Configuring Cisco UCS Service Profile Templates for Big Data

This chapter contains the following sections:

Cisco UCS Service Profile Templates for Big Data

Cisco Unified Computing System (Cisco UCS) service profiles are a powerful means for streamlining the configuration and management of Cisco UCS servers. They provide a mechanism for rapidly provisioning servers and their associated network connections with consistency in all details of the environment. They can be set up in advance before physically installing the servers.

Service profiles are built on policies—administrator-defined sets of rules and operating characteristics such as the server identity, interfaces, and network connectivity. Every active server in your Hadoop cluster must be associated with a service profile.

The Cisco UCS service profile template for Big Data enables you to set up the configuration for the servers in your Hadoop cluster. The service profile template for Big Data is included in a Hadoop cluster deploy template. When the deploy template is applied to the servers in your Hadoop cluster, the service profile template is used to configure one or more service profiles that are applied to the servers in your Hadoop cluster.

Note The service profile template for Big Data wizard gathers the information needed to create a service profile template. You can only apply this service profile template through the Hadoop cluster deploy template.

For more information about service profiles and service profile templates, see the Cisco UCS Manager configuration guides.

Creating a Cisco UCS Service Profile Template for Big Data

Before You Begin

Add a Cisco UCS Manager account.

Step 1   On the menu bar, choose **Solutions** > **Big Data Containers**.

Step 2   Click the **UCS SP Templates for Big Data** tab.

Step 3   Click **Add (+)**.

Step 4   On the **UCS SP Template for Big Data** page of the **Create UCS SP Template for Big Data** wizard, complete the following fields:

Name	Description
Template name field	A unique name for the template.
Template Description field	The description of the template.
Template Type drop-down list	Service profiles created from an initial template inherit all the properties of the template. Service profiles created from an initial service profile template are bound to the template. However, changes to the initial template do not automatically propagate to the bound service profiles. If you want to propagate changes to bound service profiles, unbind and rebind the service profile to the initial template.

Step 5   Click **Next**.

What to Do Next

Create a QoS policy.

Creating a QoS Policy

The quality of service (QoS) policy assigns a system class to the outgoing traffic for a vNIC or vHBA. This system class determines the quality of service for that traffic. For certain adapters, you can also specify additional controls on the outgoing traffic, such as burst and rate.

Step 1   On the **Create QoS Policy** page of the **Create UCS SP Template for Big Data** wizard, do one of the following:

• To accept the default QoS policies, click **Next**.

• To create one or more custom QoS policies, click **Add (+)** and continue with Step 2.

- To review or modify one of the default QoS policies, choose the policy in the table and click **Edit**. For information about the fields in the **Edit QoS Policy Entry** dialog box, see Step 2.

Step 2   In the **Add Entry to QoS Policy** dialog box, complete the following fields:

Name	Description
Name field	A unique name for the policy.
Priority drop-down list	Choose the priority assigned to this QoS policy. This can be one of the following: • **Fc**—Use this priority for QoS policies that control only vHBA traffic. • **Platinum**—Use this priority for QoS policies that control only vNIC traffic. • **Gold**—Use this priority for QoS policies that control only vNIC traffic. • **Silver**—Use this priority for QoS policies that control only vNIC traffic. • **Bronze**—Use this priority for QoS policies that control only vNIC traffic. • **Best Effort**—Do not use this priority. It is reserved for the Basic Ethernet traffic lane. If you assign this priority to a QoS policy and configure another system class as CoS 0, Cisco UCS does not default to this system class. It defaults to the priority with CoS 0 for that traffic.
Burst(Bytes) field	The normal burst size for servers that use this policy. This field determines the maximum size of traffic bursts beyond which the traffic is considered to exceed the rate limit. The default is 10240. The minimum value is 0, and the maximum value is 65535. This setting is not applicable to all adapters.

Name	Description
Rate drop-down list	Choose the expected average rate of traffic. Traffic that falls under this rate will always conform. This can be one of the following: • **line-rate**—Equals a value of 0 and specifies no rate limiting. This is the default value. • **Specify Manually**—Enables you to specify the rate in a field. The minimum value is 0, and the maximum value is 40,000,000. The granularity for rate limiting on a Cisco UCS M81KR Virtual Interface Card adapter is 1 Mbps. The adapters treat the requested rate as a "not-to-exceed" rate. Therefore, a value of 4.5 Mbps is interpreted as 4 Mbps. Any requested rate of more than 0 and less than 1 Mbps is interpreted as 1 Mbps, which is the lowest supported hardware rate limit. Rate limiting is not applicable to all adapters. For example, this setting is not supported on the Cisco UCS VIC-1240 Virtual Interface Card.
Host Control drop-down list	Decides whether Cisco UCS controls the class of service (CoS) for a vNIC. This setting has no effect on a vHBA. This is set to**None**—Cisco UCS uses the CoS value associated with the priority selected in the Priority drop-down list regardless of the CoS value assigned by the host.

Step 3 Click **Submit**.

Step 4 Click **Next**.

What to Do Next

Create a VLAN policy.

Creating a VLAN Policy

The VLAN policy creates a connection to a specific external LAN in the underlying infrastructure of a Hadoop cluster that is within a single Cisco UCS domain. The VLAN isolates traffic to that external LAN, including broadcast traffic.

Step 1 On the **Create VLAN Policy** page of the **Create UCS SP Template for Big Data** wizard, do one of the following:

- To accept the default VLAN policies, click **Next**.

- To create one or more custom VLAN policies, click **Add (+)** and continue with Step 2.

- To review or modify one of the default VLAN policies, choose the policy in the table and click **Edit**. For information about the fields in the **Edit VLAN Policy Entry** dialog box, see Step 2.

Step 2   In the **Add Entry to VLAN Policy** dialog box, complete the following fields:

Name	Description
VLAN Name field	The name of the VLAN policy.
Fabric ID drop-down list	Choose how the VLAN should be configured. This can be one of the following: • **Common/Global**—The VLAN maps to the same VLAN ID in all available fabrics. • **Fabric A**—The VLAN maps to a VLAN ID that exists only in fabric A. • **Fabric B**—The VLAN maps to a VLAN ID that exists only in fabric B.
Sharing drop-down list	By default, it is set to **None**.

Step 3   Click **Submit**.

Step 4   Click **Next**.

What to Do Next

Create a vNIC policy.

Creating a vNIC Policy

The vNIC policy defines how a vNIC on a server connects to the LAN. Each server in a Hadoop cluster requires a vNIC policy for each of the following NICs:

- MGMT

- DATA

- HDFS

Step 1   On the **Create vNIC Policy** page of the **Create UCS SP Template for Big Data** wizard, do one of the following:

- To accept the default vNIC policies, click **Next**.

• To create one or more custom vNIC policies, click **Add (+)** and continue with Step 2.

• To review or modify one of the default vNIC policies, choose the policy in the table and click **Edit**. For information about the fields in the **Edit vNIC Policy Entry** dialog box, see Step 2.

Step 2   In the **Add Entry to vNIC Policy** dialog box, complete the following fields:

Name	Description
vNIC Name field	Name of the vNIC.
Fabric ID drop-down list	Choose the fabric interconnect with which the vNICs created with this policy are associated.
	If you want vNICs created from this policy to be able to access the second fabric interconnect when the default one is unavailable, check the **Enable Failover** check box.
	Do not enable vNIC fabric failover under the following circumstances:
	Note • If the Cisco UCS domain is running in Ethernet Switch Mode, vNIC fabric failover is not supported in that mode. If all Ethernet uplinks on one fabric interconnect fail, the vNICs do not fail over on other fabric interconnect.
	• If you associate one or more vNICs created from this template with a server that has an adapter, which does not support fabric failover, such as the Cisco UCS 82598KR-CI 10-Gigabit Ethernet Adapter, Cisco UCS Manager generates a configuration fault when you associate the service profile with the server.
VLANs area	In the VLANs area, do the following to select the VLAN to be assigned to vNICs created from this policy:
	1 Click **Add**.
	2 In the **Add Entry to VLANs** dialog box, complete the following fields:
	• **Name** drop-down list—Choose the VLAN that you want to associate with the vNIC template.
	• **Set as Native VLAN** check box—Check the check box if you want this VLAN to be the native VLAN for the port.
	3 Click **Submit**.

Name	Description
MTU field	The MTU, or packet size that must be used by the vNICs created from this vNIC policy. Enter an integer between 1500 and 9216. **Note** If the vNIC template has an associated QoS policy, the MTU specified here must be equal to, or less than the MTU specified in the associated QoS System class. If this MTU value exceeds the MTU value in the QoS system class, packets might be dropped during data transmission.
Pin Group drop-down list	This is a *display-only* field.
Adapter Policy field	This field is auto-populated with **Linux**.
Dynamic vNIC Connection Policy drop-down list	This is a *display-only* field.
QoS Policy drop-down list	Choose the quality of service policy that must be used by the vNICs created from this vNIC policy.
Network Control Policy drop-down list	This is a *display-only* field.

Step 3   Click **Submit**.

Step 4   Click **Next**.

What to Do Next

Create a boot order policy.

Creating a Boot Order Policy

The Cisco UCS Manager boot policy overrides the boot order in the BIOS setup menu, and determines the following:

- Selection of the boot device
- Location from which the server boots
- Order in which boot devices are invoked

Step 1   On the **Create a Boot Order Policy** page of the **Create UCS SP Template for Big Data** wizard, set the order in which you want the following devices to boot:

- **CD-ROM**

- **Storage**

- **LAN**

If you do not want to boot from a specific device, choose the blank space at the bottom of the drop-down list.

Note   If you are booting for the first time, choose **1** for the LAN drop-down list to set it as the first boot device.

Step 2   In the **Select vNIC Policy for LAN Ethernet** pane, click **Add (+)**.

Step 3   In the **Add Entry to Select vNIC Policy for LAN Ethernet** dialog box, do the following:

a) From the **Select vNIC** drop-down list, choose the vNIC that you want to assign to the LAN.

b) If you want the VLAN shown in the **VLAN** field to be the primary VLAN, check the **Set as Primary** check box.

c) Click **Submit**.

Step 4   If you want to choose vNIC policies for other VLANs, repeat Steps 2 and 3 with a different vNIC from the **Select vNIC** drop-down list.

Step 5   Click **Next**.

What to Do Next

Create a BIOS policy.

Creating a BIOS Policy

The BIOS policy automates the configuration of certain BIOS settings for the servers in your Hadoop cluster.

Note   All the drop-down lists on this page are set to **Platform Default—**The BIOS uses the value for this attribute contained in the BIOS defaults for the server type and vendor.

Step 1   On the **Create UCS BIOS Policy** page of the **Create UCS SP Template for Big Data** wizard, do the following:

Name	Description
Quiet Boot drop-down list	Decides what the BIOS displays during Power On Self-Test (POST).
Post Error Pause drop-down list	Decides what happens when the server encounters a critical error during POST.
Resume AC on Power Loss drop-down list	Decides how the server behaves when power is restored after an unexpected power loss.
From Panel Lockout drop-down list	Decides whether the power and reset buttons on the front panel are ignored by the server.

Step 2   Click **Next**.

What to Do Next

Create a Local Disk Configuration Policy.

Creating a Local Disk Configuration Policy

This policy defines the disk configuration for disk storage local to the server and provides a flexible mechanism to define the RAID levels or JBOD configuration for name nodes and data nodes resident in a Hadoop cluster. This policy enables you to set a local disk configuration for all servers associated with a service profile.

Step 1   On the **Local Disk Configuration Policy** page of the **Create UCS SP Template for Big Data** wizard, review the following fields:

Name	Description
Configure RAID Policy table	RAID level configuration for Hadoop NameNode and DataNode (OS and data drives).

Step 2   Click **Submit**.

What to Do Next

Create a Hadoop cluster profile template.

Editing RAID Policy

Use this procedure to edit the disk configuration of local disk drives attached to the hardware RAID controller for C220 and C240 M3/M4 servers as well as the standalone boot drives on the C240 M4 servers.

Before You Begin

Create a Local Disk Configuration Policy.

Step 1   On the **Local Disk Configuration Policy** page of the **Create UCS SP Template for Big Data** wizard, choose the node type in the **Configure RAID Policy** table.

Step 2   In the **Configure RAID Policy** table, click the **Edit selected entry in the table below** icon.

Step 3   In the **Edit Configure RAID Policy Entry** dialog box, complete the following fields:

Name	Description
Node Type	The selected node type.

Name	Description
OS Disks	
Use HDD drives on M4 servers with insufficient standalone boot drives check box	Check this check box for M4 servers with insufficient standalone boot drives.
Use standalone boot drives for M4 Servers check box	By default, this option is checked and disabled. Check this check box for M4 servers with sufficient standalone boot drives.
Use JBOD (Just a Bunch Of Disks) for M4 Servers check box	Check this check box for M4 servers with multiple hard drives.
RAID Level [OS] drop-down list	Choose the RAID level for the OS (operating system) disks.
Disks Per Groups field	Specifies the number of disks that can exist per group during RAID configuration.
Wrire Mode drop-down list	Choose either **Write through** to write data without the RAID controller cache or **Write back** to write data with the cache.
Read Mode drop down-list	Choose the method to read data from the disks.
Use Cache check box	Check the **Use Cache** check box that allows you to use the RAID controller cache to read and write operations.
Use Cache if Bad BBU check box	Check the **Use Cache if Bad BBU** check box if the Battery Backup Unit (BBU) is not available for any reason that allows you to disable **Write back** and turn on **Write Through**.
Strip Size (MB) drop- down	Choose the strip size in MB, the data that is residing on each disk in the stripe.
Data Disks	
Use JBOD (Just a Bunch Of Disks) for M4 Servers check box	Check this check box for M4 servers with multiple hard drives.
RAID Level [DATA] drop-down list	Choose the RAID level for the Hadoop data disks.
Disks Per Groups field	Specifies the number of disks that can exist per group during RAID configuration.
Wrire Mode drop-down list	Choose either **Write through** to write data without the RAID controller cache or **Write back** to write data with the cache.

Name	Description
Read Mode drop down-list	Choose the method to read data from the disks.
Use Cache check box	Check the **Use Cache** check box that allows you to use the RAID controller cache to read and write operations.
Use Cache if Bad BBU check box	Check the **Use Cache if Bad BBU** check box if the Battery Backup Unit (BBU) is not available for any reason that allows you to disable **Write back** and turn on **Write Through**.
Strip Size (MB) drop- down	Choose the strip size in MB, the data that is residing on each disk in the stripe.

Step 4   Click **Submit**.

Cloning a Cisco UCS Service Profile Template

Step 1   On the menu bar, choose **Solutions** > **Big Data Containers**.

Step 2   Click the **UCS SP Templates for Big Data** tab.

Step 3   Click the row for the template that you want to clone.

Step 4   Click **Clone**.

Step 5   In the **UCS SP Template Specification** page of the Clone UCS SP Template for Big Data wizard, do the following:

    a) Enter a unique name and description for the new service profile template.

    b) Click **Next**, review the information on each page, and modify, if required.

    c) Click **Submit**.