Configuring Storage-Related Policies

This chapter includes the following sections:

Configuring vHBA Templates

vHBA Template

This template is a policy that defines how a vHBA on a server connects to the SAN. It is also referred to as a vHBA SAN connectivity template.

You need to include this policy in a service profile for it to take effect.

Creating a vHBA Template

Before You Begin

This policy requires that one or more of the following resources already exist in the system:

- Named VSAN
- WWNN pool or WWPN pool
- SAN pin group
- Statistics threshold policy

Procedure

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

Step 2 On the **SAN** tab, expand **SAN** > **Policies**.

Step 3 Expand the node for the organization where you want to create the policy.

If the system does not include multitenancy, expand the **root** node.

Step 4 Right-click the **vHBA Templates** node and choose **Create vHBA Template**.

Step 5 In the **Create vHBA Template** dialog box, complete the following fields:

Name	Description
Name field	The name of the virtual HBA template. This name can be between 1 and 16 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 has been saved.
Description field	A user-defined description of the template. Enter up to 256 characters. You can use any characters or spaces except ^ (carat), \ (backslash), > (greater than), < (less than), ' (single quote), " (double quote), ` (accent mark), or = (equal sign).
Fabric ID field	The name of the fabric interconnect that vHBAs created with this template are associated with.
Select VSAN drop-down list	The VSAN to associate with vHBAs created from this template.
Create VSAN link	Click this link if you want to create a VSAN.
Template Type field	This can be one of the following: • **Initial Template**—vHBAs created from this template are not updated if the template changes. • **Updating Template**—vHBAs created from this template are updated if the template changes.
Max Data Field Size field	The maximum size of the Fibre Channel frame payload bytes that the vHBA supports. Enter an integer between 256 and 2112. The default is 2048.
WWN Pool drop-down list	The WWN pool that a vHBA created from this template uses to derive its WWN address.
QoS Policy drop-down list	The QoS policy that is associated with vHBAs created from this template.
Pin Group drop-down list	The LAN pin group that is associated with vHBAs created from this template.
Stats Threshold Policy drop-down list	The statistics collection policy that is associated with vHBAs created from this template.

Step 6 Click **OK**.

What to Do Next

Include the vHBA template in a service profile.

Deleting a vHBA Template

Procedure

Step 1 In the **Navigation** pane, click the **SAN** tab.
Step 2 On the **SAN** tab, expand **SAN** > **Policies** > ***Organization_Name***.
Step 3 Expand the **vHBA Templates** node.
Step 4 Right-click the vHBA template that you want to delete and choose **Delete**.
Step 5 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

Binding a vHBA to a vHBA Template

You can bind a vHBA associated with a service profile to a vHBA template. When you bind the vHBA to a vHBA template, Cisco UCS Manager configures the vHBA with the values defined in the vHBA template. If the existing vHBA configuration does not match the vHBA template, Cisco UCS Manager reconfigures the vHBA. You can only change the configuration of a bound vHBA through the associated vHBA template. You cannot bind a vHBA to a vHBA template if the service profile that includes the vHBA is already bound to a service profile template.

Important If the vHBA is reconfigured when you bind it to a template, Cisco UCS Manager reboots the server associated with the service profile.

Procedure

Step 1 In the **Navigation** pane, click the **Servers** tab.
Step 2 On the **Servers** tab, expand **Servers** > **Service Profiles**.
Step 3 Expand the node for the organization that includes the service profile with the vHBA you want to bind. If the system does not include multi-tenancy, expand the **root** node.

Step 4 Expand *Service_Profile_Name* > **vHBAs**.

Step 5 Click the vHBA you want to bind to a template.

Step 6 In the **Work** pane, click the **General** tab.

Step 7 In the **Actions** area, click **Bind to a Template**.

Step 8 In the **Bind to a vHBA Template** dialog box, do the following:

a) From the **vHBA Template** drop-down list, choose the template to which you want to bind the vHBA.

b) Click **OK**.

Step 9 In the warning dialog box, click **Yes** to acknowledge that Cisco UCS Manager may need to reboot the server if the binding causes the vHBA to be reconfigured.

Unbinding a vHBA from a vHBA Template

Procedure

Step 1 In the **Navigation** pane, click the **Servers** tab.

Step 2 On the **Servers** tab, expand **Servers** > **Service Profiles**.

Step 3 Expand the node for the organization that includes the service profile with the vHBA you want to unbind. If the system does not include multi-tenancy, expand the **root** node.

Step 4 Expand *Service_Profile_Name* > **vHBAs**.

Step 5 Click the vHBA you want to unbind from a template.

Step 6 In the **Work** pane, click the **General** tab.

Step 7 In the **Actions** area, click **Unbind from a Template**.

Step 8 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

Configuring Fibre Channel Adapter Policies

Ethernet and Fibre Channel Adapter Policies

These policies govern the host-side behavior of the adapter, including how the adapter handles traffic. For example, you can use these policies to change default settings for the following:

- Queues
- Interrupt handling
- Performance enhancement
- RSS hash
- Failover in an cluster configuration with two fabric interconnects

Note For Fibre Channel adapter policies, the values displayed by Cisco UCS Manager may not match those displayed by applications such as QLogic SANsurfer. For example, the following values may result in an apparent mismatch between SANsurfer and Cisco UCS Manager:

- Max LUNs Per Target—SANsurfer has a maximum of 256 LUNs and does not display more than that number. Cisco UCS Manager supports a higher maximum number of LUNs.
- Link Down Timeout—In SANsurfer, you configure the timeout threshold for link down in seconds. In Cisco UCS Manager, you configure this value in milliseconds. Therefore, a value of 5500 ms in Cisco UCS Manager displays as 5s in SANsurfer.
- Max Data Field Size—SANsurfer has allowed values of 512, 1024, and 2048. Cisco UCS Manager allows you to set values of any size. Therefore, a value of 900 in Cisco UCS Manager displays as 512 in SANsurfer.

Operating System Specific Adapter Policies

By default, Cisco UCS provides a set of Ethernet adapter policies and Fibre Channel adapter policies. These policies include the recommended settings for each supported server operating system. Operating systems are sensitive to the settings in these policies. Storage vendors typically require non-default adapter settings. You can find the details of these required settings on the support list provided by those vendors.

Important We recommend that you use the values in these policies for the applicable operating system. Do not modify any of the values in the default policies unless directed to do so by Cisco Technical Support.

However, if you are creating an Ethernet adapter policy for a Windows OS (instead of using the default Windows adapter policy), you must use the following formulas to calculate values that work with Windows:

Completion Queues = Transmit Queues + Receive Queues
Interrupt Count = (Completion Queues + 2) rounded up to nearest power of 2

For example, if Transmit Queues = 1 and Receive Queues = 8 then:

Completion Queues = 1 + 8 = 9
Interrupt Count = (9 + 2) rounded up to the nearest power of 2 = 16

Creating a Fibre Channel Adapter Policy

Tip If the fields in an area are not displayed, click the **Expand** icon to the right of the heading.

Procedure

Step 1 In the **Navigation** pane, click the **Servers** tab.

Step 2 On the **Servers** tab, expand **Servers** > **Policies**.

Step 3 Expand the node for the organization where you want to create the policy.
If the system does not include multitenancy, expand the **root** node.

Step 4 Right-click **Fibre Channel Policies** and choose **Create Fibre Channel Adapter Policy**.

Step 5 Enter a name and description for the policy in the following fields:

Name	Description
Name field	The name of the policy. This name can be between 1 and 16 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 has been saved.
Description field	A description of the policy. We recommend that you include information about where and when the policy should be used. Enter up to 256 characters. You can use any characters or spaces except ^ (carat), \ (backslash), > (greater than), < (less than), ' (single quote), " (double quote), ` (accent mark), or = (equal sign).

Step 6 (Optional) In the **Resources** area, adjust the following values:

Name	Description
Transmit Queues field	The number of transmit queue resources to allocate. This value cannot be changed.
Ring Size field	The number of descriptors in each transmit queue. This parameter applies to Extended Link Services (ELS) and Common Transport (CT) fibre channel frames for generic services. It does not affect adapter performance. Enter an integer between 64 and 128. The default is 64.
Receive Queues field	The number of receive queue resources to allocate. This value cannot be changed.
Ring Size field	The number of descriptors in each receive queue. This parameter applies to Extended Link Services (ELS) and Common Transport (CT) fibre channel frames for generic services. It does not affect adapter performance. Enter an integer between 64 and 128. The default is 64.

Name	Description
SCSI I/O Queues field	The number of SCSI IO queue resources the system should allocate. Enter an integer between 1 and 8. The default is 1. **Note** At this time, the Cisco UCS M81KR Virtual Interface Card adapter supports only one SCSI I/O queue.
Ring Size field	The number of descriptors in each SCSI I/O queue. Enter an integer between 64 and 512. The default is 512. **Note** The number of descriptors can affect the performance of the adapter, so we recommend that you do not change the default value.

Step 7 (Optional) In the **Options** area, adjust the following values:

Name	Description
FCP Error Recovery field	Whether the system uses FCP Sequence Level Error Recovery (FC-TAPE) protocol for sequence level error recovery with tape devices. This enables or disables the Read Exchange Concise (REC) and Sequence Retransmission Request (SRR) functions on the VIC firmware. This can be one of the following: • **Disabled**—This is the default. • **Enabled**—You should select this option if your system is connected to one or more tape drive libraries. **Note** This parameter only applies to a server with a Virtual Interface Card (VIC) adapter, such as the Cisco UCS M81KR Virtual Interface Card.
Flogi Retries field	The number of times that the system tries to log in to the fabric after the first failure. Enter any integer. To specify that the system continue to try indefinitely, enter infinite in this field. We recommend you consult your storage array documentation for the optimal value for this parameter. **Note** This parameter only applies to a server with a VIC adapter, or a converged network adapter such as the Cisco UCS M71KR-E Emulex Converged Network Adapter.
Flogi Timeout field	The number of milliseconds that the system waits before it tries to log in again. Enter an integer between 1000 and 255000. The default is 4,000. We recommend you consult your storage array documentation for the optimal value for this parameter. **Note** This parameter only applies to a server with a VIC adapter or a converged network adapter.

Name	Description
Plogi Retries field	The number of times that the system tries to log into a port after the first failure. Enter an integer between 0 and 255. The default is 8. We recommend you consult your storage array documentation for the optimal value for this parameter. **Note** This parameter only applies to a server with a VIC adapter.
Plogi Timeout field	The number of milliseconds that the system waits before it tries to log in again. Enter an integer between 1000 and 255000. The default is 20,000. We recommend you consult your storage array documentation for the optimal value for this parameter. **Note** This parameter only applies to a server with a VIC adapter.
Error Detect Timeout field	The number of milliseconds to wait before the system assumes that an error has occurred. This value cannot be changed.
Port Down Timeout field	The number of milliseconds a remote Fibre Channel port should be offline before informing the SCSI upper layer that the port is unavailable. This parameter is important for host multi-pathing drivers and it is one of the key indicators used for error processing. Enter an integer between 0 and 240000. The default is 30,000. For a server with a VIC adapter running ESX, the recommended value is 10,000. We recommend you consult your storage array documentation for the optimal value for this parameter. **Note** This parameter only applies to a server with a VIC adapter.
Port Down IO Retry field	The number of times an IO request to a port is returned because the port is busy before the system decides the port is unavailable. Enter an integer between 0 and 255. The default is 8. We recommend you consult your storage array documentation for the optimal value for this parameter. **Note** This parameter only applies to a server with a VIC adapter running Windows.

Name	Description
Link Down Timeout field	The number of milliseconds the uplink port should be offline before it informs the system that the uplink port is down and fabric connectivity has been lost. Enter an integer between 0 and 240000. The default is 30,000. We recommend you consult your storage array documentation for the optimal value for this parameter. **Note** This parameter only applies to a server with a VIC adapter running Windows.
Resource Allocation Timeout field	The number of milliseconds to wait before the system assumes that a resource cannot be properly allocated. This value cannot be changed.
IO Throttle Count field	The maximum number of data or control I/O operations that can be pending in the vHBA at one time. If this value is exceeded, the additional I/O operations wait in the queue until the number of pending I/O operations decreases and the additional operations can be processed. **Note** This parameter is not the same as the LUN queue depth, which is controlled by Cisco UCS Manager based on the operating system installed on the server. Enter an integer between 1 and 1024. The default is 16. We recommend you consult your storage array documentation for the optimal value for this parameter. **Note** This parameter only applies to a server with a network adapter such as the Cisco UCS M71KR-E Emulex Converged Network Adapter or the Cisco UCS M71KR-Q QLogic Converged Network Adapter. Servers with a VIC adapter ignore this parameter.
Max LUNs Per Target field	The maximum number of LUNs that the Fibre Channel driver will export or show. The maximum number of LUNs is usually controlled by the operating system running on the server. Enter an integer between 1 and 1024. The default value is 256. For servers running ESX or Linux, the recommended value is 1024. We recommend you consult your operating system documentation for the optimal value for this parameter. **Note** This parameter only applies to a server with a VIC adapter or a network adapter.

Name	Description
Interrupt Mode field	The method used to send interrupts to the operating system from the driver. This can be one of the following: • **MSI-X**—Message Signaled Interrupts (MSI) with the optional extension. We recommend that you select this option if the operating system on the server supports it. • **MSI**—MSI only. • **INTx**—PCI INTx interrupts. **Note** This parameter only applies to a server with a VIC adapter or a network adapter running an operating system other than Windows. The Windows operating system ignores this parameter.

Step 8 Click **OK**.

Step 9 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.

Deleting a Fibre Channel Adapter Policy

Procedure

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

Step 2 On the **SAN** tab, expand **SAN** > **Policies** > ***Organization_Name***.

Step 3 Expand the **Fibre Channel Policies** node.

Step 4 Right-click the policy you want to delete and choose **Delete**.

Step 5 If the Cisco UCS Manager GUI displays a confirmation dialog box, click **Yes**.