Fibre Channel Zoning

- Information About Fibre Channel Zoning, on page 1
- Support for Fibre Channel Zoning in Cisco UCS Manager, on page 2
- Guidelines and recommendations for Cisco UCS Manager-Based Fibre Channel Zoning, on page 4
- Configuring Fibre Channel Zoning, on page 4
- Creating a VSAN for Fibre Channel Zoning, on page 5
- Creating a New Fibre Channel Zone Profile, on page 7
- Deleting a Fibre Channel Zone Profile, on page 9
- Deleting a Fibre Channel User Zone, on page 10
- Fibre Channel Storage Connection Policies, on page 10

Information About Fibre Channel Zoning

Fibre Channel zoning allows you to partition the Fibre Channel fabric into one or more zones. Each zone defines the set of Fibre Channel initiators and Fibre Channel targets that can communicate with each other in a VSAN. Zoning also enables you to set up access control between hosts and storage devices or user groups.

The access and data traffic control provided by zoning does the following:

- Enhances SAN network security
- Helps prevent data loss or corruption
- Reduces performance issues

Information About Zones

A zone consists of multiple zone members and has the following characteristics:

- Members in a zone can access each other; members in different zones cannot access each other.
- Zones can vary in size.
- Devices can belong to more than one zone.
- A physical fabric can have a maximum of 8,000 zones.

Information About Zone Sets

Each zone set consists of one or more zones. You can use zone sets to enforce access control within the Fibre Channel fabric. In addition, zone sets provide you with the following advantages:

- Only one zone set can be active at any time.
- All zones in a zone set can be activated or deactivated as a single entity across all switches in the fabric.
- Changes to a zone set are not applied until the zone set has been activated. If you make changes to the active zone set, you must reactivate that zone set to apply the changes.
- A zone can be a member of more than one zone set.
- A switch in a zone can have a maximum of 500 zone sets.

Support for Fibre Channel Zoning in Cisco UCS Manager

Cisco UCS Manager supports switch-based Fibre Channel zoning and Cisco UCS Manager-based Fibre Channel zoning. You cannot configure a combination of zoning types in the same Cisco UCS domain. You can configure a Cisco UCS domain with one of the following types of zoning:

- Cisco UCS Manager-based Fibre Channel zoning—This configuration combines direct attach storage with local zoning. Fibre Channel or FCoE storage is directly connected to the fabric interconnects and zoning is performed in Cisco UCS Manager, using Cisco UCS local zoning. Any existing Fibre Channel or FCoE uplink connections need to be disabled. Cisco UCS does not currently support active Fibre Channel or FCoE uplink connections coexisting with the utilization of the UCS Local Zoning feature.
- Switch-based Fibre Channel zoning—This configuration combines direct attach storage with uplink zoning. The Fibre Channel or FCoE storage is directly connected to the fabric interconnects and zoning is performed externally to the Cisco UCS domain through an MDS or Nexus 5000 switch. This configuration does not support local zoning in the Cisco UCS domain.

Note Zoning is configured on a per-VSAN basis. You cannot enable zoning at the fabric level.

Cisco UCS Manager-Based Fibre Channel Zoning

With Cisco UCS Manager-based zoning, Cisco UCS Manager controls the Fibre Channel zoning configuration for the Cisco UCS domain, including creating and activating zones for all VSANs that you set up with this type of zoning. This type of zoning is also know as local zoning or direct attach storage with local zoning.

Note You cannot implement Cisco UCS Manager-based zoning if the VSAN is also configured to communicate with a VSAN on an upstream switch and includes Fibre Channel or FCoE uplink ports.

Supported Fibre Channel Zoning Modes

Cisco UCS Manager-based zoning supports the following types of zoning:

- Single initiator single target—Cisco UCS Manager automatically creates one zone for each vHBA and storage port pair. Each zone has two members. We recommend that you configure this type of zoning unless you expect the number of zones to exceed the maximum supported.
- Single initiator multiple targets—Cisco UCS Manager automatically creates one zone for each vHBA. We recommend that you configure this type of zoning if you expect the number of zones to reach or exceed the maximum supported.

vHBA Initiator Groups

vHBA initiator groups determine the Fibre Channel zoning configuration for all vHBAs in a service profile. Cisco UCS Manager does not include any default vHBA initiator groups. You must create vHBA initiator groups in any service profile that is to be assigned to servers included in a zone.

The configuration in a vHBA initiator group determines the following:

- The vHBAs included in the initiator group, which are sometimes referred to as vHBA initiators.
- A Fibre Channel storage connection policy, which includes the associated VSAN and the Fibre Channel target ports on the storage array.
- The type of Fibre Channel zoning to be configured for the vHBAs included in the group.

Fibre Channel Storage Connection Policy

The Fibre Channel storage connection policy contains a collection of target storage ports on storage arrays that you use to configure Cisco UCS Manager-based Fibre Channel zoning. You can create this policy under an organization or an initiator group.

The storage arrays in these zones must be directly connected to the fabric interconnects. The target storage ports on these arrays that you include in the Fibre Channel storage connection policy can be either Fibre Channel storage ports or FCoE storage ports. You use the WWN of a port to add it to the policy and to identify the port for the Fibre Channel zone.

Note Cisco UCS Manager does not create default Fibre Channel storage.

Fibre Channel Active Zone Set Configuration

In each VSAN that has been enabled for Fibre Channel zoning, Cisco UCS Manager automatically configures one zone set and multiple zones. The zone membership specifies the set of initiators and targets that are allowed to communicate with each other. Cisco UCS Manager automatically activates that zone set.

Cisco UCS Manager processes the user-configured vHBA initiator groups and their associated Fibre Channel storage connection policy to determine the desired connectivity between Fibre Channel initiators and targets. Cisco UCS Manager uses the following information to build pair-wise zone membership between initiators and targets:

- The port WWNs of the vHBA initiators derived from the vHBA initiator groups.

- The port WWNs of the storage array derived from the storage connection policy.

Switch-Based Fibre Channel Zoning

With switch-based zoning, a Cisco UCS domain inherits the zoning configuration from the upstream switch. You cannot configure or view information about your zoning configuration in Cisco UCS Manager. You have to disable zoning on a VSAN in Cisco UCS Manager to use switch-based zoning for that VSAN.

Guidelines and recommendations for Cisco UCS Manager-Based Fibre Channel Zoning

When you plan your configuration for Fibre Channel zoning, consider the following guidelines and recommendations:

Fibre Channel Switching Mode Must Be Switch Mode for Cisco UCS Manager Configurations

If you want Cisco UCS Manager to handle Fibre Channel zoning, the fabric interconnects must be in Fibre Channel Switch mode. You cannot configure Fibre Channel zoning in End-Host mode.

Symmetrical Configuration Is Recommended for High Availability

If a Cisco UCS domain is configured for high availability with two fabric interconnects, we recommend that both fabric interconnects are configured with the same set of VSANs.

Configuring Fibre Channel Zoning

Note This procedure provides a high level overview of the steps required to configure a Cisco UCS domain for Fibre Channel zoning that is controlled by Cisco UCS Manager. You must ensure that you complete all of the following steps.

Procedure

	Command or Action	Purpose
Step 1	If you have not already done so, disconnect the fabric interconnects in the Cisco UCS domain from any external Fibre Channel switches, such as an MDS.	
Step 2	If the Cisco UCS domain still includes zones that were managed by the external Fibre Channel switch, run the **clear-unmanaged-fc-zone-all** command on every affected VSAN to remove those zones.	This functionality is not currently available in the Cisco UCS Manager GUI. You must perform this step in the Cisco UCS Manager CLI.

	Command or Action	Purpose
Step 3	Configure the Fibre Channel switching mode for both fabric interconnects in Fibre Channel Switch mode.	You cannot configure Fibre Channel zoning in End-Host mode. See Configuring Fibre Channel Switching Mode.
Step 4	Configure the Fibre Channel and FCoE storage ports that you require to carry traffic for the Fibre Channel zones.	See Configuring an Ethernet Port as an FCoE Storage Port and Configuring a Fibre Channel Storage Port.
Step 5	Create one or more VSANs and enable Fibre Channel zoning on all VSANs that you require to carry traffic for the Fibre Channel zones.	For a cluster configuration, we recommend that you create the VSANs that you intend to include in a Fibre Channel zone in the SAN Uplinks Manager and use the common/global configuration to ensure they are accessible to both fabric interconnects. See Creating a VSAN for Fibre Channel Zoning, on page 5.
Step 6	Create one or more Fibre Channel storage connection policies.	You can perform this step when you configure Fibre Channel zoning in the service profiles, if you prefer. See Creating a VSAN for Fibre Channel Zoning, on page 5.
Step 7	Configure zoning in service profiles or service profile templates for servers that need to communicate through Fibre Channel zones.	Complete the following steps to complete this configuration: • Enable zoning in the VSAN or VSANs assigned to the vHBAs. See Creating a VSAN for Fibre Channel Zoning, on page 5 • Configure one or more vHBA initiator groups. See Creating a Service Profile with the Expert Wizard.

Creating a VSAN for Fibre Channel Zoning

Note FCoE VLANs in the SAN cloud and VLANs in the LAN cloud must have different IDs. Using the same ID for an FCoE VLAN in a VSAN and a VLAN results in a critical fault and traffic disruption for all vNICs and uplink ports using that FCoE VLAN. Ethernet traffic is dropped on any VLAN with an ID that overlaps with an FCoE VLAN ID.

Procedure

Step 1 In the **Navigation** pane, click **SAN**.

Step 2 On the **SAN** tab, click the **SAN** node.

Step 3 In the **Work** pane, click the **SAN Uplinks Manager** link on the **SAN Uplinks** tab.

The SAN Uplinks Manager opens in a separate window.

Step 4 In the SAN Uplinks Manager, click the **VSAN** tab.

You can create the VSAN on any of the subtabs. However, if you use the **All** subtab, you can view all of the configured VSANs in the table.

Step 5 On the icon bar to the right of the table, click +.

If the + icon is disabled, click an entry in the table to enable it.

Step 6 In the **Create VSAN** dialog box, complete the following fields:

Name	Description
Name field	The name assigned to the network. This name can be between 1 and 32 alphanumeric characters. You cannot use spaces or any special characters other than - (hyphen), _ (underscore), : (colon), and . (period), and you cannot change this name after the object is saved.
FC Zoning field	Click the radio button to determine whether Cisco UCS Manager configures Fibre Channel zoning for the Cisco UCS domain. This can be one of the following: • **Disabled**—The upstream switch handles Fibre Channel zoning, or Fibre Channel zoning is not implemented for the Cisco UCS domain. Cisco UCS Manager does not configure Fibre Channel zoning. • **Enabled**—Cisco UCS Manager configures and controls Fibre Channel zoning for the Cisco UCS domain. **Note** If you enable Fibre Channel zoning through Cisco UCS Manager, do not configure the upstream switch with any VSANs that are being used for Fibre Channel zoning.
Type radio button	Click the radio button to determine how the VSAN should be configured. This can be one of the following: • **Common/Global**—The VSAN maps to the same VSAN ID in all available fabrics. • **Fabric A**—The VSAN maps to the a VSAN ID that exists only in fabric A. • **Fabric B**—The VSAN maps to the a VSAN ID that exists only in fabric B. • **Both Fabrics Configured Differently**—The VSAN maps to a different VSAN ID in each available fabric. If you choose this option, Cisco UCS Manager GUI displays a **VSAN ID** field and a **FCoE VLAN** field for each fabric.

Name	Description
VSAN ID field	The unique identifier assigned to the network. The ID can be between 1 and 4078, or between 4080 and 4093. 4079 is a reserved VSAN ID. In addition, if you plan to use FC end-host mode, the range between 3840 to 4079 is also a reserved VSAN ID range.
FCoE VLAN field	The unique identifier assigned to the VLAN used for Fibre Channel connections. VLAN 4048 is user configurable. However, Cisco UCS Manager uses VLAN 4048 for the following default values. If you want to assign 4048 to a VLAN, you must reconfigure these values: • After an upgrade to Cisco UCS, Release 2.0—The FCoE storage port native VLAN uses VLAN 4048 by default. If the default FCoE VSAN was set to use VLAN 1 before the upgrade, you must change it to a VLAN ID that is not used or reserved. For example, consider changing the default to 4049 if that VLAN ID is not in use. • After a fresh install of Cisco UCS, Release 2.0—The FCoE VLAN for the default VSAN uses VLAN 4048 by default. The FCoE storage port native VLAN uses VLAN 4049. For FIP-capable, converged network adapters, such as the Cisco UCS CNA M72KR-Q and the Cisco UCS CNA M72KR-E, the named VSAN must be configured with a named VLAN that is not the native VLAN for the FCoE VLAN ID. This configuration ensures that FCoE traffic can pass through these adapters.

Step 7 Click **OK**.

Creating a New Fibre Channel Zone Profile

Perform the following procedure to create a new Fibre Channel Zone Profile.

Before you begin

Ensure that the VSAN is created for the Fiber Channel Zoning.

Procedure

Step 1 In the **Navigation** pane, click **SAN**.

Step 2 On the **SAN** tab, click **Storage Cloud**.

Step 3 Right-click **FC Zone Profiles** and choose **Create FC Zone Profile**.

Step 4 In the **Create FC Zone Profile** dialog box, complete the following fields:

Field	Description
Name field	A name for the profile. This name can be between 1 and 32 alphanumeric characters. You cannot use spaces or any special characters other than - (hyphen), _(underscore), : (colon), and . (period), and you cannot change this name after the object is saved.
Description field	This field is optional. Enter a brief description of the zone profile.
FC Zoning radio button	Select the desired state of the zone profile.
FC User Zones	Click the + icon on the right of the table to create FC User Zone. The **Create FC User Zone** window is displayed. Continue to next step for details to create FC user zone. **Note** If + icon is disabled, click an entry in the table to enable it.

Step 5 Complete the following fields in the **Create FC User Zone** dialog box:

Field	Description
Name field	A name for the FC Zone. This name can be between 1 and 32 alphanumeric characters. You cannot use spaces or any special characters other than - (hyphen), _(underscore), : (colon), and . (period), and you cannot change this name after the object is saved.
Path radio button	Click the radio button to determine how the VSAN should be configured. Following options are available: • **Path A**—The VSAN path to the VSAN ID that exists only in fabric A. • **Path B**—The VSAN path to the VSAN ID that exists only in fabric B.
Note Perform one of the following to select a VSAN: • **Select VSAN** • **Create VSAN** • **Create Storage VSAN**	

Field	Description
Select VSAN drop-down list	The unique identifier assigned to the VSANs that exists already in the network. The ID can be between 1 and 4078, or between 4080 and 4093. 4079 is a reserved VSAN ID. You cannot configure fibre channel zoning in end-host mode.
Create VSAN link	Click the + icon to create a new VSAN in a new window. This allows you to perform the same task as in Creating a VSAN for Fibre Channel Zoning, on page 5. After creating the VSAN, you can return here and continue creating channel zone profile.
Create Storage VSAN link	Click the + icon to create a new storage VSAN in a new window. This allows you to perform the same task as in Creating a VSAN for Fibre Channel Zoning, on page 5. After creating the VSAN, you can return here and continue creating channel zone profile.
Member WWPNs	Click the + icon on the right of the table to create World Wide Port Name (WWPN). The **Create FC Zone Member** window is displayed. Enter the WWPN for this zone.

Step 6 Click **OK** for **Create FC Zone Member** window.

Step 7 Click **OK** for **Create FC User Zone** window.

Step 8 Click **OK** for **Create FC Zone Profile** window.

The new Fibre Channel Zone Profile created is listed under **FC Zone Profiles**.

Deleting a Fibre Channel Zone Profile

Perform the following procedure to delete a Fibre Channel Zone Profile.

Procedure

Step 1 In the **Navigation** pane, click **SAN**.

Step 2 On the **SAN** tab, click **Storage Cloud**.

Step 3 Click **FC Zone Profiles**.

Step 4 In the **Work** pane, right-click the name of the zone profile you wish to delete.

Step 5 Choose **Delete** and click **Yes** to confirm.

The zone profile is deleted from the system.

Deleting a Fibre Channel User Zone

Perform the following procedure to delete a Fibre Channel User Zone.

Procedure

Step 1 In the **Navigation** pane, click **SAN**.
Step 2 On the **SAN** tab, click **Storage Cloud**.
Step 3 Click **FC Zone Profiles**.
Step 4 In the **Work** pane, select the zone profile.
Step 5 Navigate to FC User Zones.
Step 6 Right-click the name of the user zone you wish to delete.
Step 7 Choose **Delete** and click **Yes** to confirm.

The user zone is deleted from the system.

Fibre Channel Storage Connection Policies

Deleting a Fibre Channel Storage Connection Policy

Procedure

Step 1 In the **Navigation** pane, click **SAN**.
Step 2 Expand **SAN** > **Policies** > ***Organization_Name***.
Step 3 Expand the **Storage Connection Policies** node.
Step 4 Right-click the policy you want to delete and select **Delete**.
Step 5 If a confirmation dialog box displays, click **Yes**.