing Fabric Binding Active Database

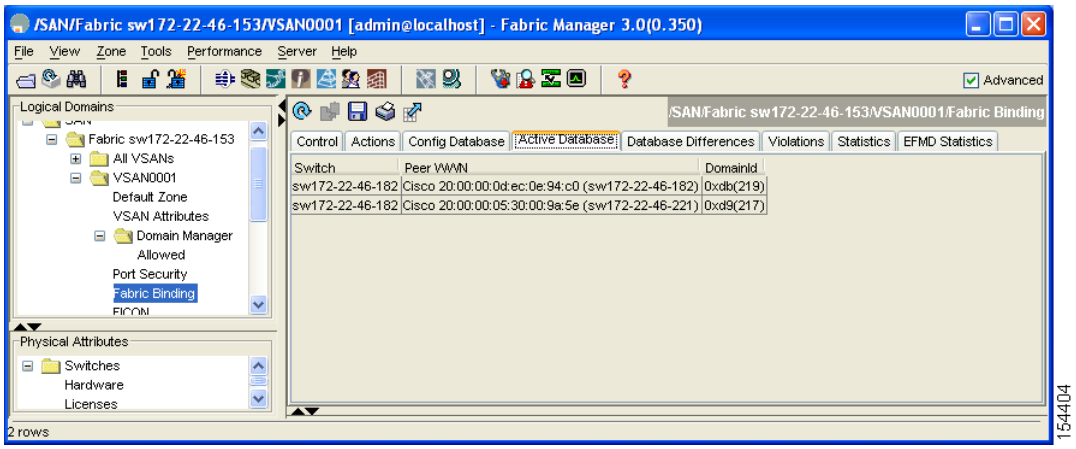
To view the fabric binding active database using Fabric Manager, perform this task:

Step 1 Expand a VSAN with fabric binding in the Logical Domains pane. Expand **Fabric Binding**.

Step 2 Click the **Active Database** tab.

You see the active database information as shown in Figure 25-5.

Figure 25-5 Fabric Binding Active Database



Saving Fabric Binding Configurations

When you save the fabric binding configuration, the config database and the active database are both saved to the startup configuration and are available after a reboot.

To save the fabric binding configuration using Fabric Manager, perform this task:

Step 1 Expand a VSAN with fabric binding in the Logical Domains pane. Expand **Fabric Binding**.

Step 2 Click the **Actions** tab (see Figure 25-3).

Step 3 Check the **Copy Active to Config** check box to copy the active database to the config database.

If the configured database is empty, this action is not successful.

Step 4 Click the **Database Differences** tab to compare the database with the Config or Active database to view the differences between the active database and the config database.

Clearing the Fabric Binding Statistics

To clear all existing statistics from the fabric binding database for a specified VSAN using Fabric Manager, perform this task:

Step 1 Expand a VSAN with fabric binding in the Logical Domains pane. Expand **Fabric Binding**.

Step 2 Click the **Statistics** tab in the Information pane.

You see the statistics in the Information pane.

Step 3 Check the **Clear** check box.

Step 4 Click the **Apply Changes** icon to save your changes.

Deleting the Fabric Binding Database

To delete the configured database for a specified VSAN using Fabric Manager, perform this task:

Step 1 Expand a VSAN with fabric binding in the Logical Domains pane. Expand **Fabric Binding**.

Step 2 Click the **Config Database** tab in the Information pane.

Step 3 Select the database that you want to delete.

Step 4 Click **Delete Row**.

Default Settings

Table 25-2 lists the default settings for the fabric binding feature.

Table 25-2 Default Fabric Binding Settings

Parameters	Default
Fabric binding	Disabled